

Dissociation in Non-Affective Psychosis: A Felt Sense of Anomaly

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Abstract

Centuries after it was first described, dissociation is one of the most poorly understood constructs in clinical psychology. Used interchangeably to signify either a symptom or an aetiological process, the term 'dissociation' has attracted multiple definitions incorporating a diverse range of experiences. The confusion conceptualising dissociation, as well as longstanding debates arising from significant theoretical and socio-historical challenges in the field, have contributed to the under-recognition of dissociative phenomena across clinical settings, and to difficulties researching the topic. As a result, the psychological mechanisms underpinning dissociation remain unknown. More precisely, to date, there are no cognitive models explaining the development or maintenance of dissociation that have been developed through extensive causal testing of proposed factors, and accordingly, there are no translational psychological treatments specifically targeting this construct. Furthermore, due to its importance in the field of trauma, dissociation has rarely been explored as a transdiagnostic experience in its own right, nor has there been full consideration of its influence across the spectrum of psychological distress. This omission may be particularly important in the field of psychosis, where there is increasing evidence that dissociation has robust links with positive psychotic symptoms, such as paranoia, delusions, and hallucinations. Dissociative experiences have even been implicated as a possible cause of such difficulties, as they create conditions ripe for uncertainty, misinterpretation, and distress. In the same way, dissociation has been suggested to sustain psychotic symptoms. Therefore, under-recognised in its own right, dissociation has until

recently also been under-recognised in terms of its importance in psychosis, and is only now being explored as a potential novel treatment target.

In order to overcome the legacy of decades of entrenched debates and confusion, new approaches to exploring dissociation are needed. Network analyses are based on network theory, which proposes that mental health problems can be understood in terms of patterns of activation between symptom ‘nodes’ connected in a network of conditional dependencies. Such analyses are gaining increasing popularity in mental health research and may be well-suited to providing fresh insights into dissociation as they allow the estimation and visualisation of inter-correlations between multiple variables at once. Some forms of network analysis may also benefit the field through the generation of novel testable hypotheses: directed acyclic graphs estimate the probable direction of effect between correlated variables using statistical probability and may therefore be particularly valuable in early-stage research.

Aims

The aims of this thesis are to clearly define the phenomenon of dissociation, demonstrate its importance in psychosis, and begin a scientifically robust interrogation of the construct which will inform the future development of a cognitive model. In order to achieve this, the first half of the thesis develops tools required for valid research from a cognitive perspective: a precise definition of the construct, and two self-report measures with which to assess dissociation and cognitive appraisals of dissociative experiences. In the second half of the thesis, state-of-the-art network analyses are used to locate dissociation within the wider context of mental health (including in relation to both common affective and psychotic experiences), and to begin determining the psychological factors underlying dissociation. Finally, key findings of the thesis are tested in the context of psychosis.

Methods

Data were collected from four participant cohorts: a small psychosis patient group (n=12, Chapter Two), two large online general population samples (*‘Mapping Dissociation in Mental Health’*: n>8000, Chapters Three and Five; and *‘Understanding Dissociative Experiences’*:

n>8000, Chapters Four and Six), and a large psychosis patient group (*'Exploring Unusual Feelings'*, n=1038, Chapters Three, Four and Seven).

Chapter Two uses a qualitative study of twelve NHS patients with psychosis diagnoses to better understand the lived experience, and hence describe the construct of, dissociation in psychosis. In Chapter Three, a systematic review of dissociative measures is carried out and triangulated with the results of Chapter Two in order to propose a novel theoretical framework which describes dissociation as it will be conceptualised for the purposes of this thesis. The theoretical framework is empirically tested via factor analysis of data from the *Mapping Dissociation* survey, generating a novel self-report measure of the new conceptualisation of dissociation. This measure is then validated using data from the clinical study *Exploring Unusual Feelings*. Chapter Four introduces a second psychometric tool: a measure of cognitive appraisals of dissociation developed with data from the *Understanding Dissociative Experiences* survey and validated using data from *Exploring Unusual Feelings*. Chapter Five explores the relationship of dissociation to other mental health presentations, including psychotic and affective symptoms. Data from *Mapping Dissociation* are modelled in two network analyses – a Gaussian graphical model and a Bayesian inference with directed acyclic graphs (DAGs) model. Chapter Six uses the same analytical methods to explore the relationships between dissociation and specific psychological factors in data from *Understanding Dissociative Experiences*. Psychological factors explored in this study include affect intolerance, perseverative thinking, anxiety sensitivity, alexithymia, and body vigilance. Finally, Chapter Seven tests the key findings from the previous two chapters in a large clinical patient sample (*Exploring Unusual Feelings*).

Results

Within the context of non-affective psychosis, dissociation is described by patients as having a negative impact on their relationships with other people, and on their existing mental health difficulties, mood, cognition, daily functioning, and sense of self (Chapter Two). As well as highlighting the significant difficulty inherent in describing their highly subjective nature, the results also reveal that a common denominator of participants'

dissociative experiences is a felt sense of anomaly (FSA) where this is conceptualised as a subjective feeling of oddness or strangeness. Triangulation of these results with a systematic review carried out in Chapter Three leads to the proposition that FSA may take a number of 'forms' (e.g. unreality, unfamiliarity, detachment) and affect any of a range of 'domains' (e.g. perception of the external environment, experience of one's emotions). Empirically testing the proposed theoretical framework using factor analysis reveals seven key factors of FSA-dissociation: anomalous experiences of the self, body, and emotion, and altered senses of familiarity, connection, agency, and reality. The self-report scale developed in this chapter was found to be psychometrically robust in general population and clinical groups, and is therefore used as the primary measure of dissociation throughout the thesis.

Chapter Four develops and validates a new measure of cognitive appraisals of dissociation and demonstrates its additional explanatory power above that of FSA-dissociation alone when predicting hallucinations and paranoia scores in a clinical group using regression analyses. These results, as well as the results of Chapter Five, support the hypothesis that dissociation has a causal influence on positive psychotic symptoms. In Chapter Five, network analyses find that dissociation is a probable cause of paranoia, grandiosity, and cognitive disorganisation. Dissociation is also found to have a robust relationship with hallucinations, but as with its relationship to depression and anxiety, the direction of influence is unclear.

Network analyses in Chapter Six find direct relationships between dissociation and cognitive appraisals, safety behaviours, perseverative thinking, low general self-efficacy, and low alexithymia. Testing these candidates for potential maintenance mechanisms of FSA-dissociation in a clinical group (Chapter Seven) reveals direct relationships between dissociation and cognitive appraisals, safety behaviours, perseverative thinking, affect intolerance, and low alexithymia. The results of these network analyses also support the hypothesis that dissociation is related to lower wellbeing, and may cause psychotic symptoms: both paranoia and hallucinations had direct relationships with dissociation.

Conclusions

This thesis defines the construct of dissociation (as it is experienced in the context of non-affective psychosis) as having a core phenomenological experience of a felt sense of anomaly (FSA). Dissociative experiences of this kind are experienced as distressing, disruptive, and appear to be a probable cause of cognitive disorganisation, paranoia, and hallucinations. They may be experienced in relation to a range of ‘domains’ (e.g. one’s body or emotions) and involve different ‘types’ of anomaly (such as unfamiliarity or detachment). Appraisals of such experiences typically include fears about social, biological, or psychological ill effects, as well as concerns about lack of control or agency. Such appraisals are important in the development and maintenance of dissociative experiences and may partially explain the effect of dissociation on psychotic symptoms.

Dissociation may also play an important causal role within the broader field of mental health, including having a direct negative effect on general mental wellbeing, and therefore merits greater consideration within the fields of psychiatry and psychology. This thesis contributes to an evidence-based cognitive understanding of dissociation, and identifies psychological factors that may maintain dissociation (perseverative thinking, self-efficacy, and alexithymia) but which require further testing with experimental designs. An implication of the work outlined here is that dissociation may arise from two interacting processes: rumination upon catastrophic appraisals of dissociative experiences, and cognitive responses to emotion in the context of heightened affect sensitivity. Of clinical relevance, FSA-dissociation appears to be commonly experienced in psychosis and non-clinical participant groups, and may result in sensations and metacognitions of being mentally and emotionally ‘overwhelmed’.

Future research should seek to verify the maintenance processes proposed in this thesis and determine how best to disrupt them, with a view to developing an evidence-based translational psychological intervention for dissociation. The results of this thesis imply that such an intervention would not only be welcomed by people experiencing dissociation, but that it may also be a potential novel treatment for psychotic symptoms.

Declaration

The work described in this thesis was carried out between October 2017 and December 2020 under the supervision of Professor Daniel Freeman and Professor Anke Ehlers. The work in this thesis is my own, with only the exceptions listed below:

- The statistical analysis of non-clinical data in Chapter 3 was carried out by Dr Esther Beierl.
- The statistical analysis of non-clinical data in Chapter 4 was carried out in collaboration with Dr Jessica C. Bird.
- The Bayesian inference with directed acyclic graphs analysis in Chapter 5 was carried out in collaboration with Assoc. Professor Robin Evans.

I declare that the work presented in this thesis has not been submitted for any other degree, in this or in any other university or institute of learning.

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Finally, and most importantly, thank you to the participants of the studies in this thesis. I have learnt so much and am so grateful for your time. I was blown away by the enthusiasm and encouragement from the twelve generous people who took part in the qualitative study in Chapter Two, and by the surprising number of people who emailed me after taking part in an online survey. It is incredibly heartening to receive kind words from a stranger, and motivating beyond anything else for those words to express how much the work you’re engaged in is wanted and needed. Daniel once challenged me after a bad journal review to identify what I’m doing this work for – and since all the chapters in this thesis begin with a quotation, I will end this acknowledgments section with one:

*‘Unless someone like you
cares a whole awful lot,
nothing is going to get better.
It’s not.’*

- *The Lorax, Dr Seuss.*

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1 Introduction: The Current Understanding of Dissociation

*'The real voyage of discovery consists not in seeking new landscapes,
but in having new eyes.'*
(Proust)

The history of dissociation as a psychiatric concern began in nineteenth century Paris, at the Pitié-Salpêtrière hospital, when new case studies by Jean-Martin Charcot and Pierre Janet sparked international interest (Putnam, 1989). Since those first descriptions of 'hysteria', the construct of dissociation has been debated and reconceptualised many times, falling in and out of favour as a focus of mainstream clinical and research efforts (Wright, 1997). Currently, dissociation research output is slowly building again, indicating a possible new wave of increased interest. With the recent growing emphasis on trauma-informed care (Isobel, 2016), and in the context of contemporary psychiatry's greater consideration of psychosocial factors in understanding complex mental health difficulties (Craddock et al., 2018), many researchers and clinicians are now re-visiting this 'neglected' (p.1; Şar, 2011) construct from a fresh perspective.

Dissociation causes significant distress but is critically under-recognised

Dissociative symptoms are reported at a high rate transdiagnostically (Lyssenko et al., 2018) – for example, at a rate of twelve percent in eating disorders (Vanderlinden, Vandereycken, Van Dyck & Vertommen, 1993), and above fifty percent in borderline

personality disorder (Korzekwa, Dell, Links, Thabane & Fougere 2009). Such ubiquity is significant, as dissociative symptoms may be a predictor of clinical severity (La Mela, Maglietta, Castellini, Amoroso & Lucarelli 2010) and non-responsiveness to standard treatment (Bae, Kim & Park, 2016). This suggests that throughout mental health services, undetected and untreated dissociative symptoms may be part of the reason why treatments can fail, resulting in repeat referrals, and ultimately, adding to increased treatment costs – although better quality evidence is required to evaluate this fully (Langeland et al., 2020). In terms of human impact, dissociation may therefore also be partly responsible for patients' confusion and demoralisation after routine treatment approaches have failed to improve wellbeing, and may lead to people believing that they are beyond help (DPD Diaries, 2018).

These difficult experiences may be a contributing factor in the high risk to self associated with dissociation. Non-suicidal self-injury is elevated in adult outpatients who meet dissociative disorder criteria or have dissociative experiences (Calati, Bensassi & Courtet, 2017), and is robustly associated with dissociation in adolescents (Černis, Chan & Cooper, 2019). In a general outpatient psychiatry sample, meeting criteria for a dissociative disorder was found to be the strongest predictor of a person making multiple suicide attempts (Foote, Smolin, Neft & Lipschitz, 2008). Rates of attempted suicide may even be as high as seventy-eight percent in dissociative identity disorder (DID; Ross, 1997), one of the most severe forms of dissociative disorder.

These statistics illustrate that people experiencing dissociation require effective, specific clinical support. However, current evidence indicates that not enough receive it. There are warnings that dissociative symptoms remain consistently under-recognised or misidentified by clinicians (Bailey & Brand, 2017; Şar, 2011), and at the time of writing, no National Institute for Health and Care Excellence (NICE) guidelines exist for the treatment of dissociation or dissociative disorders (such as

depersonalisation disorder; DPD). In the United Kingdom, only one specialist NHS clinic exists for the specific treatment of DPD in adults, and there is no specialist NHS provision for people under the age of 18 experiencing dissociative disorders. Where NHS Trusts are developing local provision for dissociation, these currently focus on identifying DID cases within trauma care pathways, and frequently rely upon a small number of private specialist centres for consultation and training (Dr R. Andrews, personal communication, November 5, 2020). This shortfall in care provision was recently raised in the House of Commons, where it was highlighted that patients in the UK wait eight to twelve years to receive a diagnosis of DPD and that improvements in the understanding and treatment of dissociative disorders are urgently needed (HC Deb 12 March 2019).

The predicament in which the field of dissociation finds itself today can be viewed in the light of decades of complex sociohistorical and scientific context. Whilst a full exploration is outside the scope of this thesis, there are two particular key themes in understanding the unique challenges for clinical research in this area. Firstly, controversy in the late twentieth century that damaged the reputation of dissociation with clinicians outside the field and left a legacy of enduring scepticism. Secondly, and relatedly, the decades-long conflict amongst those within the field that has resulted in a research environment that is arguably inimical to new ideas to a degree.

Scepticism: The ‘recovered memory’ controversy

Emerging from obscurity after being left behind in the surge of new psychoanalytic thinking, dissociation enjoyed a second peak of interest in the mid-twentieth century when clinicians seeking to understand trauma responses revisited Janet’s ideas. Renewed vigour built rapidly as media portrayals of multiple personality disorder (MPD, now known as dissociative identity disorder; DID) brought the subject to a broader audience than ever before (Putnam, 1996). However, concerns grew about the new ‘*epidemic*’ of MPD cases, and in particular, increasing reports of ‘retrieved’

memories of childhood traumas in patients with no known trauma history (Paris, 2012). These retrieved memories were interpreted by therapists as examples of 'dissociative amnesia': that the patient's memories of abuse or neglect had been too painful to be held in conscious awareness, and had thus been 'dissociated' into a separate 'part' of them without conscious recollection (Nemiah, 1979). Such recollections of abuse were seen as support for the original nineteenth century hypothesis that autobiographical material could be 'split off' as a result of trauma, and as evidence that therapy could successfully bring dissociated content back into awareness for resolution.

However, many in the psychiatric community began to doubt the prevailing explanations of MPD as a disorder of fragmented 'self' and questioned the role therapists might be (unwittingly) playing in these cases. Sceptical about the volume of retrieved trauma memories, these commentators proposed that during therapy, even gentle well-intentioned questioning regarding the possibility of past trauma or additional 'personalities' could influence a highly suggestible client and crystallise into new developments in their presentation (Lindsay & Briere, 1997).

Demonstrations of the ease with which 'false memories' could be produced were highlighted as a counter-argument to dissociative amnesia (Lynn et al., 2014), and the suggestion made that MPD (DID) presentations need not be caused by trauma at all (Spanos, 1994).

To the most sceptical, false memory research was the final proof that MPD was an iatrogenic problem. Against a backdrop of revelations that case studies had been exaggerated for media portrayals, and reports of patients' presentations worsening during therapy, many concluded that MPD was a factitious disorder and that patients presenting with MPD were malingering, facilitated by naïve practitioners who believed the disorder was real (Paris, 2012). A 'highly publicized backlash'

against mental health practitioners ensued (Loewenstein, 2018); the wave of mainstream interest in dissociation had broken.

The overt scepticism about dissociative presentations that arose in this context still presents a considerable challenge for dissociation research to this day. In practical terms, current diagnostic interviews for the assessment of ‘general psychiatric psychopathology’ typically omit dissociation altogether (Şar, 2011), perpetuating dissociation’s exclusion from the broader narrative in psychiatry. In terms of clinicians’ attitudes, whilst concerted efforts continue to be made to repair the damaged reputation of the field and rebuild clinicians’ acceptance of the construct of dissociation, many nevertheless *‘have beliefs about dissociation ... founded on unexamined ideas and influenced by media portrayals’* (Loewenstein, 2018; p.229).

Stagnation: The Trauma Model versus Fantasy Model

Amid the overt scepticism which denied the veracity of MPD, a number of theorists proposed that MPD patients were not deliberately malingering, but that their presentations were also not necessarily traumagenic. A view of MPD (DID) as an iatrogenic condition of people prone to ‘fantasy’ and suggestibility (Lynn et al., 2014) – dubbed the ‘fantasy model’ (Dalenberg et al., 2012) – gained traction, and is still strongly held by many today (Piper & Merskey, 2004). This is important to the current landscape of dissociation research, since the argument between proponents of the fantasy model (FM) and trauma model (TM) has dominated the literature for decades, and *‘has stymied progress in understanding dissociation as much, if not more, than it has inspired research that transcends a single perspective’* (p.1, Lynn et al., 2019).

The original FM holds that dissociation is the result of cognitive failures, high trait fantasy proneness, and suggestion. It proposes that people who mistrust their memory, are forgetful, easily distracted (Giesbrecht, Lynn, Lilienfeld & Merckelbach, 2008), and who may have other psychological difficulties (such as ‘High Negative

Emotionality'; Lynn et al., 2014) are especially susceptible to media and sociocultural influences at the broader level of influence (Lynn et al., 2014), and '*inadvertent therapist cueing*' (Lynn, Lilienfeld, Merckelbach, Giesbrecht & van der Kloet, 2012) at a more proximal level. The FM therefore argues that the relationship between trauma and dissociation is false, or at best '*artificially inflate[d]*' (Giesbrecht et al., 2008) because these factors produce over-reporting of trauma via '*pseudo-memories*' and '*confabulation*' (Giesbrecht et al., 2008).

As the FM model developed, somewhat less emphasis was placed on fantasy proneness as the key factor of interest, and it has since become known as the '*sociocognitive model*' (SCM; Spanos, 1994). This model holds a less sceptical stance than the original FM, but its proponents still argue that the TM misrepresents the links between trauma and dissociation. SCM proponents' main criticism of the TM literature is that it relies too much upon correlational associations to draw conclusions about aetiology, without adequately considering other possible causes or addressing possible over-reporting of trauma (Lynn et al., 2014). SCM theorists therefore dispute the idea that trauma is the (sole) cause of dissociative presentations and argue that the role of trauma has been over-stated to the exclusion of other possibilities. From the SCM perspective, DID is understood as '*a disorder of self-understanding*' (Lynn et al., 2014), and other dissociative experiences as the result of '*subtle deficits in neuropsychological performance*' (Giesbrecht et al., 2008).

On the other side of the debate, the '*trauma model*' (TM) has its roots in Janet's nineteenth-century conceptualisations of dissociation. This model proposes that dissociation arises as a form of protective post-traumatic response to early pain and abuse (Spiegel, 1984), which may then become relied upon as a key coping mechanism in later life (Steinberg, 1995). Depending on how dissociation is conceptualised, this may involve a physiological defence cascade (Schauer & Elbert, 2010), a particular information processing style (Dorahy, 2006), or some other

mechanism. Regardless, proponents of the TM point to consistent associations between dissociation and objective records of trauma, which remain strong even when suggestibility and fantasy proneness are statistically controlled for (Dalenberg et al, 2012).

Decades of debate between the TM and SCM have misdirected research efforts towards defending or attacking these models (or other researchers; Lindsay & Briere, 1997), and as a result, some believe that there has been ‘stymied’ progress in the field:

“[C]lashing views of dissociation have provoked considerable defensiveness on the part of proponents on both sides, inhibited rigorous self-examination of entrenched stances, and contributed to insularity and “closedness” [...] this deeply ingrained and by now predictable pattern of discourse, [...] has stifled potential expansion of the boundaries of knowledge regarding transtheoretical ways of understanding dissociation and dissociative disorders” (p.4; Lynn et al., 2019)

Thus, dissociation has perhaps become an insular field: an infertile ground for new attempts to investigate and understand the construct, disregarded by sceptics, and dissuading to those who could otherwise be valuable contributors to its progress. The net result is wide-ranging ‘neglect’ (Şar, 2014) of the field, perpetuating the aforementioned shortfall in recognition and provision of care.

Dissociation is poorly conceptualised

A further barrier to those wishing to engage with the field is the problem of understanding precisely what phenomenon (or phenomena) the term ‘dissociation’ might refer to. The dilemma of defining the boundaries of ‘dissociation’ is neatly summarised by Nijenhuis and van der Hart (2011), who state that:

‘Some understandings of dissociation are so broad that a host of common psychobiological phenomena would qualify as dissociative. Overly narrow conceptualizations of dissociation exclude phenomena that originally, and for good reasons, have been regarded as dissociative. A common lack of conceptual distinctions between dissociation as process, organization, deficit, psychological defense and symptom adds to the current confusion.’ (p.416).

This ‘*confusion*’ has resulted in several leading authors warning that the field faces a conceptualisation crisis: Allen, Console and Lewis (1999) state that ‘*the term “dissociation” has been loosely applied to such a wide range of phenomena that it is at risk of becoming virtually meaningless*’ (p. 169), whilst van der Hart and Dorahy (2009) concede that the field of dissociation is ‘*in need of some conceptual housecleaning*’ (p.21). Because dissociation has become ‘*a vague term used to describe a broad range of phenomena*’ (Marshall, Spitzer & Liebowitz, 1999, p.1681), theorists, clinicians, and researchers may be using the same term to refer to rather different phenomena, depending on which – often unstated – assumptions are being made. This undoubtedly contributes to the field’s difficulties. As previously stated, a full exploration of the strengths and limitations of the numerous definitions of dissociation is outside the scope of this thesis. However, within this variety of approaches, there are three key interlinked themes: unidimensional versus multidimensional conceptualisations; disagreement regarding the nature of dissociation; and the distinction between categorical (taxon) and continuum approaches.

The unidimensional approach views dissociation as a singular state (or trait), ‘*wherein seemingly disparate types of symptoms represent different (often severity-related) manifestations of a single underlying process*’ (Briere, Weathers & Runtz, 2005; p.222). The underlying process is described in the DSM-5 (Diagnostic and Statistical Manual of Mental Disorders, fifth edition; American Psychiatric Association, 2013) as the

'disruption of and/or discontinuity in the normal integration of consciousness, memory, identity, emotion, perception, body representation, motor control, and behaviour' (p. 291).

Factor analyses of dissociation measures that result in a single-factor solution are often cited as support for this approach (e.g. Bernstein, Ellason, Ross & Vanderlinden, 2001).

In contrast, the multidimensional approach suggests that symptom clusters indicate that there are several related, but potentially separable, constructs under the broader category of 'dissociation'. Indeed, the inclusion of distinct dissociative disorder diagnoses in the DSM-5 is viewed as support for this conceptualisation. Such diagnoses are drawing increasing research and clinical efforts: in particular depersonalisation/derealisation disorder (DP/DR) and DPD – a cluster of symptoms where the person experiences a detachment from their experience of themselves (depersonalisation) or their surrounding environment (derealisation). Theoretical, as well as diagnostic, distinctions between dissociation 'dimensions' have also been proposed. Most notably, Holmes et al. (2005) outline two distinct forms of dissociation: detachment and compartmentalisation. The former describes experiences involving altered states of consciousness, such as depersonalization, derealisation and other forms of separation from one's internal or external environment. The latter – compartmentalization – refers to deficits or loss of control in specific functions, such as in dissociative amnesia, dissociative seizures, or functional neurological symptoms. Holmes et al. (2005) state that although both forms of dissociation may exist on a spectrum of severity, they are nevertheless independent and need not co-occur. Holmes et al. – and other authors approaching dissociation from a multidimensional lens – argue that by referring to all of these categories as 'dissociation', we may be conflating separable phenomena.

Whether describing the *'manifestations of a single underlying process'*, or defining phenomena which may fall into a dissociative subtype, there lies further confusion

in that there are over a dozen different conceptualisations of the construct of ‘dissociation’ (Table 1) and clear disagreement among these. Disagreement arises not only in determining which particular symptoms may be considered ‘dissociative’, but also with respect to whether ‘dissociation’ describes a psychological symptom, aetiological process, or neurocognitive deficit. Recent authors have suggested that dissociation may be a learned or natural information processing style (Dorahy, 2006; de Ruiter, Elzinga & Phaf, 2006; Bucci, 2007), a normal transient experience that can become chronic and problematic (Hunter, Phillips, Chalder, Sierra & David, 2003), a reduction of ‘*phenomenal depth*’ (Gaebler, Lamke, Daniels & Walter, 2013), or due to the organization of one’s self-concept (Chiu, Chang & Hui, 2017), whilst many conceptualise dissociation as a post-traumatic alteration of consciousness (Bækkelund, Frewen, Lanius, Ottesen Berg & Arnevik, 2018). Over the decades, a broad range of experiences have been described as dissociative, including posttraumatic flashbacks, age regression, emotional numbing, mood swings, and medically unexplained neurological symptoms (Kennedy & Kennerley, 2013). The result is that (even within the unidimensional approach to dissociation) there is currently little clarity on what qualifies an experience as ‘dissociative’, as any unifying concept has become obscured.

Table 1. Examples of contemporary conceptualizations of dissociation, and what ‘type’ of phenomenon the author conceptualises dissociation to be.

Reference	Conceptualization	Type
Allen, Console & Lewis (1999)	Dissociation is a result of altered attention and consciousness.	Symptom
Bucci (2007)	Dissociation is a natural result of information processing.	Symptom
Chiu, Chang & Hui (2017)	Dissociation is due to a characteristic organization of self-concept.	Organization
De Ruiter, Elzinga, & Phaf (2006)	Dissociation is a style of information processing enabling heightened reconstruction ability.	Process
Dorahy (2006)	Dissociation is a learned style of processing which enables avoidance of threat information.	Process
Frewen & Lanius (2015)	Dissociation is a result of trauma-related alteration of consciousness.	Symptom
Gaebler et al. (2013)	Dissociation is due to reduced ‘phenomenal depth’.	Deficit
Holmes et al. (2005)	Dissociation is made up of two different concepts: Compartmentalization Detachment	Deficit Symptom
Hunter et al. (2003)	Dissociation is a normal transient experience that can become chronic.	Symptom
Kennedy et al. (2004)	Dissociation is a product of ‘decoupling’ of mental processes which may occur at three different stages of information processing	Symptom
Lesley (2006)	Dissociation occurs when one’s sense of agency is absent.	Deficit
Putnam (1991)	Dissociation is a psychological defence mechanism.	Defence
Rauschenberger & Lynn (1995)	Dissociation is exacerbated by fantasy proneness (“The Fantasy Model”).	Symptom
Schauer & Elbert (2010)	Dissociation is an over-rehearsed physiological fear response.	Symptom
van der Kolk & van der Hart (1991)	Dissociation is an over-rehearsed trauma coping response (“The Trauma Model”).	Defence

Adding to this complexity, some theorists disagree that all of the above symptoms exist along a continuum of severity. Waller, Putnam and Carlson (1996) state that as well as a dissociative trait, which does exist along a spectrum and explains non-pathological experiences, *pathological* dissociation is a distinct 'taxon' of experience that is limited to those with a dissociative difficulty. These authors are clear that this category is not a descriptor of a severe end of a continuum, but rather '*psychometrically distinguishable*' in a manner analogous to recognising meningitis patients within a cohort of patients with neck stiffness (p. 303). The validity of this conceptualisation has been called into question, however (Simeon, Knutelska, Nelson, Guralnik & Schmeidler, 2003; Davis Merrit & You, 2008). Further, it is not clear how other proposed subcategories of dissociation may relate to this taxon (for example, Holmes et al.'s (2005) construct of compartmentalisation).

As may be expected, the poor conceptualisation of dissociation is reflected in the instruments available to measure it. Currently available scales describe a broad range of phenomenology including experiences which have face validity for a different diagnosis (such as blunted or numbed affect), may be considered non-pathological (such as absorption or daydreaming), or those which have been argued to belong in other diagnostic categories (such as anomalous perceptions). Whilst undoubtedly making a significant contribution to the progress of dissociation research, the most widely used measure of dissociation – the Dissociative Experiences Scale (DES; Carlson & Putnam, 1993) – has notable limitations. Of key importance is its unstable factor structure (Olsen, Clapp, Parra & Beck, 2013), which stokes the unidimensional versus multidimensional debate. It is also important to note that the scale omits more subtle dissociative experiences, which have been increasingly recognised as clinically important since the initial development of the measure (Černis, Cooper & Chan, 2018).

To summarise, as a consequence of its turbulent history, many clinicians still view dissociation with scepticism or dismiss it entirely (Loewenstein, 2018). This has no doubt contributed to the omission of dissociation in broader medical and psychological thinking (Şar, 2011). It could be argued this predicament is self-perpetuating and further complicated by longstanding debates and confusion regarding the conceptualisation of dissociation, which has resulted in '*stagnated*' research progress (Lynn et al., 2019). Arguably, theorists' and researchers' '*entrenched stances*' have also created a difficult environment for new approaches to thrive (Lynn et al., 2019). Therefore, whilst there have been calls for '*innovative thinking and research*' in the field (Şar, 2014), the history of its development has created significant barriers to such work, including scepticism, under-recognition, and the confusing complexity of the field in its present '*entrenched*' state.

In spite of this, new approaches to dissociation have been emerging in recent years (Aksen, Polizzi & Lynn, 2020; Lanius et al., 2018; Scalabrini, Mucci, Esposito, Damiani & Northoff, 2020). Whilst the conceptual and contextual overlap with post-traumatic presentations is warranted and has driven progress towards the current understanding of dissociation, many researchers are now beginning to expand the field beyond this relatively narrow focus. In particular, there is increasing recognition that a fuller understanding has yet to be achieved of dissociation as a transdiagnostic construct. The growing popularity of transdiagnostic (Schaeuffele, Schulz, Knaevelsrud, Renneberg & Boettcher, 2020) and network (McNally, 2021) approaches to psychopathology have highlighted the potential importance of phenomena that reliably cluster with more disorder-specific symptoms. Dissociation is thus emerging as a construct of increasing interest as its high incidence and significant correlation to other mental health difficulties (Lyssenko et al., 2018) becomes more widely appreciated, and as the availability of more sophisticated techniques facilitate new approaches to investigation (e.g. Schimmenti & Şar, 2019). One notable emerging area of enquiry is the relevance of dissociation to psychosis.

Dissociation may be particularly important in psychosis

The first indication that dissociation may be important in psychosis is the consistent finding that dissociative experiences occur at a high rate in psychosis populations. In a meta-analysis of studies using the DES, Lyssenko et al. (2018) found a mean score of 17.8 in the pooled group of 594 participants with schizophrenia. This score is over three times the average DES score typical for the adult general population (Carlson & Putnam, 1993). Demonstrating high rates of dissociative experience regardless of specific diagnosis, Černis et al. (2014) found that sixty percent of fifty non-affective psychosis patients meeting the criteria for a persecutory delusion reported experiencing a minimum of ten different depersonalisation symptoms ‘often’ over the past six months. Similarly, a systematic review of symptom overlap between psychotic and dissociative disorders (Renard et al., 2017) concluded that schizophrenia spectrum disorder patients experience clinically significant levels of dissociative symptoms at a rate of 34% for dissociative amnesia, 48% for depersonalisation, 22% for derealisation, and 46% and 56% for identity confusion and alteration, respectively. Such research demonstrates a clear comorbidity between dissociative and psychotic phenomena. Indeed, there is a ‘*robust and well-replicated*’ association between dissociation and specific psychotic symptoms (Longden et al., 2020). In a meta-analysis of ninety-three papers, Longden et al. (2020) found strong associations between dissociation and individual psychotic symptoms, with a ‘robust’ relationship to positive psychotic symptoms in particular (all positive symptoms: $r=0.44$; hallucinations: $r=0.46$; delusions: $r=0.42$; paranoia: $r=0.45$; and cognitive disorganization: $r=0.35$).

Multiple explanatory accounts of the association between dissociation and psychosis have been put forward. One such account centres upon the importance of trauma, since dissociation is commonly conceptualised as a post-traumatic response (as above), and trauma is common in psychosis (Kilcommons & Morrison, 2005; Achim

et al., 2011). Thus, trauma could be a common cause of both dissociation and psychosis, explaining their high co-morbidity.

A second school of thought examines the way in which symptoms and experiences have been categorised as either 'psychotic' or 'dissociative'. More tentative theorists invoke the 'fuzzy' boundary between dissociation and psychosis (Renard et al., 2017) and suggest that it is difficult or even impossible to make clear categorical distinctions between the two. Consistent with a network approach to psychopathology, this approach highlights the artificial nature of current diagnostic distinctions and implies that increased diagnostic flexibility is required in future research to advance our understanding of the clustering of these symptoms. A more forceful argument is made by theorists such as Moskowitz and Corstens (2008), who state that auditory verbal hallucinations (AVH; or 'voices') should be re-categorised and henceforth considered a dissociative symptom. The argument put forward is that, since they occur outside of psychosis disorders in a manner indistinguishable from that of schizophrenia, and sometimes at higher rates than in psychotic disorders, AVH cannot be considered pathognomonic to schizophrenia. These authors therefore also dispute the current diagnostic boundaries, contending that some symptoms have fallen on the wrong side of the division between psychosis and dissociation.

A third hypothesis is that dissociation may cause psychotic experiences. In the context of post-traumatic stress in psychosis, Hardy (2017) suggests that unhelpful methods for managing post-traumatic emotional dysregulation – for example, through dissociation – serve to perpetuate psychosis. This effect occurs via the influence of dissociation on stress sensitivity, trauma-related intrusions, and coping responses. The exacerbation of these processes maintains the sense of threat integral to both PTSD and psychosis. This model reflects similar proposals by Newman-Taylor and Sambrook (2013), and Larkin and Morrison (2005) that misinterpreted

dissociative experiences (arising as a result of trauma) produce psychotic symptoms, and that dissociation employed as a coping strategy for distress maintains the sense of threat and therefore the post-traumatic and psychotic symptoms.

Notably, psychological models of positive psychotic symptoms without an explicit trauma focus also suggest that dissociation may be instrumental in the formation and maintenance of psychotic experiences. For example, Maher and Ross (1984) and Garety, Kuipers, Fowler, Freeman and Bebbington (2001) outline cognitive-behavioural models of psychotic symptoms where anomalous experiences – such as dissociative experiences – lead to a '*search for meaning*', resulting in the adoption of unusual explanatory beliefs which may later form the basis of hallucinations, delusions, and fixed ideas. Garety et al. (2001) propose (as does Freeman, 2016, in reference to persecutory delusions) that the search for meaning is initiated because the anomalous or dissociative experiences are mistakenly attributed to external factors and interpreted as significant (or threatening) in some way. This interpretation is influenced by information processing biases and pre-existing beliefs about the self, world, and others, among other psychological factors and within the context of genetic and environmental risk.

The implication of models proposing that dissociation causes psychotic symptoms is that reducing dissociation may therefore alleviate them. Recent publications reflect increasing clinical interest in addressing this hypothesis. For example, Farrelly, Peters, Azis, David and Hunter (2016) outline a protocol for a brief CBT intervention for DP/DR in psychosis, and McCartney et al. (2019) and Varese et al. (2020) demonstrate that modified CBT can improve dissociation, AVH, and post-traumatic symptoms in psychosis. In this case series, Varese et al. demonstrate significant clinical benefit in terms of AVH, dissociation distress, and mood from targeting dissociation (as well as voices and trauma) in patients experiencing psychosis with a history of interpersonal trauma.

Importantly, whether or not dissociation is truly a mechanism of psychotic symptoms, it is nevertheless a clinical problem for up to half of people with psychotic disorders and is considerably under-recognised in practice. The development of the understanding of and treatments for dissociation as a construct in its own right could therefore greatly benefit people with psychosis, and thus merit further attention and research efforts. Paradoxically, the scale of the problem of dissociation in psychosis represents an asset as well as a challenge: psychosis groups may represent a naturally 'enriched sample' within which to research the construct of dissociation, without the diagnostic challenges and confounds of recruiting patients with dissociative disorders.

Thesis aims: Developing an evidence-based understanding of dissociation using the Oxford Approach

The overview of the field presented in this chapter illustrates that dissociation is a common clinical problem related to a broader range of psychopathology than initially considered during its inception. It is a construct important both in its own right and with regards its potential effects on other presentations. Nevertheless, dissociation remains poorly conceptualised and measured and, as highlighted by Lynn et al. (2019), much remains unknown about the psychological factors underpinning it. Whilst there has been progress demonstrating the clinical value of targeting dissociation in psychosis (e.g. Varese et al., 2020), the further development and enhancement of such interventions is likely to benefit from a robust understanding of the causes and mechanisms of dissociation. However, as yet there has been no systematic exploration of the construct of dissociation in this context.

There is a precedent in psychological literature for systematic explorations of psychological constructs such that foundational theoretical and mechanistic findings can be translated into targeted clinically useful interventions. Referred to in this thesis as the ‘Oxford Approach’, this framework for treatment development demonstrated initially by Clark (1999) and Ehlers and Clark (2000) at the University of Oxford follows a series of ordinal stages to achieve the goal of a targeted, evidence-based, theoretically-grounded cognitive intervention. This approach has recently been used to develop a translational psychological therapy for persecutory delusions (Freeman, 2016).

The Oxford Approach asserts that before a disorder-specific psychological treatment can be developed, an established theoretical basis must exist first. A theoretical basis is built by clearly defining the construct of interest and identifying factors responsible for the persistence of the problem (maintenance mechanisms). Only after thorough experimental testing of the identified factors – to demonstrate their causal effect on the construct of interest – can these mechanisms be unified into a single psychological explanation (a cognitive model). Treatment protocols are then based upon this model: thus translating theoretical research into clinical intervention.

In the case of dissociation, these stages align with the research priorities outlined in a review by Spitzer, Barnow, Freyberger and Grabe (2006). The authors conclude:

‘Future research will need to focus on the following issues: a) further elaboration of the theoretical conceptualization [of dissociation]; b) empirical validation of emerging concepts; c) applying the concepts to clinical questions [...]; d) evaluation of the concepts’ utility for other domains involving dissociation e.g. ASD, PTSD or borderline personality disorder’ (p.84-85).

Therefore, the aims of this thesis are to undertake the first stages of the Oxford Approach: to clearly define the phenomenon of dissociation; demonstrate its importance in psychosis; and begin a scientifically robust interrogation of the construct which will inform the future development of a cognitive model. This will include the identification of potential maintenance mechanisms of dissociation.

Accordingly, Chapter Two will explore the phenomenological experience of dissociation as it arises in non-affective psychosis in order to inform the development of a precise definition and new theoretical framework of the construct in Chapter Three. The development of two self-report measures with which to assess dissociation (Chapter Three) and cognitive appraisals of dissociative experiences (Chapter Four) will be described. These tools developed in the first half of the thesis – a clear working definition and corresponding validated scales – will facilitate the interrogation of the construct of dissociation in the second half of the thesis. In this half, state-of-the-art network analyses will be used to locate dissociation within the wider context of mental health (including in relation to both common affective and psychotic experiences) (Chapter Five), and to begin to identify possible psychological factors underlying dissociation (Chapter Six). Finally, the key findings of the thesis will be tested in the context of non-affective psychosis (Chapter Seven). The implications of this work for the fields of dissociation and psychosis, and suggestions for further development of the ideas presented will be discussed in the conclusion of the thesis (Chapter Eight).

PART 1:

**Understanding & Measuring the Experience of
Dissociation**

2 The Phenomenology of Dissociation in Non-Affective Psychosis¹

'Whereof one cannot speak, thereof one must be silent.'
(Wittgenstein)

Chapter Abstract

Rationale

Chapter One outlined the lack of conceptual clarity around dissociation. In order to understand dissociation in the context of psychosis without prejudice from a pre-existing theoretical stance, Chapter Two explores dissociation at the phenomenological level by asking people with psychosis to describe their lived experience of the phenomenon.

Methods

Qualitative interviews were carried out with twelve NHS patients with non-affective psychosis diagnoses and experience of dissociation. Transcripts were analysed using Thematic Analysis.

Results

Dissociation involves subjective strangeness, unreality, disconnection, and shifts in perception. It is distressing, and has multiple psychosocial impacts, but can easily be overlooked due to the difficulty describing it and behavioural similarities to negative psychotic symptoms, such as social withdrawal.

Conclusions

The core subjective experience of dissociation in non-affective psychosis appears to be a felt sense of anomaly (FSA) which may relate to the internal world (thoughts, emotions, or memories), the physical body, or the external world (the environment and other people). This will be explored further in the next chapter.

¹ This chapter is adapted from the paper attached in Appendix 7.1: Černis E, Freeman D, & Ehlers A, (2020). *Describing the indescribable: A qualitative study of dissociative experiences in psychosis*. PLoS One, 15(2): e0229091. DOI: 10.1371/journal.pone.0229091

Introduction

As described in Chapter One, dissociation is a complex phenomenon, and a broad range of experiences have been considered to fall within its bounds over its long history. In this context, and with the additional challenge of inadequate training in this area (Brand, Shielke & Brams, 2017), it is understandably difficult for clinicians to be confident recognising or asking about dissociation in clinic. In research, the array of conceptualisations and the longstanding opposition between the two particular standpoints of the Trauma Model and Fantasy Model also present a barrier to understanding, communication, and ultimately, progress (Lynn et al., 2019). Therefore, the first aim of this thesis, in line with the Oxford Approach described in Chapter One, is to form a clear understanding of the phenomenon of interest.

Qualitative research may be the ideal starting point for achieving this aim. Such methods ‘answer questions about experience, meaning and perspective’ (Hammarberg, Kirkman & de Lacey, 2016), and therefore present an opportunity for patient voice to be heard by clinicians and researchers. Specifically, the inductive, ‘bottom-up’ nature of qualitative methods emphasises the value of information gained through lived experience and explores this openly without prejudice from a pre-existing theoretical stance. This is vital for improving insight into poorly understood areas, and facilitates the generation of theories and hypotheses from previously unconsidered perspectives or incorporating previously overlooked information. Due to this inherent benefit, qualitative methods are increasingly viewed as a ‘prerequisite’ for quantitative research: especially when researching ‘unchartered territory’ (Greenhalgh, 2014). In terms of levels of evidence (e.g. Murad, Asi, Alsawas & Alahdab, 2016), qualitative research may be relatively low in the hierarchy, however – as implied by the pyramid structure of this framework (and explicit in the Oxford Approach) – such work is nevertheless foundational to higher

level research. By better understanding the construct, its challenges and benefits, and its associated variables, a more detailed picture emerges upon which quantitative hypotheses can be based.

Surprisingly, there is little qualitative evidence regarding the lived experience of dissociation to guide our understanding, and none regarding the experience of dissociation in the context of psychosis. Therefore, this study sought to learn more about dissociation in non-affective psychosis by referring to patient expertise.

Specifically, the current study aimed to answer the following questions:

1. What is it like to experience dissociation (in the context of non-affective psychosis)?
2. What is the impact of dissociation?
3. What factors begin, maintain, and end dissociation in the context of non-affective psychosis?
4. What thoughts and beliefs do people with non-affective psychosis have about their dissociative experiences?

These research questions will provide insights valuable for realising the aims of the thesis. Research Question 1 asks about the phenomenology of dissociation in the context of psychosis to develop a clear unprejudiced conceptualisation of the construct, as discussed above. Research Question 2 addresses the impact of dissociation, since this is not well understood at present and may have implications for clinical practice and intervention. Finally, Research Questions 3 and 4 explore participants' lived experience using a cognitive-behavioural framework, which may yield information relevant for developing a cognitive model of dissociation in psychosis.

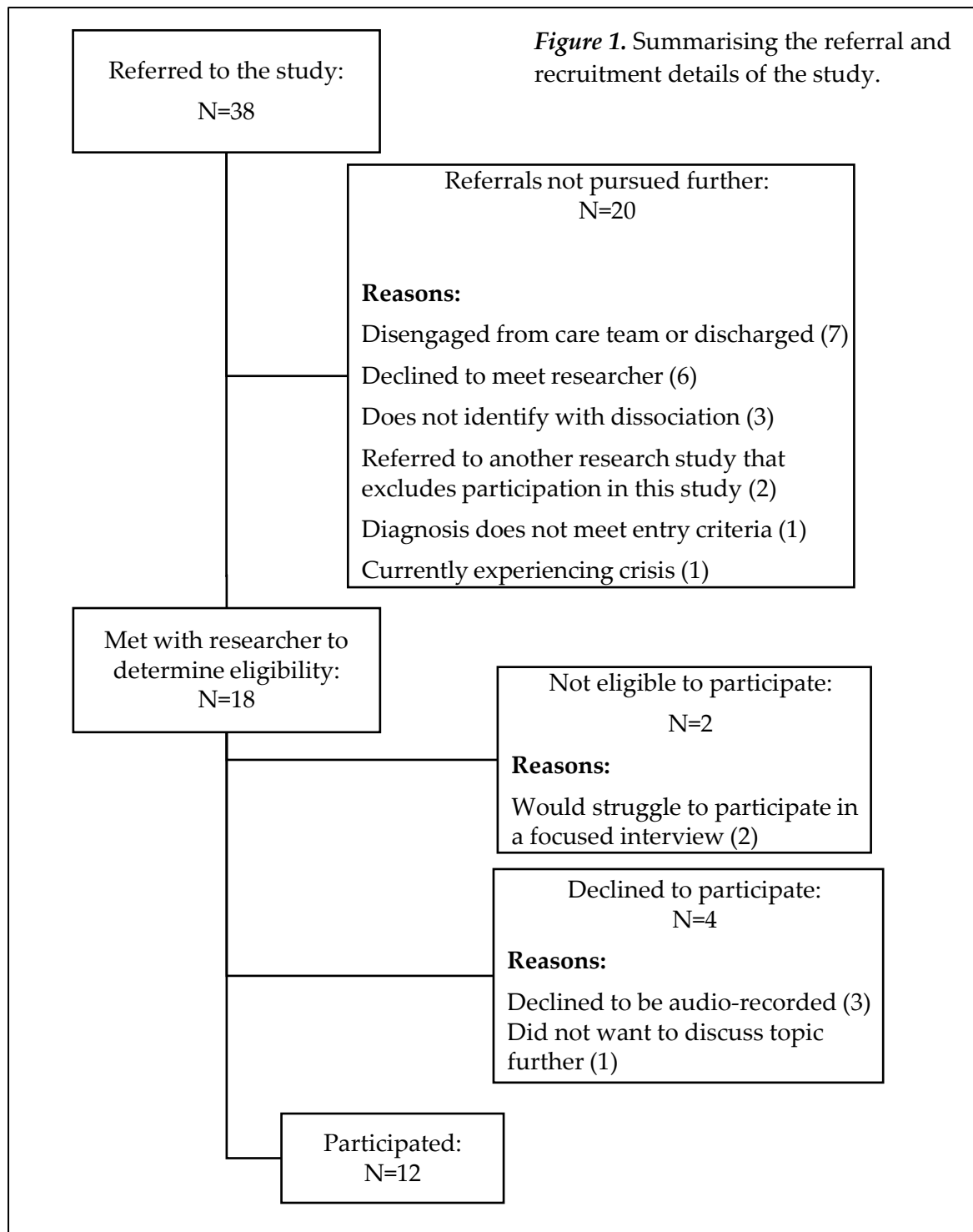
Methods

This study received ethical approval from the NHS Health Research Authority (REC reference: 18/SC/0048). All patients gave written informed consent to participate, including for the interviews to be audio-recorded and anonymised quotations to be used. A copy of the participant information sheet (PIS) and informed consent form (ICF) can be found in Appendices 1.1 and 1.2, respectively.

Participants

Twelve participants were recruited from Oxford Health NHS Foundation Trust via referral by clinical or research staff. Staff referred patients on their caseload who may have already reported dissociative experiences, or may be interested in participating. After confirming whether the person provisionally met entry criteria, staff approached the person to discuss the study and gave them a PIS. Those who were interested and felt the study may be relevant to them gave verbal consent to be contacted directly to discuss the study in further detail and arrange to meet. The aim of the 'screening' meetings was to check eligibility to participate according to the inclusion and exclusion criteria. A summary of participant recruitment is shown in Figure 1.

Inclusion criteria were: a primary diagnosis of a psychosis spectrum disorder (confirmed by the clinical team at referral, and recorded according to self-report); aged 16 or over; self-reported experience of dissociation; and a Dissociative Experiences Scale (DES-II; Carlson & Putnam, 1993) score above 5.4.



The cut-off score on the DES-II was chosen based on Carlson and Putnam's (1993) statement that a score of 5.4 is a typical mean for the general population. This cut-off was chosen because in order to include a wide range of perspectives, including those who had since improved and were no longer regularly experiencing dissociation.

Participants with general population-level scores were able to recall previous dissociative experiences clearly and discuss them in detail. In these cases, the DES score reflects that the participants had not experienced dissociation within the past two weeks, not that they had never experienced higher levels. It is of note that the majority of this sample (nine participants) scored far above the proposed average mean for Schizophrenia (DES=15.4) and within the ranges expected for dissociative disorders (Carlson & Putnam, 1993). The mean score was 36.91 (SD=20.00), indicating high levels of currently-experienced dissociation within the group.

‘Self-reported experience of dissociation’ was assessed via discussion with the participant using the items of the DES and the content of the Participant Information Sheet (PIS; Appendix 1.1) as prompts. The PIS featured a selection of eight items from the Dissociative Experiences Measure, Oxford (DEMO; Černis, Cooper & Chan, 2018) and also stated: *‘Sometimes, people have strange feelings and experiences – like feeling that they are ‘spaced out’, numb, unreal, disconnected, or ‘trapped in a bubble’. These experiences are sometimes called ‘dissociation’ or ‘depersonalisation’.* The term ‘depersonalisation’ was included in this instance since recent popular articles (e.g. Jones, May 10, 2018) have used this term and it may therefore have been heard by participants before. In the discussion regarding self-reported experience, participants were asked if they identified with any of the content in the PIS or DES, or had experienced anything similar that was not listed. They were then asked to give some brief detail in order to determine that the item had been understood as intended.

Exclusion criteria were: insufficient comprehension of English to participate; primary diagnosis of alcohol or substance dependence; primary diagnosis of personality disorder; presence of organic syndrome or learning disability; or dissociation only experienced in the context of alcohol or illicit substance use. Additionally, two people were not invited to participate following clinical

judgement of their ability to participate in a focused interview. At the initial eligibility meeting, one person was unable to identify or describe their thoughts or feelings about dissociation; and a second person struggled to disengage from other distressing topics in order to answer focused questions. Participant characteristics can be seen in Table 1 (below).

Participants were not directly asked about trauma history, nor was this screened for upon entry to the study. However, four participants disclosed life experiences or re-experiencing symptoms indicative of previous trauma during interview.

Table 1. Summarising participant characteristics.

Participant code	Gender; Age at interview	Ethnicity	Marital status	Employment status	Recorded diagnosis	DES-II score
1	M; 16	White British	Single	Student	Psychosis NOS (First Episode)	47.14
2	M; 55	White British	Single	Voluntary work	Schizoaffective Disorder	7.14
3	M; 29	White British	Married	Self-Employed	Schizophrenia	50.71
4	F; 27	White British	Married	Housewife	Schizophrenia	9.29
5	M; 40	White British	Single	Unemployed	Schizophrenia	34.29
6	M; 64	White British	Single	Retired	Schizophrenia	42.86
7	M; 18	British Asian	Single	Student	Psychosis NOS (First Episode)	33.21
8	F; 33	White British	Single	Unemployed	Schizoaffective Disorder	52.86
9	M; 42	White British	Single	Self-Employed	Paranoid Schizophrenia	38.93
10	M; 47	White British	Single	Unemployed	Paranoid Schizophrenia	51.43
11	F; 21	White British	Single	Student	Unspecified Inorganic Psychosis	68.57
12	F; 43	Mixed: Irish & African	Single	Unemployed	Schizophrenia	6.43

Procedure

Interviews were semi-structured, audio-recorded, and conducted face-to-face. Interviews took place at participants' homes or local NHS mental health team base, according to participant preference. Interviews followed a topic guide (Appendix 1.3) which was developed via consensus meetings, consultation with a Lived Experience Advisory Panel (LEAP), and a pilot interview. The LEAP panel was formed of people with experience of psychosis, and mental health services and treatments. It was initially formed by the McPin Foundation to advise on a clinical trial of a psychological intervention for psychosis. Members of this panel gave feedback on the information sheet and study design, including reviewing the topic guide. No changes were made at this stage, and the LEAP agreed with the importance of the research questions posed. One volunteer from the panel then took part in a pilot interview following the topic guide. The experience and content of this interview was discussed, and feedback subsequently incorporated into the approach taken during the study interviews (for example, that prompting for further detail was acceptable to the interviewee); no content in the topic guide was changed. The topic guide was also reviewed following the first three interviews to ensure it was still suitable. The only change made at this stage was to use participants' DES forms as an initial point of discussion if they found it difficult to answer the first open-ended question about their experience of dissociation.

The topic guide was structured according to the four research questions outlined above (*Introduction*). Interviews therefore began with an open question asking the interviewee to describe their experience of dissociation using their own words; followed by questions relating to each of the four research questions listed above; and ended with an invitation to discuss any aspects of dissociation not already covered. Interviews lasted on average one hour (range: 30 minutes to 1 hour 40). The audio recordings were transcribed and anonymised, with transcriptions checked for accuracy against the audio recording.

Method of Analysis

NVivo version 12 (QSR International, 2018) was used during the coding and analysis of data. Thematic analysis was the chosen analytic method since it has been identified as an approach well-suited to under-researched areas, enabling flexibility and detailed insight – including highlighting contradictions within the data (Braun & Clarke, 2006). Interviews were analysed using deductive thematic analysis to separate the data into the research questions posed, and then using inductive thematic analysis within each question to enable flexibility and fidelity to the data. A coding framework was developed following immersion in the transcripts of the early interviews. The framework evolved through constant comparison and modification as each new interview was added to the dataset. One example of this is that initial interviews were coded with many fine-grained ('splitter') codes (Guest, MacQueen & Namey, 2012a) (e.g. 'affects concentration', 'confusing', 'difficult to remember the truth'), which then began to be incorporated into fewer broader ('lumper') codes (Guest et al., 2012a) (e.g. 'I can't trust my head') as similar content continued to appear in later interviews. Details of the original fine-grained codes were retained in NVivo to facilitate understanding of these broader codes. Broader codes were later gathered into 'themes' according to the thematic analysis method (Braun & Clarke, 2006).

Interviews were analysed using a single primary coder, supported by discussions within the wider team about the methods involved (i.e. transitioning from fine-grained to broader codes). To reduce bias, time was taken between preliminary and review coding of transcripts (Guest, MacQueen & Namey, 2012b), and preliminary themes were reported to the LEAP partway through the study. Additionally, negative case analysis was also undertaken: 'actively sought' and 'spontaneously occurring' (Brodsky, 2008) data that contradicted a code was incorporated or added as a new code in order to reflect the complexity of dissociative experience. For

example, the sub-theme ‘negative experience: not wholly negative’ (below) arose from evidence contradicting the sub-theme ‘negative experience: fear’. However, it is important to note using a single primary coder is a source of bias (see *Discussion*).

Results

1. What is it like to experience dissociation?

See Figure 2 for a visual summary of the results for this research question.

Disconnected

All participants described being “detached” and “disconnected”. For some, this felt like being trapped in a metaphorical “box” (P8), “bubble” (P4), behind “a layer of Perspex” (P8) or experiencing life through a “keyhole” (P1). Others experienced this in a less definite way and described feeling “murky” (P6) or hazy. Whilst these sensations often related to external events, interviewees also reported detachment from internal cues: feeling “numb”, having a “blank” mind, and being “dead to feelings” (P2).

Detachment resulted in losing time (P8: “*you just don’t really feel like you’re here ... time kind of elapses*”), and feeling as though they were “going through the motions” of living whilst feeling none of the usual associated sensations:

P8: “Sometimes I can even show the right emotions, I guess, but I don’t feel them”

Feelings of disconnection also resulted in sensations of being separate from, or outside of, their body:

P5: “...and suddenly I feel a bit outside of myself, dizzy, and kind of disoriented”

Participants reported that these experiences of disconnection persisted, sometimes building in intensity, and often also felt strange and unreal (below).

Strange

Ten interviewees described the quality of the experience of dissociation as “strange”, “weird” or otherwise “*a bit disconcerting*” (P3). Two related elements appeared to contribute towards this. The first is the issue of choice or control. Participants reported not having a choice as to whether or when dissociation would occur; not having control over it once it began; and sometimes not feeling fully in control of their actions when feeling dissociated:

P5: “You try and get control of it, but it’s like a bar of soap or something, it just keeps slipping out of your hands.”

Secondly, people described dissociation as though it was a separate entity to themselves, including not identifying themselves as “them” at times:

P7: “It doesn’t feel like me, but deep down I do know it’s me. It’s not a case of: I think I’m watching through someone else – it just doesn’t feel like me.”

P6: “Like now, I’m watching myself speaking, but that’s not me.”

Interviewer: “Which bit isn’t you?”

P6: “The speaking bit. The words that are coming out seem to be coming from me, but there is something here sort of monitoring the words and saying, ‘well I suppose he’s talking about the right sort of thing’

Unreal

Sensations of strangeness and disconnection appear to contribute to another major theme of ‘unreality’. Eight people described that their surroundings, experiences, or they themselves did not feel real, or that they struggled with reality:

P6: “It’s as if what appears to be the reality around me is crumbling”

Four people even stated that they felt as though the world around them might not exist at all.

Participants described being trapped in a “*simulation*” (P1), computer (P10), video game (P9, P12), nightmare (P2), or alternate universe (P6). These examples of artificial – unreal – environments encapsulate sensations of strange unreality (externally) and the apparent lack of personal agency (internally).

Perhaps unsurprisingly, given the above, some participants described experiencing life as fragmented:

P1: “Life isn’t a coherent succession of events any more. It’s just different sort of sporadic moments which I just remember”

This was a sensation participants doubted anyone else had felt before:

P6: “I can’t imagine anyone else having the same sort of consciousness”

Changes in Perception

Interviewees commonly reported increased volume and intensely bright colours as part of their dissociative experience. Numerous reports blur the lines between anomalous perceptual experience and hallucinations:

P3: "It's sort of like old 3D films: it's got extra colours around the images."

Understandably, some interviewees found these experiences overwhelming. This "*overwhelm*" (P2) appeared to drive the "unreality" discussed above, and linked closely with the reports of being unable to cope, "*hypersensitive*" (P9), or "*fragile*" (P2).

In terms of physical perception, participants reported a lack of bodily sensation, feeling separate from the body, or even feeling they did not have a body at all:

P12: "And it didn't feel like it was my body, it just felt like- I was just sort of reflecting. Like I was a mirror or a camera or something like that. I wasn't aware that I actually had a body."

Interviewer: "But then you sit and relax and then your body starts to feel unreal?"

P10: Yeah, like it's not there.

Interviewer: [...] So it's like a whole leg has gone missing or..?

P10: Sometimes, yeah. My arm or something, yeah."

This lack of sensation (or absence of a body part) linked with sensations of lightness or floating:

P6: "It feels- I wouldn't say weightless, but you don't- there's no sensation"

Conversely, some people described dissociation in terms of heaviness, slowness or tiredness:

P3: "It can feel like trying to move through water fast"

Some described the sensation in terms of depth or distance (which at times overlapped with feelings of numbness):

P6: "I don't feel I'm outside my body, I feel I'm deep inside"

Anomalous bodily and perceptual experiences further contributed towards difficulties feeling connected to one's self:

P9: "I'm present in this body in emotions and stuff, but it ain't me: just a thing. [...] Because I don't use my facial muscles for expressions, when I do, it's like 'oh that's someone else, no, I'm not comfortable with that'."

P10: "And when I look in a mirror as well, I look like someone else all the time. I see a different person in different mirrors."

Negative Experience

The vast majority of interviewees felt that dissociation was a negative experience:

P8: "it was the worst feeling in the world".

Specifically, participants reported fear and frustration:

P2: "Everything was frightening. And I was fearful and anxious and paranoid."

P4: "Always like a frustration. I'd get so frustrated that it was happening again."

Participants also predicted that other people would be scared, upset, or worried if they understood the truth about dissociation:

P6: "I would like my head to be opened up and for me to say, 'look, this is what it's like inside', and I think people would be very frightened."

However, whilst many described the unpleasantness of dissociation, some interviewees explained sometimes the experiences could also be exciting or refreshing:

P8: "Honestly? Sometimes [it's] quite refreshing because- I think the nature of how my illness plays out sometimes that I over-care, so for a while it's quite refreshing. [...] It's quite like, 'oh okay, this is how it feels when you don't really give a shit' [...] And at first it's like, 'okay, it's quite cool, I get it', but then it's not cool. It's not cool."

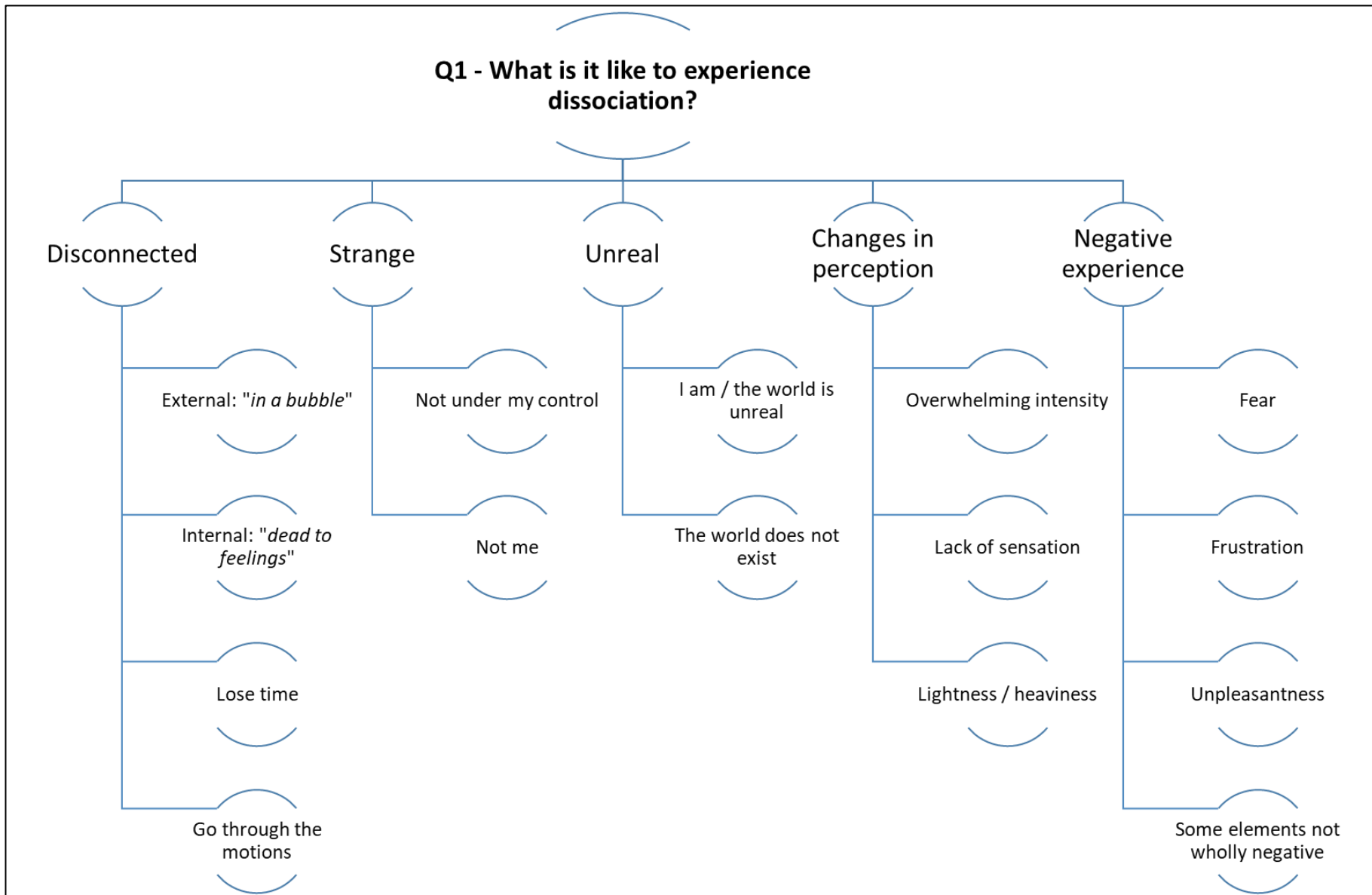
Many interviewees also described how they had become accustomed to some of their dissociative experiences, expressing apparently neutral emotional experience of dissociation:

P7: "By the evening, I'll still be a bit murky – but I'm usually murky, so it's fine."

However, Participant 6 gave an insight into how it may not be entirely neutral:

P6: "I'm so used to it I can talk about it quite blandly, although it is quite an intense feeling. I'm overwhelmed by it all the time. But because I'm so used to it, it doesn't bother me quite the same way it used to."

Figure 2. Summarising the themes for the first research question



2. What is the impact of dissociation?

See Figure 3 for a summary of the results for this research question.

Functioning

Eleven participants reported some minor difficulty with day-to-day functioning. Participant 1's summary *"I mean – I can function, it's just hard"*, appeared to be the general view. However, three interviewees reported dissociation had significantly disrupted their life (P4: *"I didn't finish my A Levels"*; P6: *"I had a year off school"*).

Interviewees described a number of specific 'in-the-moment' impairments which were associated with greater frustration or distress, such as communication (comprehension or speech generation). Two key ways in which memory was affected by dissociation were described: firstly, participants experienced absence of memory or difficulty retrieving memories:

P1: "If I go into a room, I forget how I got there or I just forget large chunks of what I do throughout the day [...] I feel like it's there, it's just being blocked."

Secondly, interviewees described feeling a lack of ownership or agency in retrieved memories:

P2: "With some things, it's like I have the memory of something, but it's more like someone's described it to me in detail, rather than me experiencing it."

Memory and communication difficulties also impacted social relationships. Participant 7 described feeling concerned that if friends discovered he could not recall meeting with them, the friends would be upset and conclude that he did not value their friendship. Concerns about inadvertently offending people in this way – or because of being under-responsive or non-communicative when feeling

dissociated – were common. Participants expressed not wanting to upset or stress their friends and family, as well worrying what people who knew them less well would make of their dissociated state. However, close friends and family can begin to recognise the signs that the person is experiencing dissociation:

P8: “She says she can always tell because I just- she says, ‘You’re just not there, it’s blank, like – there’s no character, there’s no spark, there’s no nothing. It’s like your brain’s just switched off from us’.”

Absence of Emotional Connection

Participants reported that if they did notice dissociation happening (many reported that they did not notice until it ended), they tried to “*snap out of*” (P11), “*break through*” (P8) or “*get out*” (P3) of it. Often, this was to try and re-connect with others: one of the most widely endorsed themes regarding the impact of dissociation was ‘loneliness’. Seven people reported feeling ‘*just really lonely*’ (P4) and isolated. Although this was explained as being because ‘*no-one understands*’ (P10) by a number of participants, most stated that it was a result of being unable to feel emotional closeness because of dissociation:

P4: “I would just burst into tears or just feel- and you know you’re not alone, because you’ve got everybody around you [...] but at the same time, in that moment, and in that bubble, you just feel you are the most disconnected, isolated person ever.”

Impact on Mental Health

For some, the desire to “*snap out of*” dissociation was also because of the impact it can have on mental health:

P11: “[Dissociation] can get quite linked to my mood or to a psychosis episode, so it’s important that I try and break out of it as early as I can.”

Most interviewees made a link between dissociation and anxiety, indicating that dissociative experiences lead them to worry more:

P12: “Being cut off from the real world and just sort of chattering away on my own, or staying in at home and over-thinking and ruminating and not actually – yeah, feeling part of the world.”

There were also indications that this could tip into paranoia:

P8: “I think the paranoia is where the overlap is [...] it’s very easy for the voices and the paranoia to creep in and fill your head with what could have happened, rather than knowing what did happen.”

Participant 8 was not the only person who discussed the connection between voices and dissociation. Others reported that dissociative episodes could act as a trigger for the voices starting (P11), or make them louder and more aggressive (P4). Participants 2 and 6 described hearing non-voice sounds which became part of the perceptual “*overwhelm*” described above, and which they interpreted as having a particular meaning or significance:

P6: “My hearing can change; I can hear things and I think ‘What does that mean?’ As if somebody’s trying to communicate with me a bit sometimes.”

Dissociation can therefore exacerbate worry and anxiety, which may interact with psychotic symptoms. A number of interviewees described a next stage in the sequence of events: yet more severe consequences for their mental health:

P2: “Well, I became suicidal actually”

Behavioural Responses

Participants described a range of methods for coping with dissociation. The most commonly reported was the impulse to withdraw:

P4: “It’s really hard because some days, you do just want to hide.”

When withdrawal is reported as being under the person’s control – rather than “zoning out” and “*just sit[ting] and star[ing] at nothing*” (P4) – it can take the form of having a “*lie down*” (P6), or finding another comfortable way of “*rid[ing] it out*” (P1) or “*let[ting] it go away*” (P7). This kind of withdrawal was linked to the belief that there is no way of preventing or stopping a dissociative experience and therefore the only option is to wait for it to pass.

Withdrawal was also related to the belief that stress and other intense emotion are negative and best avoided (see Question 3). This resulted in avoidance of busy social situations, sticking to familiar routines, and trying to stay “in the moment” to avoid becoming stressed:

P6: “If I can just smoothly move through the experience and not allow this hook- [gesticulates near head] -not be too aware of what’s going on, just allow it to flow through, then I can manage.”

Sometimes, therapeutic coping mechanisms – particularly grounding and sensory kits – were employed to achieve avoidance of stress. However, participants noted that while these sometimes reduced the length of time spent dissociated, they did

not prevent it happening entirely. Others noted that they forgot coping techniques when dissociated:

P12: "So one minute it's like "oh..!", next minute it's like... [makes "whoosh" motion]. It happens so quickly [...] and you forget that: "oh, I could just phone my CPN [Community Psychiatric Nurse]". I mean, you just forget things like that."

As well as physical avoidance of potentially stressful situations through withdrawal, participants also described mental avoidance of difficult thoughts or thoughts about dissociation through distraction and "keeping busy". Techniques employed included fostering a busy lifestyle, asking close friends or family provide distraction through conversation, or performing mental tasks or puzzles:

P7: "Plan meals for either the week or the next two weeks, even if I have no intention of cooking them"

Mental tasks sometimes took the form of devising tests to see whether dissociation had passed or to try and force it to pass. For example, Participant 8 recounted how they forced themselves to look at their friend's pet snake to try and invoke a fear response and "break" dissociation.

Mental avoidance of dissociation was also achieved by not talking about the experience (P3: *"I tend not to speak about it much"*). As well as feeling that no-one would understand the experience (next section), this was driven by fear of dissociation:

P6: "I think it was really I was just terrified of what was going on and I didn't trust anyone enough to talk to them about it"

Despite this high level of mental avoidance, participants also implied that they actively observed or judged their internal world during dissociation, sometimes engaging in monitoring or checking behaviours:

P7: “A case of “ok, remembering this is not real”. Well, I always knew it wasn’t real, but it’s a case of: I can see it happening, I can just sort of move past it – it’s not as if I have to stop and look at it, which was the issue before, because I needed to make sure whether or not it was happening.”

Not Knowing How to Explain the Experience

The difficulty of describing dissociative experiences and finding the appropriate words or language for them was a common theme of the interviews. Many relied upon metaphor to get their meaning across (such as the “box”, “bubble” etc. above). Ten of the twelve participants explicitly stated:

P5: “I don’t really know how to explain it”

It was therefore also a common experience for interviewees that other people did not understand what they were describing:

P8: “When you explain it, nobody gets it”

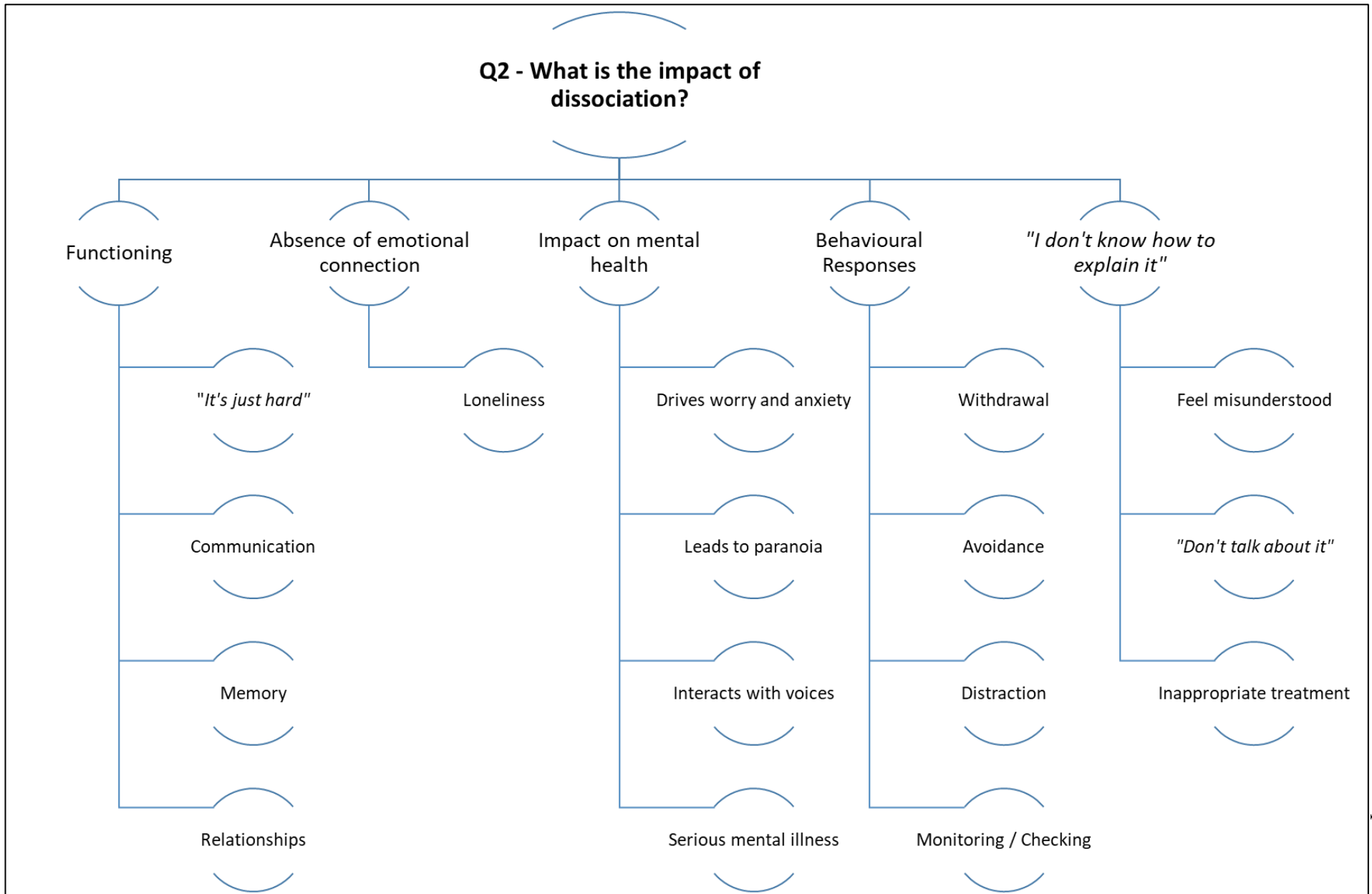
This led to people choosing not to speak about dissociation, and – if they did – professionals mistaking it for another problem, particularly depression or psychosis:

P6: “They might be related, but they’re very separate experiences to me. I think that’s fundamental. When you’re actually going through the problem, it’s very difficult to get across to somebody that you’re having two separate

qualitative experiences. I've got the mysticism [dissociation], and I've got the schizophrenia."

As well as feeling misunderstood and unheard, participants suggested that people experiencing dissociation may undergo inappropriate or irrelevant treatment (such as Participant 12, who described being on medication for bipolar disorder: "*obviously I didn't have the symptoms, so it was working on just 'me'.*").

Figure 3. Summarising the themes for the second research question



3. What factors begin, maintain, or end a dissociative experience?

See Figure 4 for a summary of the results for this research question.

Factors that Begin Dissociation

Whilst some participants stated that dissociation *“can happen completely randomly”* (P1), the majority of participants noticed that anxiety or “stress” could trigger a dissociative experience. This was true for emotional distress more broadly; including low mood, feeling “upset”, or worsening psychotic symptoms. For those who experienced voice-hearing, a number had heard voices (or “noises”) long before they had felt disconnected, one person suggested that the two came together (although they believed them to be separate phenomena), and others indicated that feeling disconnected allowed “space” for voices to intrude and worsen. A similar pattern was reported for paranoid thinking: some participants cited paranoia as causing stress and anxiety, which in turn caused them to dissociate; whilst others described feeling paranoid as a result of feeling unreal or feeling that something had been altered in themselves or their surroundings.

Participants reported that listening intently to voices, *“dwelling on a situation”* (P4) or *“getting into your own head”* (P5) by focusing on thoughts and emotions could cause dissociation. This included dwelling on dissociation itself, in which case dissociation was seen to *“trigger itself off”* (P4).

Related to internal focus, participants reported that dissociation was more likely to happen when they were alone or feeling isolated. Isolation was also noted as something that may have initially contributed to dissociation alongside stress: nine participants described dissociation beginning during a significantly stressful period in their lives – and three made explicit reference to feeling unsupported or alone during these times. These stressful periods included surviving a domestically violent

relationship, having a “*turbulent*” family life when young, being physically attacked, experiencing bereavement, and having to drop out of university due to mental ill-health and stress.

Proximal precipitating factors identified included feeling “*mentally exhausted*” (P1), “*sitting doing nothing in particular*” (P6), and feeling “*overwhelmed*” by too much mental or perceptual stimulation (including from psychotic experiences). “Feeling overwhelmed” was discussed with particular reference to emotion, which six participants reported that they “*didn’t want*”, since “*things like emotions I’ve never been able to cope with*” (P9). Such discussions also highlighted longstanding beliefs that intense emotion was potentially dangerous due to participants’ relative “*fragility*” and (in)ability to cope.

These participants explained how they tended to avoid or “*repress every single emotion*” (P11), sometimes due to beliefs about the danger of emotion:

P9: “Yeah, no, I didn’t want emotions. From the earliest I can remember.”

Interviewer: “Any particular reason why you didn’t want emotions?”

P9: “I’m uncomfortable with them.”

Interviewer: [...] “What would happen if you didn’t stop [your emotions]?”

P9: “Well, they can become so intense that you have no control over it. [...]

They’d be psychotic.”

This seems particularly relevant to the development of dissociation: some participants identified that emotion could bring on dissociation (P6: “*you get charged emotionally [...] and that can bring on layers of unreality as well*”) and therefore dissociation is “*a withdrawal from excessive emotion*” (P11). However, the exact chain of events is unclear, as some interviewees noted that avoiding emotion may actually

have led to them experiencing dissociation (P11: *"it was some form of emotional leakage"*).

Other predisposing factors identified by participants were: a tendency to daydream excessively when young, having a busy or enquiring mind (prone to dissecting events), and poor sleep. Further, participants expressed negative self-beliefs of being "bad" or "different"; these may also be predisposing factors.

Factors that Maintain Dissociation

The factors of stress, tiredness, isolation, and dwelling on internal events identified above were also cited as relevant to the persistence and re-occurrence of dissociative experiences.

Additionally, withdrawal behaviour may perpetuate dissociation: participants reported disengaging from activities which might be potentially positive because they believed it would be impossible to feel the positive emotion. This arguably continues the absence of emotional connection:

P6: "The few relationships I've had with women have been with women I've not really fancied particularly, because there's not a large emotion in my mind. If I feel a large charge of emotion, I have to back off."

The way in which participants spoke about dissociation also implied two further potential maintenance factors, although these were less clear. The first is *"being trapped in"* (P12) the experience (including losing insight). Participants reported that as a result of "being trapped", they found it difficult to respond to dissociation, which allowed the episode to continue unchecked:

P11: "There are dissociation images which are engaging ones, where I think I'm in them."

This may interact with beliefs about control over dissociation. Secondly, previous positive experiences of dissociation might promote ambivalence about dissociation and affect how someone responds when they feel it coming on:

P6: "In a way, it's sort of an adventure"

Factors that End Dissociation

Interviewees reported that dissociation can end suddenly or by slowly fading away. Two participants suggested that dissociation might never end, but rather, one's attention shifts elsewhere. Indeed, being distracted – particularly by other people talking directly to you – appeared to be one of the most common routes out of dissociation. When this was sudden, participants talked about being "snapped out of" dissociation.

Four participants reported that there was nothing that could be done to end dissociation (recalling the issue of control discussed above), and that all that could be done was to "*ride it out, sort of wait for it to finish*" (P1). However, two participants identified that they noticed dissociation had ended when they were "*not doing anything – just sort of trying to relax*" (P3).

In terms of treatment approaches, it was evident that participants welcomed support for dissociative experiences. Two participants suggested that a lack of medical intervention earlier in their lives had led to worse outcomes for their mental health, and seven participants noted that dissociation was easier to manage once they had achieved a better understanding and acceptance of it. The support of others –

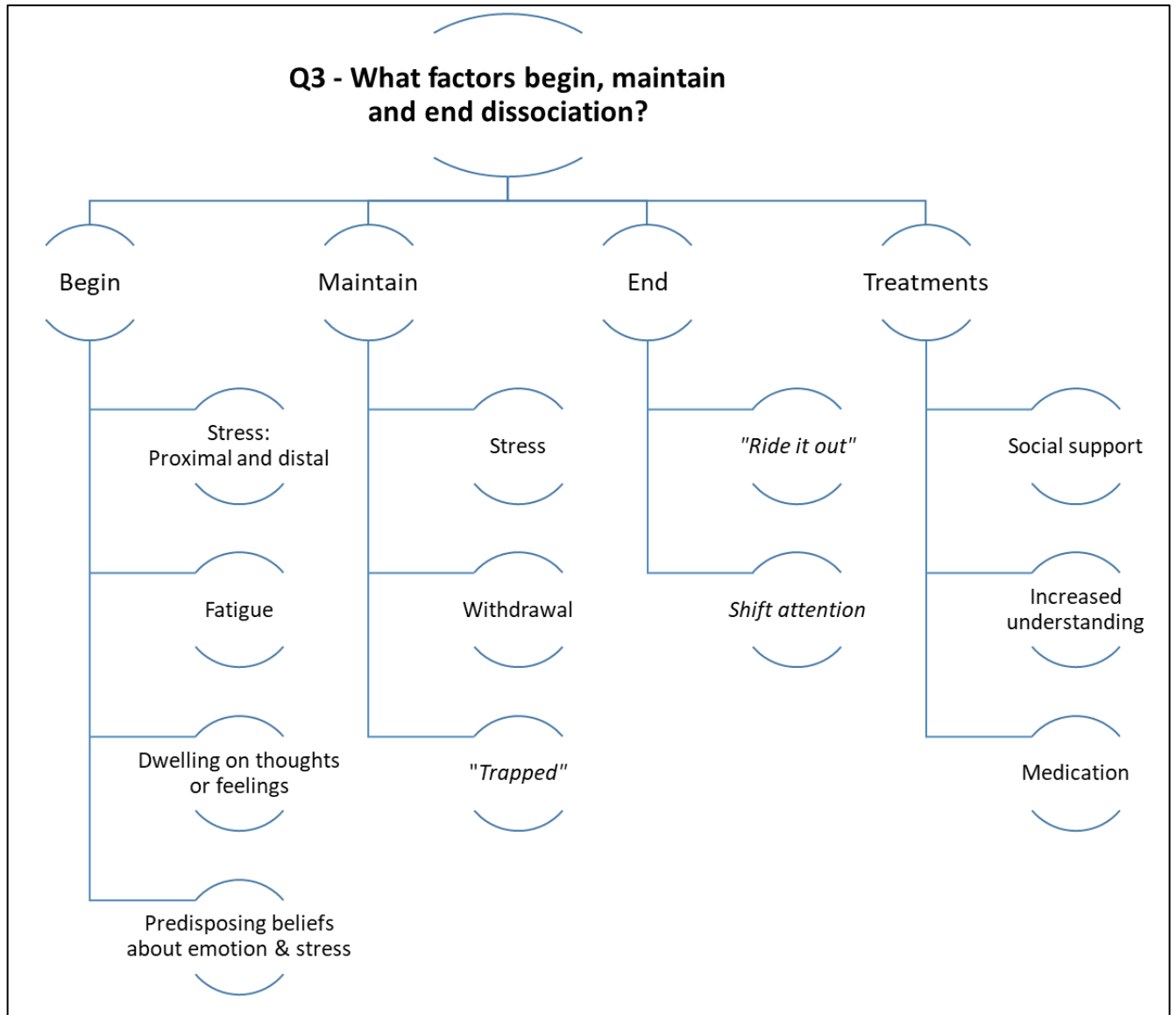
discussions with friends and family, or formal support groups – were cited as important for achieving this and for managing mental health more broadly.

Interviewees also named specific treatment techniques as effective including medication (P4: *“I take my medication religiously every day”*), using a box of sensory objects for grounding (P8: *“It reminds me of my Nan’s dog’s ears, which always seems to bring me back”*), and making lifestyle changes:

P12: *“I started swimming regularly [...] There were things I was trying to do to change, like CBT or giving up smoking, trying to have less caffeine...”*

However, although these were often reported as being helpful, it should be noted that participants also found limitations to these treatment approaches. For example, some noted that grounding techniques might only reduce the length of dissociation, rather than preventing it; care plan or psychological techniques might be forgotten or inaccessible during dissociative episodes; and medication was not always effective for the specific experience of dissociation.

Figure 4. Summarising the themes for the third research question



4. What thoughts and beliefs do people have about dissociative experiences?

See Figure 5 for a summary of the results for this research question.

During the experience

Some interviewees said that they are aware of their thinking changing during dissociation. Participant 6 described their thoughts *“going skew-whiff”* or *“wonky”*, and Participant 11 said that their thoughts might speed up or *“completely slow down”*. Five participants referred to *“going blank”* and having *“just nothing in your head”* (P8). These experiences made it challenging for people to identify any thoughts arising during dissociation.

When people could identify thoughts, these often reflected the sensations and experiences described in Question 1 (for example, feeling overwhelmed: P6: *“it’s too much”*; or finding things unreal: P1: *“it’s just like a game”*). These could occur alongside awareness of or insight into the experience (P9: *“Ah, you’re going through this again”*).

Interviewees described focusing on what was happening, and anxiously searching for explanations:

P10 “Why me? What have these things happened to me?”

Participants described either actively trying to figure out what was happening or passively observing the experience to learn more about it. Potential answers to these questions ranged from benign (P7 *“Am I dreaming?”*), to catastrophic (P4 *“I’m completely losing my mind.”*). Some also appeared more psychotic in nature:

P12: “I’m not part of the world any more. I’m not going to get away to the other planet and live like everyone else.”

Anxious cognitions in general were frequently reported, including: worrying that dissociation was about to happen, that it meant something was wrong, worrying about the consequences of the dissociative feelings, worrying others would notice, and worrying how long the sensations would last. Thoughts about wanting the experiences to stop or end once it had begun were also reported.

Interviewees reported thoughts about being unable – or prevented from – doing the things they would usually do and not being able to cope with the sensation continuing. These thoughts appeared connected to others reflecting hopelessness, loss of motivation, or passive acceptance the situation:

P6: “What’s the point?”

After the experience

Participants reported surprise (P4: *“Ooh, I’m back now”*) and relief when realising dissociation had ended. One participant reported feeling slightly *“guilty”* afterwards, linked to appraisals that it had not been “them” in control during dissociation and therefore that they could not claim to have personally achieved what had been done during that episode. This caused internal conflict, as the participant reported knowing logically that it had been them.

“Returning” from dissociation, for some, involved checking what the impact of the episode was (P8: *“Ok, what have I missed?”*), and re-adjusting to the world after being numb or detached:

P8: “It’s like all of a sudden, that little box that was around you isn’t there now and everything’s like “bam!” in your face, or in your ears, or the smell or- everything’s more heightened. I struggle with that; I don’t like it.”

About the experience

The most common theme when asking about dissociation was that of confusion: not knowing what it is or why it happens. For some, this was acutely distressing:

P6: "I used to be so desperate to find out what was going on and why I was the way I was. I used to look around, look at people, look at things, as if I'm crying out 'is there somebody out there than understands what's going on to me?!'"

The distress and confusion might be partially explained by beliefs that dissociation is unusual, or that one's mind is unusual compared to others:

P1: "most people don't experience this"

Perhaps to help themselves understand what – and why – they feel this way, participants often developed "*a theory*" (P12) about dissociation. For example, Participant 5 suggests dissociation might be "*a kind of thought disorder type thing, maybe*", and Participant 8 explains:

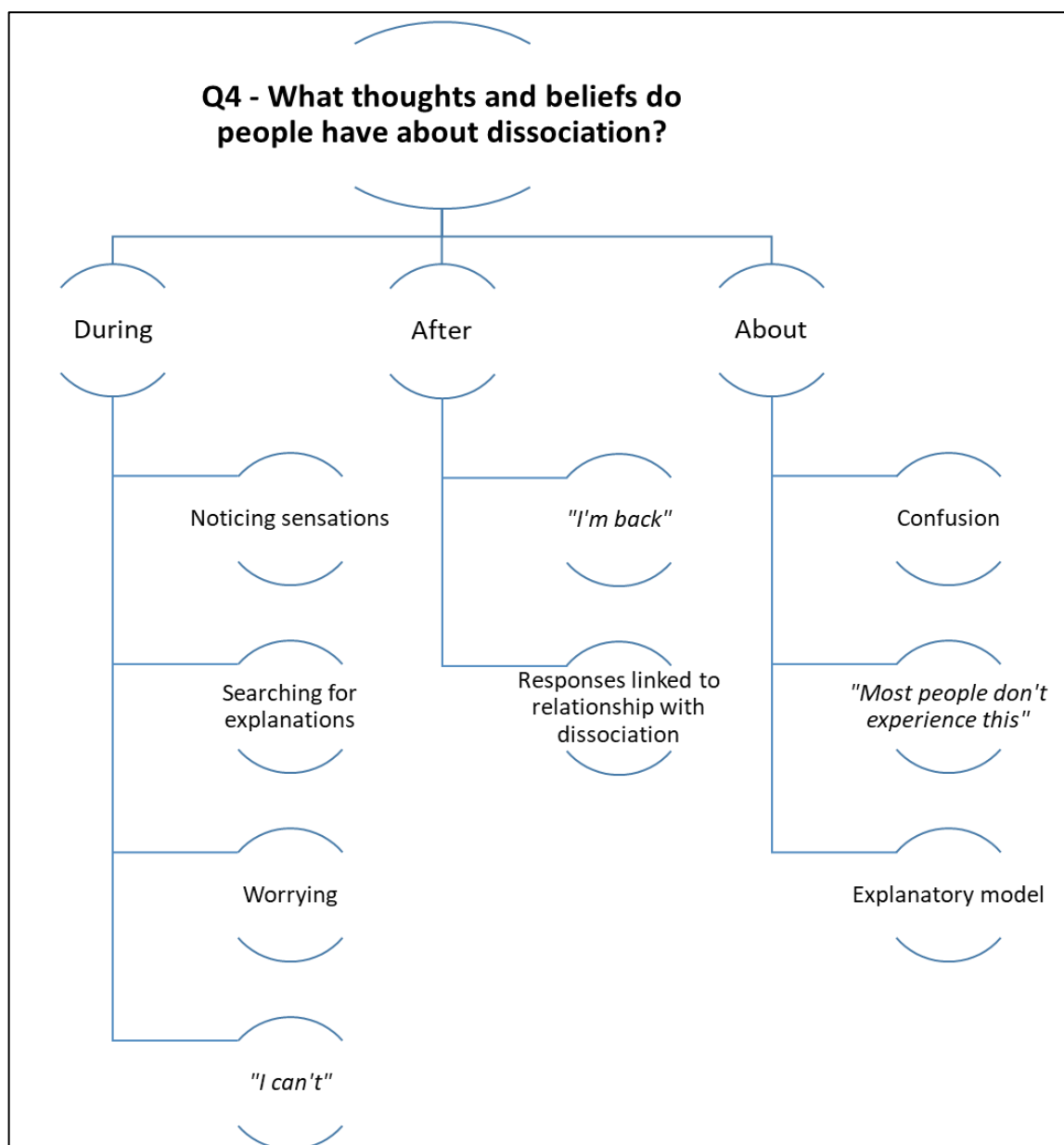
P8: "I sometimes wonder whether it's like my brain has reached the max it can cope with, so it's just like 'I'm going to shut off'".

Whilst these are somewhat psychological explanations, two interviewees used physical explanations: wondering if they have a brain tumour or blood clot in the brain. One participant even underwent scans to determine whether this was true. Other explanations showed the influence of hallucinations, paranoia, aberrant salience, and jumping to conclusions and appeared more psychotic-like in content – such as being trapped in a video game or computer simulation.

Explanations influenced how dangerous participants perceived dissociation to be. They also varied in conviction over time: sometimes taking on a delusional intensity, and other times acting as placeholders for experiences the participant was struggling to describe to others:

P6: "My description of it was as if I was the second coming of Christ. I wasn't a religious person, but that was the only way I could think of explaining it"

Figure 5. Summarising the themes for the fourth research question



Discussion

Key Findings

The aim of this study was to better understand the phenomenology of dissociation arising in the context of non-affective psychosis. This appears best described as a negative, highly subjective experience where the core feature is a “felt sense” of strangeness (which will be referred to henceforth as a ‘Felt Sense of Anomaly’; FSA). The most reported ‘types’ of ‘strangeness’ in this sample were finding that things somehow felt ‘unreal’ or feelings of unanticipated detachment. Feeling unanticipated emotional detachment from others was associated with significant distress. People also experienced unanticipated unfamiliarity, and a sense of automaticity (rather than voluntary or effortful control).

As discussed, dissociation is conceptualised as a multi-dimensional construct, with a vast range of symptoms and experiences proposed to fall within its bounds (e.g. Kennedy & Kennerley, 2013). It is unsurprising, therefore, that the open and exploratory approach taken by this study resulted in omissions of particular experiences described in other reports of dissociation, instead bringing to the fore those symptoms that were the most problematic or most noteworthy to the people experiencing them. For example, no participant described dissociative amnesia; however, several described memory blanking and experiencing their memories as unfamiliar. In line with Lynn et al. (2019), who state that ‘it can be challenging, if not impossible, to distinguish amnesia from encoding failure’, a number of participants stated that they were aware that their lack of memory for events related to periods when they were feeling unreal or detached. The results here therefore highlight interviewees’ *subjective experience* of their memory as somehow altered or anomalous.

It is striking that feeling unable to describe dissociative experiences was such a strong theme in the results. Participants struggled to find the words to describe dissociation, often relying on “as if” statements or metaphors to describe highly subjective and sometimes subtle experiences. The result of this difficulty – perhaps exacerbated by fear, mental avoidance, and concerns about others’ reactions – was that people did not feel able to talk about these events. Lack of reporting to clinicians may partially explain why dissociation is so often under-recognised (Bailey & Brand, 2017). Therefore, clinicians should be encouraged to listen out for descriptions of FSA when assessing patients, and to proactively ask about dissociative experiences, as clients are unlikely to raise these unprompted. Further, it was a common experience that attempting to describe dissociation resulted in the listener misunderstanding. Within this small sample of lived experience alone, clinicians reportedly interpreted descriptions of dissociation as depression, worsening psychosis, or bipolar disorder. It seems likely that people with non-affective psychosis describing dissociation to their care team repeatedly feel unheard or misunderstood, and may receive inappropriate treatment.

However, recognising the distinction between dissociation and psychosis may be especially challenging when assessing presentations featuring negative psychotic symptoms. In particular, the Positive and Negative Syndrome Scale (PANSS; Kay, Fiszbein & Opler, 1987) negative scale items of “blunted affect”, “emotional withdrawal”, and “passive/apathetic social withdrawal” may present similarly to one of the main types of experience described by participants (emotional detachment) and one of their main responses (withdrawal). Further questions may therefore need to be asked when assessing a patient presenting with these symptoms in order to understand the possible cause.

Placing the Findings in Context

According to interviewees, there are many interactions between dissociation and psychosis. Hallucinations or hallucination-like experiences contributed to feelings of strangeness; paranoia was identified as a potential consequence of dissociation; and a range of psychotic features (including voices) acted as triggers and modifiers for dissociation. As discussed in Chapter One, many theorists argue that it is difficult – or impossible – to make distinctions between psychotic and dissociative symptoms, taking the stance that these experiences overlap, and that many apparently psychotic symptoms may in fact be dissociative (and vice versa) (e.g. Moskowitz & Corstens, 2008). It is not within the aims of this thesis to address the question of whether or which symptoms require re-categorising, however, it is important to note that participants commented on the distinguishable nature of these experiences. That is to say, people with psychosis diagnoses experience dissociation as distinct from their psychotic symptoms, describing these as having the anomalous (detached, strange, and unreal) qualities described above. Further, they reported a sense of frustration when clinicians did not understand that they were describing two separable phenomena (dissociation and psychosis).

Whilst the exact pattern of causal relationships between dissociative and psychotic experiences is unknown (whatever the extent of their overlap), these results appear to support the Garety, Kuipers, Fowler, Freeman and Bebbington (2001) model of the development of positive psychotic symptoms. Namely, participants described how they found dissociative experiences confusing and distressing, and subsequently engaged in a “search for meaning”. For some, the result was an explanation with a psychotic-like quality (e.g. the world is a computer simulation). Completing the chain of events proposed in the model, sometimes these explanations were held with such conviction that they met criteria for a paranoid or grandiose delusion. Relevant to treatment development, participants also suggested that having a better understanding of dissociation modified or negated their need for a “search for

meaning". Interviewees reported feeling less afraid and more capable once they understood dissociation better. It is possible, therefore, that psychoeducation could similarly influence the "search for meaning" and this should be considered when developing interventions for dissociation in psychosis.

The findings of this study also support Hunter, Phillips, Chalder, Sierra and David's (2003) cognitive-behavioural conceptualisation of depersonalisation and derealisation (DP/DR) within the novel context of non-affective psychosis. Hunter et al. suggest that DP/DR can result from anxiety, stress, or fatigue and is maintained by avoidance, safety behaviours, and cognitive biases (such as symptom monitoring). These results imply additional factors may also be important: beliefs about one's ability to cope with stress or (extreme) emotion, perceived powerlessness, and ambivalence about dissociation. These results indicate specific interventions which may be helpful for ameliorating dissociation and the distress it causes. For example, the role of stress, fatigue, avoidance, and withdrawal imply that techniques such as grounding, problem-solving, pacing, activity scheduling, and behavioural experiments may be effective in the treatment of dissociation. Motivational interviewing may be appropriate where people have high levels of ambivalence towards dissociation. Whilst some of these techniques have already been suggested as interventions for dissociation (e.g. Baker et al., 2007), others constitute potentially novel applications and warrant further exploration.

Strengths & Limitations

The results of this study are limited by its methodology: participants were not asked to review transcripts for accuracy, and only a single coder was used during analysis. This reduces the validity of the results through the introduction of risk of bias. However, the sample size was adequate for a qualitative method, negative case analysis was included, and the topic guide was developed in collaboration with a

Lived Experience Advisory Panel, piloted, and reviewed after the first three interviews. These elements of the methodology improve the credibility of the findings, which have good face validity and appear to triangulate with existing literature within and outside of psychosis (e.g. Hunter et al., 2003).

It is interesting that the DES scores of nine participants were in the range expected for people with dissociative disorder diagnoses, and it is a limitation of the study that co-morbid dissociative disorders were not asked about or recorded. However, given the under-recognition of such difficulties (van der Hart & Dorahy, 2009), it is unlikely that many of the participants had a formal diagnosis of dissociation, even if they met criteria for these. Some may argue that participants may have been misdiagnosed with a psychotic disorder, and in fact better fit the criteria for a dissociative disorder. This is unlikely to be true for all participants, many of whom described key psychotic symptoms, such as delusions. Further, any misdiagnosis must surely serve to further illustrate the need for clinicians to be better informed and feel more confident in recognising and asking about dissociative phenomena.

Chapter Conclusions

In this chapter, a qualitative study indicated that for people with psychosis diagnoses, the experience of dissociation is generally distressing, has widespread personal impact, and is subjectively distinct from the experience of psychotic symptoms.

Furthermore, the core phenomenological experience of dissociation in this context may be a 'felt sense of anomaly' (FSA). This felt sense may relate to the internal world (thoughts, emotions, or memories), the physical body, or the external world (the environment and other people). The subjective anomaly may be a sense of unfamiliarity, unreal-ness, detachment or some other sense of deviation from normal experience. Considering FSA as a common denominator in this way serves as a broad but descriptive heuristic for simplifying the confusing array of dissociative symptoms as it unifies at least a subset of these into a single phenomenological subgroup. The concept of FSA will therefore be considered more closely in Chapter Three, which seeks to establish a definition of dissociation for use within this thesis.

This chapter also highlights psychological factors that may be plausible candidates for maintenance mechanisms of dissociation: ambivalence, perceived ability to cope with stress and emotion, and perceived powerlessness. These are additional to factors implicated by existing literature, and warrant further investigation. These will therefore be considered again later in the thesis.

3 Conceptualising & Operationalising a New Perspective of Dissociation¹

"It took them a couple of years to work out that dissociation was what was going on because lots of the screening questionnaires that I had didn't speak to the sort of experiences that I was having"
(Qualitative study participant 11)

Chapter Abstract

Rationale

The complexity and subtlety of dissociation is highlighted by Chapters One and Two. Chapter Three therefore aims to establish a clear working definition of dissociation, and a corresponding assessment measure, for use within this thesis. In accordance with the Oxford Approach, the working definition adopted in this thesis will relate to the phenomenological expression of dissociation.

Methods

First, a systematic review of dissociation measures was carried out to seek consensus in the conceptualisation of dissociation at the phenomenological level in the existing literature. Subsequently, a novel theoretical framework for Felt Sense Anomaly (FSA) is outlined. In this conceptualisation, FSA may be experienced in various domains (e.g. body) in different forms (e.g. unreality). Next, factor analysis* of 8861 online survey responses was used to develop a measure and empirically test the proposed framework. Finally, confirmatory factor analysis with a group of 1031 NHS patients with psychosis was used to validate the measure in a clinical population.

Results

Factor analyses found that FSA-type dissociation manifests in seven key ways: anomalous experiences of the self, body, and emotion, and altered senses of familiarity, connection, agency, and reality. This produced a seven-factor measure. A separate single factor measure of global FSA (i.e. without reference to domain or type) was also developed.

Conclusions

This chapter empirically delineates a discrete subset of dissociative experiences unified by FSA. The resulting measures are psychometrically valid within a non-clinical and psychosis group, and support the proposed theoretical framework.

¹ This chapter is adapted from the paper attached in Appendix 7.2: Černis E, Beierl E, Molodynski A, Ehlers A, Freeman D (2021). A new perspective and assessment measure for common dissociative experiences: 'Felt Sense of Anomaly'. *PLoS One*, 16: e0247037. DOI: 10.1371/journal.pone.0247037

*The statistical analysis in Part 2A was carried out in collaboration with Dr E. Beierl.

Introduction

In the context of the confusing array of definitions outlined in Chapter One, it is important for this thesis to establish a clear working definition of dissociation that provides clarity as to what precisely is being investigated. Further, the operationalisation of this definition – that is, a way that the definition may be applied to people's experiences – is a vital tool for this programme of research.

To meet the aims of the thesis, a helpful working definition of dissociation should describe what patients experience and facilitate discussion of the patient's concerns in a clinical setting. Presently, the term 'dissociation' does not achieve this, in part because the term does not describe an established 'single, coherent referent' (Cardena, 1994) which unites disparate 'dissociative' experiences. As discussed in Chapter One, the Oxford Approach proposes that before a theoretical basis for understanding a particular phenomenon can exist, it must first be clearly understood at the phenomenological level.

Therefore, to achieve a working definition of dissociation for this thesis, this chapter first aims to determine whether there is any consensus in the existing literature as to how best to conceptualize dissociation at the phenomenological level, and from this, to select and elucidate a definition for use in this thesis. Further, this chapter will also establish a self-report measure based on this definition for use in subsequent studies.

At present, the majority of research uses the Dissociative Experiences Scale as a measure of dissociation (DES; Bernstein & Putnam, 1986; also, DES-II, Carlson & Putnam, 1993). This is the longest-standing and most widely-used measure of dissociative experiences, containing 28 items such as 'Some people are told that they sometimes do not recognize friends or family members' and 'Some people find that they sometimes are able to ignore pain'. Whilst this measure has had significant impact in the field and greatly facilitated discourse about dissociative experiences in

clinic and research, the DES does have limitations as outlined by Holmes et al. (2005) and others (e.g. Černis, Cooper & Chan, 2018). Most relevant here are the observations that the DES reflects a now outdated view of dissociation, and omits some experiences (most notably emotional numbing) that would be required for its comprehensive measurement. Accordingly, it would be beneficial to research and clinical endeavours if any new characterisations of dissociation or dissociative sub-categories (e.g. Holmes et al., 2005) were accompanied by a comprehensive measure of that construct.

Part 1 - Conceptualising

A Systematic Review of Phenomenology

In the absence of a consensus regarding the symptoms and mechanisms of dissociation (Chapter One), a coherent set of experiences was sought on the basis of the phenomenology studied to date under the term. To achieve this, a systematic search of the literature for measures of dissociation was undertaken (See Table 1 for search terms and Figure 1 for the PRISMA diagram). Measures were chosen since these must necessarily specify which phenomena are most relevant or prototypical when assessing the concept to be measured, and therefore should provide descriptions of notable, fundamental examples of dissociative phenomenology. Specifically, papers were sought where a measure of dissociation (or an incorporated concept, e.g. depersonalization) was subjected to factor analysis. The aim was to inspect the factors produced by these analyses and search for common themes among measures.

Table 1. Summarising the method and results of the systematic review of existing dissociation measures

Method

The search was run on 15th July 2019 in Ovid Medline using the search terms: dissociation; dissociative; depersonali*; dereali*; “intrusi* + memor*”; flashback*; unreality; fugue; reliving; “conversion+disorder”. (Note that the wildcard “dissociat*” was not used as this returns many papers entitled “Dissociating... [X] and [Y]...” which are not in the dissociation or wider clinical psychology literature).

The search was limited to English language, and to journal article or review formats. Due to the occurrence of the word ‘dissociation’ used in other contexts (as above), search terms were limited to the title and abstract of the paper, ensuring that a full-text search did not pick up irrelevant uses of the terms.

Results

Despite the conservative approach to search criteria, a large number of irrelevant results were produced. Therefore, a total of 14474 papers were retrieved meeting the above criteria. Titles and abstracts were then searched by hand using Mendeley Reference Manager (v.1.19.2; Mendeley Ltd, 2018) to identify relevant papers. This produced a smaller group of 138 papers discussing the measurement of dissociation (Figure 1).

Table 2 summarises the 77 papers which factor analysed 26 measures of dissociation. The DES received the most attention of any individual measure, with 28 factor analyses carried out on the adult version of this scale. Of these, just over half found absorption (n=19) and depersonalization (n=18) were a factor in dissociation; half incorporated some form of memory difficulty or amnesia; and seven found a single factor structure. By contrast, non-DES measures (41 studies, 24 measures) were more mixed, and less likely to incorporate absorption (4 studies, 2 measures), or memory problems (11 studies, 9 measures). However, factors relating to depersonalisation experiences were still relatively common (present in 20 studies of 13 measures), and a similar proportion of factor analyses resulted in a single factor structure (12 studies of 6 measures). Across Table 2, excluding single factor results, approximately 70 unique factors have been implicated in dissociation.

Figure 1. PRISMA 2009 flow diagram for the systematic review of dissociation measures.

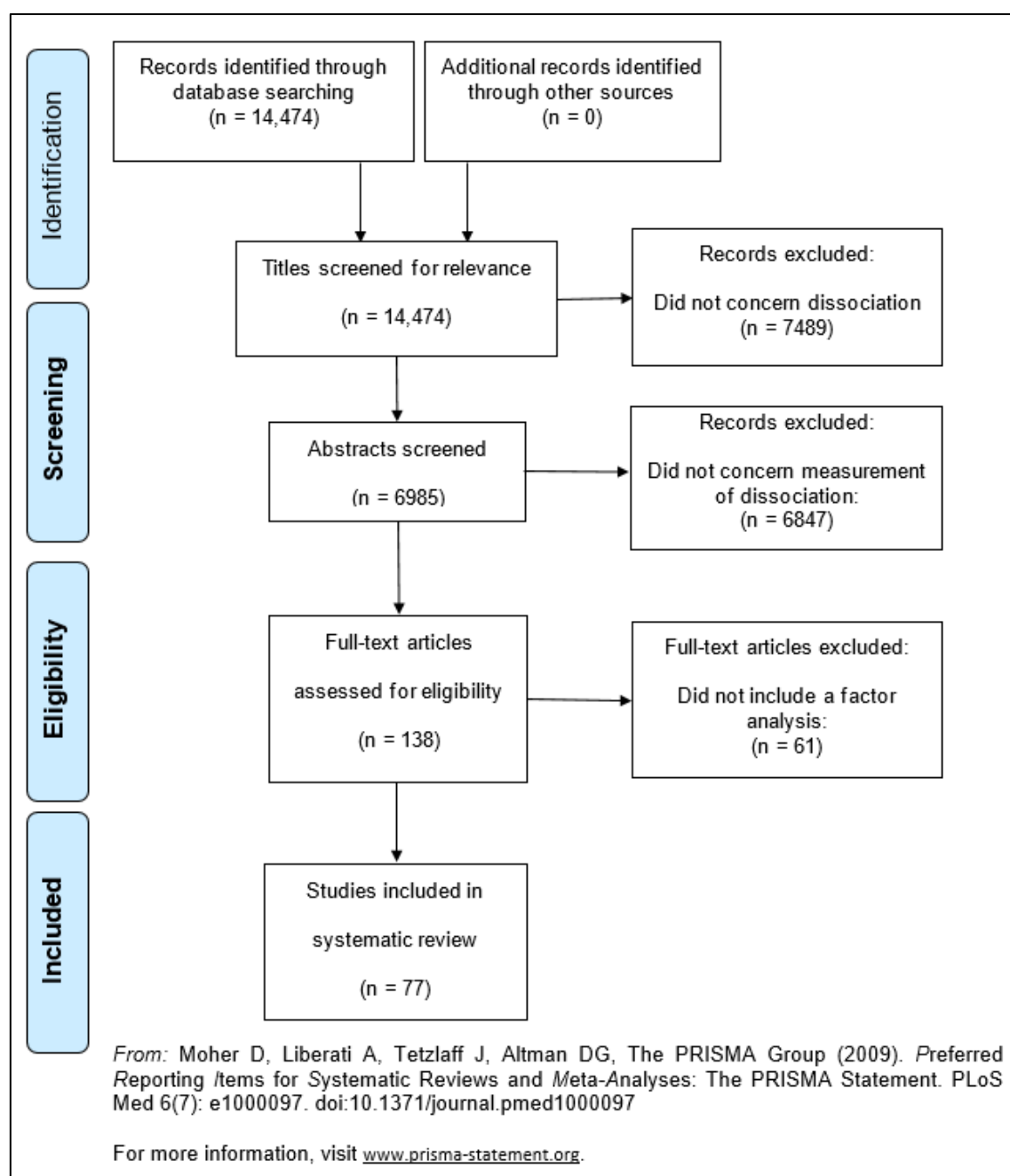


Table 2. Summarising the results of N=77 studies which carried out factor analysis on measures of dissociation or closely-related concepts (e.g. depersonalisation) (NB: References for studies in this table can be found in Appendix 2.1)

Reference	Factors				Sample characteristics
Dissociative Experiences Scale (Bernstein & Putnam, 1986):					
Allen, Coyne & Console (1997)	Detachment from one’s own actions	Detachment from the self and the environment			n=266 female inpatients 74.1% PTSD diagnoses DES mean=35.1 (SD=23.2)
Amdur & Liberzon (1996)	Depersonalization / derealization	Memory disturbance	Absorption	Distractibility	n=129 male patients 100% PTSD diagnoses DES mean=30.43 (SD=17.94)
Armour, Contractor, Palmieri & Elhai (2014)	Absorption	Amnesia		Depersonalization / derealization	n=165 university students 13.3% probable PTSD DES mean not stated
Brunner, Parzer, Schmitt & Resch (2004) <i>German version</i>	Dissociative amnesia	Absorption / imaginative involvement		Depersonalisation / derealization	n=52 patients, 1056 control PTSD rate not stated DES mean=2.81 (SD=1.67) (BPD); 1.40 (SD=1.06) (schizophrenia); 1.72 (SD=1.13) (controls)
Carleton, Abram & Asmundson (2010) <i>DES items & Tellegen Absorption Scale items</i>	Imaginative involvement	Dissociative amnesia		Attentional dissociation	n=841 undergraduates, 635 community women PTSD rate not stated DES mean not stated
Darves-Bornoz, Degiovanni & Gaillard (1999) <i>French version</i>	Depersonalisation / derealisation	Amnestic fragmentation of identity		Absorption-imaginative involvement	n=140 victims of rape PTSD rate not stated DES mean=24.1 (SD=16.5)
Dunn, Ryan & Paolo (1994)	Depersonalization / derealization	Moderate amnesiac dissociation	Absorption-imaginative involvement	Severe amnesiac dissociation	n=493 male substance use patients PTSD rate not stated DES mean not stated
Espirito Santo & Abreu (2009) <i>Portuguese version</i>	Depersonalization- Derealization	Absorption	Distractibility	Memory disturbances	n=570 mixed patient & general population 9% PTSD diagnoses DES mean=18.81 (SD=13.82)

Reference	Factors				Sample characteristics
Dissociative Experiences Scale (Bernstein & Putnam, 1986) cont'd:					
Fischer & Elnitsky (1990) <i>Including the Perceptual Alteration Scale items</i>	Single factor				n=507 undergraduates PTSD rate not stated DES mean not stated
Holtgraves & Stockdale (1997)	Single factor				n=201 (study 1) & 195 (study 2) undergraduates PTSD rate not stated DES mean not stated
Korlin, Edman & Nyback (2007)	Single factor				n=342 general population; 181 patients PTSD rate not stated DES mean not stated
Laroi, Billieux, Defeldre, Ceschi & van der Linden (2013) <i>French version</i>	Automatic pilot related dissociation		Defensive dissociation		n=188 (study 1) & 210 (study 2) university students PTSD rate not stated DES mean not stated
Lipsanen, Saarijarvi & Lauerma (2003) <i>Finnish version</i>	Single factor				n=924 general population PTSD rate not stated DES mean=8.41 (SD not stated)
Mazzotti et al. (2016)	Absorption	Compartmentalization		Detachment	n=780 patients; 2303 undergraduates and non-psychiatry patients PTSD rate not stated DES mean=14.63 (SD=11.78) (general population); 20.02 (SD=16.29) (psychiatry patients)
Olsen, Clapp, Parra & Beck (2013)	Absorption		Depersonalization		n=575 (study 1) & 459 (study 2) female undergraduates PTSD rate not stated DES mean not stated
Ray & Faith (1995)	Absorption / derealization	Depersonalization	Segment amnesia	In situ amnesia	n=1190 undergraduates PTSD rate not stated DES mean=67.97 (SE=1.03) (altered response format)

Reference	Factors					Sample characteristics	
Dissociative Experiences Scale (Bernstein & Putnam, 1986) cont'd:							
Ray, June, Turaj & Lundy (1992) <i>Revised version</i>	Fantasy / absorption	Segment amnesia	Depersonalization	In situ amnesia	Different selves	Denial	n=264 university students PTSD rate not stated DES mean not stated
Ross, Ellason & Anderson (1995)	Absorption / imaginative involvement		Activities of dissociated states		Depersonalization / derealization		n=274 patients with DID <i>Full text not available to authors</i>
Ross, Joshi & Currie (1991)	Absorption / imaginative involvement		Activities of dissociated states		Depersonalization / derealization		n=1055 general population PTSD rate not stated DES mean=10.8 (SD=10.1)
Ruiz, Poythress, Lilienfeld & Douglas (2008)	Absorption		Depersonalization		Amnesia		n=1551 offenders PTSD rate not stated DES mean=18.6 (SD=13.6)
Sanders & Green (1994)	Imaginative involvement		Depersonalization / derealization		Amnesia		n=860 undergraduates <i>Full text not available to authors</i>
Schimmenti (2016a) <i>Italian version</i>			Single factor				n=794 general population PTSD rate not stated DES mean=18.60 (SD=13.85)
Schwartz & Frischholz (1991)	Amnestic dissociation		Absorption & imaginative involvement		Depersonalisation / derealization		<i>Full text unavailable</i>
Simeon et al (1998)	Absorption		Amnesia		Depersonalization / derealization		n=50 patients with DPD; 20 controls PTSD rate not stated DES mean=23.41 (SD=13.63) (DPD); 4.02 (SD=2.91) (controls)
Soffer-Dudek, Lassri, Soffer-Dudek & Shahar (2015)	Absorption / imaginative involvement		Depersonalization / derealization		Amnesia		n=679 undergraduates PTSD rate not stated DES mean not stated
Stockdale, Gridley, Balogh & Holtgraves (2002)	Absorption		Depersonalization		Amnesia		n=971 undergraduates PTSD rate not stated DES mean not stated

Reference	Factors				Sample characteristics
Dissociative Experiences Scale (Bernstein & Putnam, 1986) cont'd:					
Wright & Loftus (1999) <i>Standard, verbal, & comparative versions</i>	Single factor				n=75 undergraduates PTSD rate not stated DES mean=12.73 (SD=2.39)
Zingrone & Alvarado (2001)	Single factor				n=308 university students PTSD rate not stated DES mean=21.70 (SD=12.87)
Adolescent Dissociative Experiences Scale (Armstrong, Putnam, Carlson, Libero & Smith 1997)					
Armstrong et al. (1997)	Amnesia	Absorption	Passive influence	Depersonalization / derealization	n=102 referred for psychological evaluation PTSD rate not stated A-DES mean=4.85 (SD=1.14) (dissociative disorders)
De Pasquale, Sciacca & Hichy (2016) <i>Italian version</i>	Dissociative amnesia	Absorption & imaginative involvement	Depersonalisation / derealization	Passive influence	n=633 students PTSD rate not stated A-DES mean=2.02 (SD=1.47)
Farrington, Waller, Smerden & Faupel (2001)	Single factor				n=810 students PTSD rate not stated A-DES mean=2.66 (SD=1.81)
Kerig et al (2016)	Depersonalization / derealization	Amnesia	Loss of conscious control		n=784 in juvenile detention subset (n=212) completed PTSD measure: 47% met PTSD criteria A-DES mean=58.07 (SD=48.69)
Muris, Merckelbach & Peeters (2003)	Single factor				n=331 students PTSD (SCARED) mean=5.28 A-DES mean=1.27 (SD=1.18)
Nilsson & Svedin (2006a) <i>Swedish version</i>	Single factor				n=400 students; 20 outpatients 15.5% non-clinical & 100% clinical group reported trauma A-DES mean=0.84 (SD=1.05) (non-clinical); 3.28 (SD=1.89) (clinical)

Reference	Factors			Sample characteristics
Adolescent Dissociative Experiences Scale (Armstrong, Putnam, Carlson, Libero & Smith 1997)				
Schimmenti (2016b) <i>Italian version</i>		Single factor		n=1806 students PTSD rate not stated A-DES mean=1.92 (SD=1.43)
Yoshizumi, Hamada, Kaida, Gotow & Murase (2010) <i>Japanese version</i>	Depersonalization	Disintegration of conscious control	Amnesia	n=2272 students PTSD rate not stated A-DES mean=2.21 (SD=1.69)
Peritraumatic Dissociative Experiences Questionnaire (Marmar, Weiss & Metzler, 1997)				
Birmes et al. (2005) <i>French version</i>		Single factor		n=48 (group 1); 43 (group 2) emergency department patients (critical incident victims) PTSD rate not stated DES mean not stated
Boelen, Keijsers & van den Hout (2012)		Single factor		n=168 grief processes research programme participants PTSD rate not stated DES mean not stated
Brooks et al. (2009)	Altered awareness		Derealization	n=247 patients at trauma hospitals PTSD rate not stated DES mean not stated
Bui et al. (2011) <i>Child version</i>		Single factor		n=133 child emergency department patients 5% PTSD diagnoses at 1 month DES mean not stated
Marshall, Orlando, Jaycox, Foy & Belzberg (2002) <i>Modified version</i>		Single factor		n=284 youth exposed to community violence PCL item mean=2.28 (SD=0.84) DES mean not stated
Sijbrandij et al. (2012)	Altered awareness		Derealization	n=219 police officers; 343 trauma- exposed civilians PTSD rate not stated DES mean not stated

Chap

Reference	Factors				Sample characteristics
Cambridge Depersonalisation Scale (Sierra & Berrios, 2000)					
Aponte-Soto, Velez-Pastrana, Martinez-Taboas & Gonzalez (2014)	Anomalous body experience	Emotional and sensory numbing	Alienation from surroundings	Perceptual alterations	n=300 general population PTSD rate not stated DES mean=13.20 (SD=14.19)
Blevins, Witte & Weathers (2013)	Unreality and detachment		Emotional and physical numbing		n=534 undergraduates 100% one Criterion A1 event DES mean not stated
Fagioli et al. (2015) <i>Italian version</i>	Detachment from the Self	Anomalous bodily experiences	Numbing	Temporal blunting	n=149 inpatients & outpatients PTSD rate not stated DES mean not stated
Sierra, Baker, Medford & David (2005)	Anomalous body experience	Emotional numbing	Anomalous subjective recall	Alienation from surroundings	n=150 depersonalisation patients PTSD rate not stated DES mean=24.1 (SD=14.7)
Somatoform Dissociation Questionnaire (Nijenhuis, Spinhoven, van Dyck, van der Hart & Vanderlinden, 1996)					
El-Hage, Darvez-Bornoz, Allilaire & Gaillard (2002) <i>French version</i>	Sensory neglect	Subjective reactions to perceptive distortions		Vigilance modulation disturbance	n=140 outpatients 54.3% lifetime PTSD diagnoses DES mean=14.6 (SD=12.9)
Mueller-Pfeiffer et al. (2010) <i>German version</i>		Single factor			n=225 psychiatry patients 16% PTSD diagnoses DES mean= 4.5 (SD=2.6) (non-dissociative group); 32.9 (SD=15.8) (dissociative group)
Nijenhuis et al. (1996)		Single factor			n=100 outpatients PTSD rate not stated DES mean not stated
Nijenhuis, Spinhoven, van Dyck, van der Hart & Vanderlinden (1998)		Single factor			n=31 outpatients with dissociative symptoms PTSD rate not stated DES mean not stated

Chap

Reference	Factors					Sample characteristics
Multidimensional Inventory of Dissociation (Dell, 2006)						
Dell (2013)	Discovering dissociated actions	Lapses of recent memory and skills		Gaps in remote memory		n=2569 clinical & non-clinical PTSD rate not stated DES mean not stated
Dell (2006)	Single factor					n=817 (multiple groups) PTSD rate not stated DES mean not stated
Somer & Dell (2005) <i>Hebrew version</i>	Single factor					n=151 undergraduate & general population PTSD rate not stated DES mean not stated
Curious Experiences Survey (Goldberg, 1999)						
Cann & Harris (2003)	Absorption	Depersonalization		Amnesia		n=194 undergraduates PTSD rate not stated DES mean not stated
Goldberg (1999)	Broad factor: Dissociation (31 items)	Subscale: dissociation (17 items)	Subscale: depersonalisation	Subscale: absorption	Subscale: amnesia	n=755 general population PTSD rate not stated DES mean not stated
Dissociation Questionnaire (Vanderlinden, Van Dyck, Vandereycken, Vertommen & Verkes, 1993)						
Vanderlinden et al. (1993)	Identity confusion	Loss of control over behaviour, thoughts & emotions		Amnesia	Absorption	n=98 eating disorder patients PTSD rate not stated DES mean not stated
Nilsson & Svedin (2006b) <i>Swedish version</i>	Identity confusion	Loss of control		Amnesia	Absorption	n=74 outpatient adolescents; 400 control adolescents PTSD rate not stated DES mean not stated
Perceptual Alterations Scale (Sanders, 1986)						
Sanders (1986)	Modification of Affect	Modification of Control		Modification of Cognition		Full text unavailable
Fischer & Elnitsky (1990)	Single factor					n=507 undergraduates PTSD rate not stated DES mean not stated

Chap

Reference		Factors					Sample characteristics
Questionnaire of Experiences of Dissociation (Riley, 1988)							
Ray & Faith (1995)	Depersonalization	Process amnesia	Fantasy / daydream	Dissociated body behaviour	Trance		n=1190 undergraduates PTSD rate not stated DES mean=67.97 (SE=1.03) (altered response format)
Ray et al. (1992) <i>Revised version</i>	Depersonalization	Process amnesia	Fantasy / daydream	Dissociated body behaviour	Trance		n=264 undergraduates PTSD rate not stated DES mean=2.17 (SE=0.03)
Scale of Bodily Connection (Price & Adams Thompson, 2007)							
Price & Adams Thompson (2007)		Body awareness			Body dissociation		n=291 undergraduates PTSD rate not stated DES mean not stated
Price, Adams Thompson & Chieh Cheng (2017)		Body awareness			Body dissociation		n=3634 (various groups) PTSD rate not stated DES mean not stated
Scale	Reference	Factors					Sample characteristics
Clinician-Administered Dissociative States Scale	Bremner et al. (1998)	Amnesia		Depersonalisation		Derealization	n=68 PTSD patients 100% PTSD diagnoses DES mean not stated
Dissociative Symptoms Scale	Carlson et al. (2018)	Depersonalization / Derealization	Gaps	Sensory Misperceptions		Cognitive-Behavioural Reexperiencing	n=1592 multiple groups PTSD rate not stated DES mean not stated
The Dissociative Experiences Measure, Oxford	Černis, Cooper & Chan (2018)	Unreality	Numb & Disconnected	Memory Blanks	Zoned Out	Vivid Internal World	n=691 general population PTSD rate not stated DES mean not stated
Self-Experience Lifetime Frequency Scale	Heering et al. (2016)	Disturbance of self-awareness		(Milder forms of) diminished self-affection or depersonalisation			n=426 psychosis patients; 526 healthy siblings; 297 healthy controls PTSD rate not stated DES mean not stated

Scale	Reference	Factors							Sample characteristics
Depersonalization scale <i>including 12 items of Dixon's (1963) scale</i>	Jacobs & Bovasso (1992)	Inauthenticity	Self-negation	Self-objectification		Derealization			n=368 undergraduates PTSD rate not stated DES mean not stated
Wessex Dissociation Scale	Kennedy et al. (2004)	Stage 1 (hallucinations / pseudo-hallucinations)		Stage 2 (including cognitive blanking, intrusions, numbing of affect)		Somatic dissociation			n=80 psychology services patients; 80 undergraduates PTSD rate not stated DES mean=20.7 (SD=16.2) clinical; 9.77 (SD=7.68) non-clinical
State Scale of Dissociation	Kruger & Mace (2002)	Identity confusion, derealization, depersonalization		Conversion	Amnesia	Identity alteration	Hypermnesia		n=67 patients; 63 controls PTSD rate not stated DES mean not stated
Traumatic Dissociation & Grief Scale	Laor et al. (2002)	Perceptual distortions		Body-self distortions		Irritability	Guilt & anhedonia		n=303 children (202 displaced by earthquake; 101 not directly affected) PTSD rate not stated DES mean not stated
Trait Dissociation Questionnaire	Murray, Ehlers & Mayou (2002)	Lability of mood & impulsivity	Sense of split self	Detachment from others & the world	Emotional numbing	Confusion & altered time senses	Amnesia for important life events	Memory lapses	n=27 inpatient & 439 outpatient accident & emergency department patients 31.6% inpatients & 28.3% outpatients PTSD diagnoses at 1 month DES mean not stated
Scale unknown: 'Questionnaire responses from 189 victims of life-threatening accidents'	Noyes & Slymen (1979)	Depersonalization		Hyperalertness		Mystical consciousness			<i>Full text not available to authors</i>
Steinberg dissociation questionnaires (5 measures) (Steinberg & Schnall, 2000)	Sar, Alioğlu & Akyuz (2017)	Cognitive-emotional self-detachment		Perceptual detachment		Bodily self-detachment	Detachment from reality		n=1301 undergraduates PTSD rate not stated DES mean not stated
Conversion Disorder Scale for Children	Sarfraz & Ijaz (2014)	Feeling of disability				Body pain	Seizures		n=107 outpatients & controls <i>Full text not available to authors</i>

Scale	Reference	Factors			Sample characteristics
Dissociation Tension Scale	Stiglmayr et al. (2010)	Single factor			n=294 psychiatry patients 7.5% PTSD diagnoses DES mean not stated
Child Dissociative Checklist (Putnam, Helmers & Trickett, 1993)	Wherry, Neil & Taylor (2009)	Variability	General externalising problems	Pathological dissociation	n=232 children with abuse histories PTSD rate not stated DES mean not stated
Dissociative Symptoms Severity Scale – Child form	Yalin Sapmaz et al. (2017)	Single factor			n= 30 adolescent patients; 83 controls 100% PTSD diagnosis in clinical group A-DES mean=122.30 (SD=52.61) (clinical); 65.96 (SD=53.52) (controls)

Table 2 therefore illustrates the argument that experiences described as “dissociative” cover such a wide range of domains and processes that these are now difficult to unify completely in an understandable way (Marshall, Spitzer & Liebowitz, 1999). Although experiences of derealization, depersonalisation and amnesia were described by a number of measures, Table 2 shows no unanimous inter-measure themes of phenomenology.

Definition & Framework Development

In order to identify a common denominator for people’s dissociative experiences, the results of the above systematic review were considered alongside those of the qualitative study in Chapter Two. The results above support the conclusion of Chapter Two that many common dissociative experiences involve a subjective ‘felt sense’ that something is ‘wrong’, ‘off’, ‘odd’, or somehow anomalous: the construct of ‘Felt Sense of Anomaly’ (FSA). As a result, there may be adequate basis to consider FSA as a phenomenological constant in a subset of dissociative experiences, and to use this as the starting point for defining dissociation for the purpose of the thesis.

Inspection of the measures in the systematic review revealed that many scale items contain words indicating that they do assess FSA. Items refer to judgements and perceptions of experiences being subjectively ‘different’, ‘altered’, or otherwise anomalous (e.g. *‘some people have the experience of looking in a mirror and not recognizing themselves’*; DES-II; Carlson & Putnam, 1993). Other items appear to describe behavioural responses to FSA, such as checking, in order to gain reassurance (Table 3). Many items were ambiguously worded and could be endorsed by respondents experiencing non-pathological or non-dissociative experiences. It is interesting to note that in many ambiguous or easily misinterpreted items, the construct of FSA is absent from the wording of the item, but the experience described may be explained by FSA. For example, *‘my favourite activities are no longer enjoyable’* (Cambridge

Depersonalization Scale; Sierra & Berrios, 2000) may be misinterpreted as assessing depression or low mood rather than dissociation, but can be understood in terms of FSA. In the context of a dissociation measure, this item may be intended to describe the subjective experience of one's emotions being anomalous (specifically, numbed or detached).

Table 3. Examples of the four categories of items reviewed.

Items that fit with FSA	
<i>I see things around me differently than usual (for example, as if looking through a tunnel, or merely seeing part of an object).</i>	Item 13: Somatoform Dissociation Questionnaire; Nijenhuis, Spinhoven, Van Dyck, van der Hart & Vanderlinden.(1996)
<i>Right now, I do not feel like my real self.</i>	Item 17: State Scale of Dissociation; Krüger & Mace (2002)
<i>I feel like my body or parts of it have changed.</i>	Item 16: Traumatic Dissociation & Grief Scale; Laor et al. (2002)
Responses to FSA	
<i>I have to touch myself to make sure I have a real body or a real existence.</i>	Item 27: Cambridge Depersonalization Scale; Sierra & Berrios (2000)
<i>When I am interacting with a person [...] I must tell myself that I am interacting with the person [...] in order to experience it.</i>	Unnamed scale; Jacobs & Bovasso (1992)
<i>It is absolutely essential that I do some things in a certain way.</i>	Item 40: Wessex Dissociation Scale; Kennedy et al. (2004)
Ambiguous: Non-pathological	
<i>Child continues to lie or deny misbehaviour even when the evidence is obvious.</i>	Item 9: Child Dissociative Checklist; Putnam, Helmers & Trickett (1993)
<i>Some people have the experience of being accused of lying when they do not think that they have lied.</i>	Item 10: Dissociative Experiences Scale II; Carlson & Putnam (1993)
<i>I want to do two conflicting things at once and find myself arguing with myself.</i>	Item 22: Perceptual Alteration Scale; Sanders (1986)
Ambiguous: Non-dissociative	
<i>My favourite activities are no longer enjoyable.</i>	Item 5: Cambridge Depersonalization Scale; Sierra & Berrios (2000)
<i>I gorge myself with food without thinking about it.</i>	Item 4: Dissociation Questionnaire; Vanderlinden, Vandereycken, Van Dyck & Vertommen (1993)
<i>I get confused about whether I have done something or only thought about doing it.</i>	Item 7: Adolescent Dissociative Experiences Scale; Armstrong, Putnam, Carlson, Libero & Smith (1997)

Whilst examining the measures in Table 2, it also became clear that there was a broader range of ways in which FSA could be experienced than those found in Chapter Two. Therefore, a theoretical framework was developed for conceptualising FSA-type dissociation whereby different ‘domains’ can be affected by a ‘type’ of anomaly. The ‘domain’ affected by FSA may be that of physical sensation, perception (of external or internal stimuli), mental content or processes (such as memory), or in the experience of selfhood. The ‘type’ of anomaly may take the form of: unfamiliarity, unreality, automaticity or lack of control (where this would be unexpected), or an unanticipated sense of detachment or absence.

This framework is summarised in an ‘FSA matrix’ (Table 4), with each cell containing an experience where a domain is affected by a type of anomaly. For example, one’s mind [domain] could be experienced as detached [type] – as in reports of being unable to easily access one’s memories; or one’s self [domain] may feel unfamiliar [type], as occurs in depersonalisation. In this way, the core experience of FSA unites these disparate experiences – all of which have previously been described as dissociative. The matrix in the format ‘domain x type’ enables the identification of which experiences may be included in the sub-domain of FSA-type dissociative experiences.

This conceptual framework was used to systematically generate items for a new measure; the development of which, in turn, empirically tests the proposed framework.

Table 4. The ‘FSA matrix’ used to systematically generate items for the development of a novel dissociation measure focusing on felt sense of anomaly, with one example shown per cell. Two cells (Automatic x World; Automatic x Others) are blank, as it would not be considered anomalous if these did not respond to a person’s attempts at control.

		Types of Anomaly				
		Unreal	Unfamiliar	Automatic	Disconnected	Absent
Domains	Mind	My thoughts don’t seem real.	Some of the things in my head don’t seem to be mine.	I can’t access my thoughts or memories at will.	I feel detached from my own mind.	My mind goes completely empty.
	Affect	My emotions don’t seem real	I have emotions that don’t feel like they’re mine.	My emotional reactions don’t fit with the situation I am in.	I feel disconnected from my emotions.	I can’t feel emotions.
	Physiology	My body (or parts of it) feels unreal or strange.	My body (or parts of it) feels like it doesn’t belong to me.	My body (or parts of it) feels like it has a mind of its own.	I feel disconnected from the sensations in my body.	My body feels numb.
	Perception	The things happening around me seem unreal to me – like a dream or a movie.	One or more of my senses seem strange, distorted, or odd to me.	My sense of sight, touch, hearing (etc.) don’t respond to me.	I feel as if I’m experiencing life from very far away.	I don’t notice how much time passes.
	Identity	I feel that I’m not a real person.	I don’t recognize myself.	I act like someone else without meaning to.	I feel disconnected from who I really am.	I feel like I don’t exist.
	Behaviour	My actions feel fake or unreal.	Things I’ve done many times before seem new or unfamiliar.	I feel like I’m on automatic pilot.	I feel disconnected from my own actions.	I freeze, unable to do anything.
	World	The world around me seems unreal.	Places that I know seem unfamiliar.	-	I feel that I’m not part of the world around me.	I am absorbed in my own world and do not notice what is happening around me.
	Others	Other people seem unreal.	People I know seem unfamiliar.	-	I feel detached from the people I am close to.	Other people stop existing when I can’t see them.
		Unreal	Unfamiliar	Automatic	Disconnected	Absent

Part 2 – Operationalising

The experience statements systematically generated by the FSA matrix were used as an item pool for generating two self-report measures of FSA-type dissociation: a brief 'screening' and a full scale. Initial measure development took place within a general population online survey group (Part A). Psychometric fit was then assessed in a clinical (non-affective psychosis) group (Part B).

A. Measure development (online survey group)

Methods

Study design

The study was a questionnaire development study using an online cross-sectional self-report survey. A subsample of respondents also provided test-retest data for the novel questionnaire.

Participants

Participants were recruited via social media, the majority via Facebook Ads (Appendix 2.2). The advertisements were titled "*Mapping dissociation in mental health*" and stated that questionnaires concerned "common thoughts and feelings". The information sheet (Appendix 2.3) described dissociation as "*strange feelings and experiences such as 'spacing out', feeling 'unreal', or feeling detached from the world around you*". Inclusion criteria were deliberately very broad: any adult (age 18 years or over) normally resident in the UK. There were no exclusion criteria, and no required level of current or past dissociation.

13186 responses were recorded by Qualtrics (Qualtrics, 2018). 144 (1.09%) did not consent to the study, and 307 (2.33%) indicated consent but then left the survey without continuing onto the first page of measures. After removing participants who did not meet the inclusion criteria, or had high levels of missing data (greater than

20% in any of the measures required for analysis), the final sample was 8861. For analysis, the sample was split into three equal subsamples of nearly 3000 people (*Statistical Analysis*). Each of the three subsamples had a mean age of 40 years, scored within the general population range on the DES (Carlson & Putnam, 1993), and highly on the PTSD Checklist (Weathers et al., 2013). In each sample, approximately 86% of respondents were female, 93% were White, and 85% reported lifetime mental health difficulties (with a further two thirds of these reporting that such experiences are ongoing) (Table 5).

Table 5. Summarising descriptive statistics for the three subsamples used for measure development.

	Sample 1 (n = 2953)	Sample 2 (n = 2954)	Sample 3 (n = 2954)
Gender	287 (9.7%) male 2557 (86.6%) female 80 (2.7%) other	317 (10.7%) male 2544 (86.1%) female 75 (2.5%) other	280 (9.5%) male 2568 (86.9%) female 78 (2.6%) other
Ethnicity	2751 (93.1%) White	2751 (93.1%) White	2768 (93.7%) White
“Have you ever experienced mental health difficulties?”	2528 (85.6%) Yes 360 (12.2%) No	2497 (84.5%) Yes 405 (13.7%) No	2508 (84.9%) Yes 388 (13.1%) No
“If yes, are these still ongoing?”	1929 (65.3%) Yes 534 (18.1%) No	1900 (64.3%) Yes 537 (18.2%) No	1943 (65.8%) Yes 519 (17.6%) No
	Range Mean (SD)		
Age	18 – 88 40.04 (15.67)	18 – 84 40.02 (15.84)	18 – 85 40.38 (15.78)
	Mean (SD)	Mean (SD)	Mean (SD)
Dissociative Experiences Scale (DES)*	2.37 (1.85)	2.41 (1.89)	2.40 (1.89)
PTSD Checklist (PCL-5)*	30.07 (20.14)	29.29 (20.22)	27.00 (19.93)

**t-tests for differences in mean scores between genders male and female found no significant statistical differences in any sample*

Procedures

Questionnaires were completed online using Qualtrics. Therefore, informed consent and assessment were both carried out online. The questionnaire landing page contained the participant information sheet and statements regarding informed consent (Appendix 2.3), as per the British Psychological Society (2017) guidelines for ethical internet-mediated research. Participants were told that the aim of the study was to explore dissociation and common thoughts, feelings, and experiences, and that they need not have experienced dissociation in order to take part. After acknowledging the consent statements, participants were asked the demographic questions, and shown the item pool and measures (*Measures*).

The survey was accessible on desktop and mobile web browsers. Incomplete datasets were retrieved automatically after a week of non-activity and added to the dataset. Data collection began on May 24, 2018 and ended on July 23, 2018. Test-retest data were collected between September 3 and 13, 2018. The study received ethical approval from the Central University Research Ethics Committee of the University of Oxford (ref: R57488/RE002). Details of organisations able to provide mental health and emergency support were shown in the information sheet, and again at the end of the survey.

Measures

Černis Felt Sense of Anomaly Scale (ČEFSA) & Global FSA Scale:

First, an initial item pool of 98 items (full item pool: Appendix 2.4) was systematically generated by completing the cells of the aforementioned FSA matrix (Table 4). For example, the cell at the juncture of affect [domain] and unreal [type] would produce the item “*my emotions don’t seem real*”. Using this method, a minimum of two items per cell were generated (with the exception of ‘world x automatic’ and ‘others x automatic’ where it was considered that it would not be anomalous to

experience the world or others as not under one's control). Generated items were required to clearly relate to both the domain and the type of anomaly. Further, they were not to describe a reaction or behaviour (as these may be idiosyncratic, and are not dissociative phenomena in their own right), nor could items be written such that the item might have surface validity for another disorder (in order to minimise misinterpretation by respondents). Items were validated against these criteria via discussion between the DPhil candidate and supervisors.

Additionally, six items were generated that were 'global', in that they only described FSA without reference to specific domain or type (e.g. 'I feel odd', 'Things seem strange'). These items were generated to develop a supplementary brief "general FSA" scale (*Statistical analysis*).

All 104 items (Appendix 2.4) were checked for readability by volunteers with lived experience of mental health problems. In particular, volunteers checked that it was clear to a layperson what the items were asking, and that the language used was easily accessible throughout.

Two face-validity checks were carried out on the initial pool of items. First, a group of volunteer clinical psychologists and psychology graduates at the Department of Psychiatry, University of Oxford, received a list of the items and were asked to indicate where in a blank copy of the FSA matrix they believed these would best fit. Discrepancy was extremely low. Where there was discrepancy, the most common pattern was that 'Unfamiliarity' items were assigned as 'Unreality' and vice versa, and 'Automaticity' items were assigned as 'Disconnection' and vice versa. Secondly, two volunteers with lived experience of mental health difficulties read the items in the item pool and judged their readability and comprehensibility. From this, it was decided that more informal language (e.g. 'don't' as opposed to 'do not') would be used, and a small number of items were re-worded for clarity.

Items were rated for the past two weeks on a Likert scale from “0 Never” to “4 Always”, with the instruction ‘*Please read the following items and rate how often you have experienced these over the past TWO WEEKS*’.

Dissociative Experiences Scale II (DES-II; Carlson & Putnam, 1993):

The DES-II comprises 28 items each rated from 0% to 100%. Items cover dissociative and amnestic experiences such as “Some people sometimes find that they are approached by people that they do not know, who call them by another name or insist that they have met them before.” Higher scores indicate greater dissociation. No time period is specified in the instructions.

Post-Traumatic Symptom Disorder Checklist (PCL-5; Weathers et al., 2013):

To assess PTSD symptoms over the past month, the PCL-5 contains 20 items such as “feeling very upset when something reminded you of the stressful experience”, rated on a five-point Likert scale from “0 not at all” to “4 extremely”. Participants were asked to rate “the most upsetting event” they had experienced (i.e. not necessarily a Criterion A event). This was indicated via selecting from a list including “end of a relationship”, “natural death of a significant other”, “severe accident”, and “other not listed”. Higher scores indicate greater trauma symptomatology.

Statistical analysis

Analyses were conducted in R, version 3.5.1 (R Core Team, 2018) with packages *semTools* (v 0.5-0; Jorgensen, Pornprasertmanit, Schoemann & Rosseel, 2018), *psych* (Revelle, 2018) and *lavaan* (version 0.6-3; Rosseel, 2018). For analysis, the sample was split into three equal subsamples of nearly 3000 people. This was to enable refinement of the item pool via two exploratory factor analyses (EFA) with appropriately large samples, and then a test of the final factor structure in a third

subsample via confirmatory factor analysis (CFA). Sample splitting was done by randomly allocating cases to subsets using a function in R.

The global items were separated from items developed using the FSA matrix and analysed separately. This was done for two reasons: first, because the construct underlying these items was distinct (they represent general FSA, rather than an interaction between a type and domain); and second, to fulfil the aim of providing a very brief, standalone tool with which to measure the underlying common denominator of FSA. This may have utility in situations where a shorter measure would be more appropriate (e.g. screening in clinics).

In each EFA, parallel analysis (Horn, 1965) using the 'parallel analysis engine' (Patil, Singh, Mishra & Donovan, 2007) was carried out to determine the appropriate number of factors. This method states that factors should be retained only where calculated factor eigenvalues are greater than those which may be obtained by chance. It is a method that is largely considered to be more accurate than the Minimum Average Partial (MAP) test (Velicer, 1976), which has been shown by simulation studies to lead to under-factoring (Pearson, Mundrom & Piccone, 2013). It is also preferable to using the Kaiser criterion (accepting all factors with an eigenvalue greater than 1.0; Kaiser, 1960), since this can lead to over-factoring.

In order to refine the item pool to improve model fit, items which loaded weakly to a factor (less than 0.3), or cross-loaded strongly across multiple factors (loading coefficients within 0.2), were discarded after each EFA. Model fit parameters were assessed for fit following the recommendations of Beierl, Bühner and Heene (2018).

Following measure development in the first and second subsamples, and confirmatory factor analysis in the third subsample, the psychometric properties of the final scale(s) were also assessed in the third subsample. Validity was tested via

convergent validity with an existing dissociation measure (the DES-II) using Pearson correlation. Further, confirmatory factor analyses were carried out to test the factor structure in participants scoring above and below the clinical cut-off on the PTSD measure (PCL-5; Weathers et al., 2013). Reliability was assessed via internal consistency (Cronbach's alpha) and one-week test-retest reliability (intra-class correlation).

Results

Firstly, the Kaiser-Meyer-Olkin (KMO) and Bartlett's test of sphericity statistics were inspected for each of the three subsamples. The KMO statistic tests the relationships among variables, and the Bartlett's test tests the correlations within the correlation matrix. These are both required to be high for factor analysis to be viable. For all three subsamples, the KMO (Sample 1: KMO = 0.99; Sample 2 = 0.99; Sample 3 = 0.99) and Bartlett's test of sphericity statistics (Sample 1: χ^2 (5356) = 292738.9, $p < 0.001$; Sample 2: χ^2 (5356) = 288075.7, $p < 0.001$; Sample 3: χ^2 (5356) = 295685.4, $p < 0.001$) indicated that factor analysis was appropriate.

Items developed from the FSA matrix: Černis Felt Sense of Anomaly (FSA) Scale
EFA with oblique rotation was carried out on the first two subsamples, with items discarded after each EFA according to the criteria described above.

The first EFA (n=2953) indicated that a seven-factor solution was the most appropriate using parallel analysis. A Chi-square difference test was used to compare five-, six-, and seven-factor models and determine which best fit the data. This model comparison method, and initial inspection of the factor contents from a theoretical perspective supported a seven-factor structure (Chi square: 25524.400, $df=4088$, $p < 0.001$, CFI=0.920, RMSEA=0.042, SRMR=0.018). Factors were identified as

'Anomalous Experience of the Self', 'Anomalous Experience of the Physical Body', 'Altered Sense of Familiarity', 'Anomalous Experience of Emotion', 'Altered Sense of Connection', 'Altered Sense of Agency', and 'Altered Sense of Reality'.

After the second EFA ($n=2954$), only five items meeting the aforementioned criteria were retained per factor. These were selected based on which combination of five items produced a theoretically well-rounded set of items within the factor (i.e. reducing repetition where possible). The purpose of this was to reduce the length of the final measure, whilst evenly representing all factors and describing a broad range of clinically useful dissociative experiences. This was achieved via consensus between the DPhil candidate and supervisors. The result was a measure of 35 items, each of which load strongly to their factor (Chi square=10215.014, $df=2138$, $p<0.001$, CFI=0.944, RMSEA=0.036, SRMR=0.016). The final scale (the Černis Felt Sense of Anomaly; ČEFSA scale) can be found in Appendix 2.5.

In the third and final subsample, a Confirmatory Factor Analysis (CFA) ($n=2954$) was carried out to test the seven-factor structure of the 35-item measure. This showed a good model fit for a second-order factor structure (Chi square=4989.435, $df=553$, $p<0.001$, CFI=0.929, RMSEA=0.052, SRMR=0.047), where the high loadings of each of the seven factors indicate that they well-represent the higher-order construct of FSA-type dissociation (Figure 2).

A second-order factor structure was chosen as this is a better theoretical fit for the data. That is, all seven first-order factors represent facets of the broader construct of dissociation: the measure factors are correlated because they share a common cause.

Figure 2. The second-order seven-factor structure of the measure, with factor loadings.

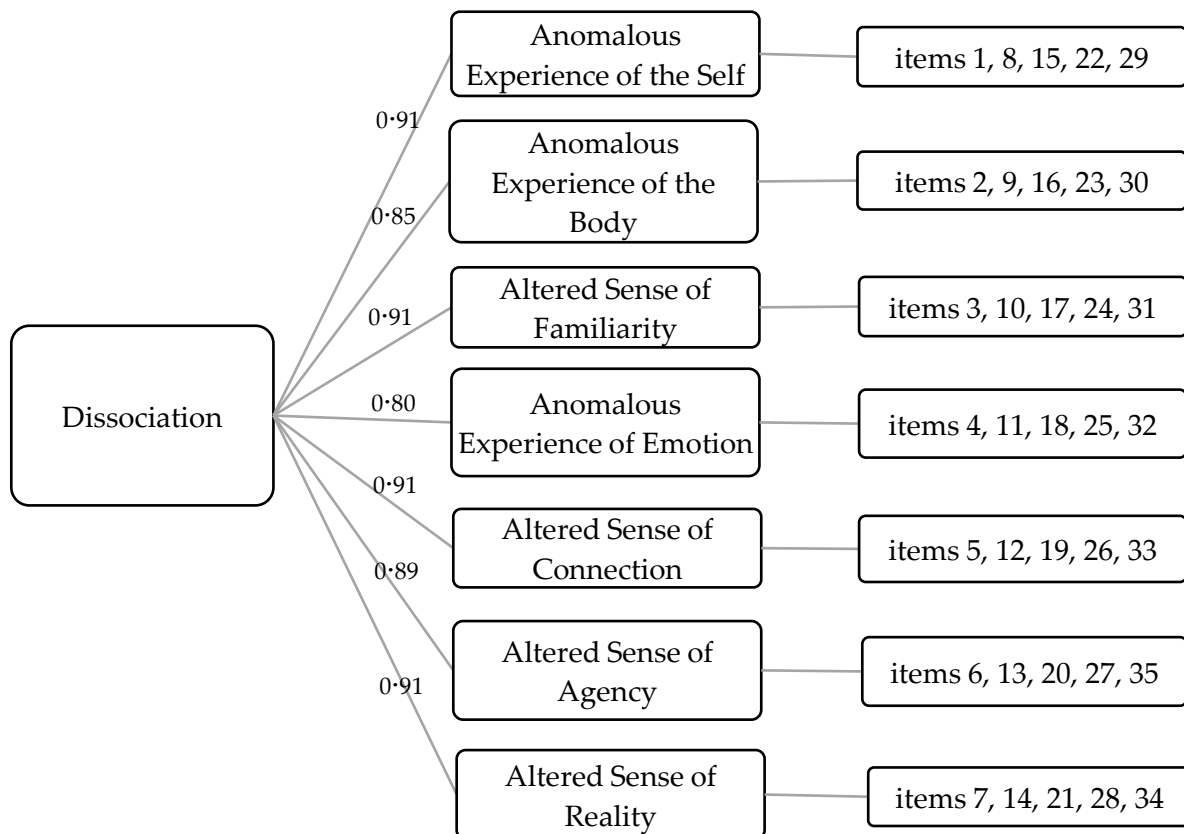
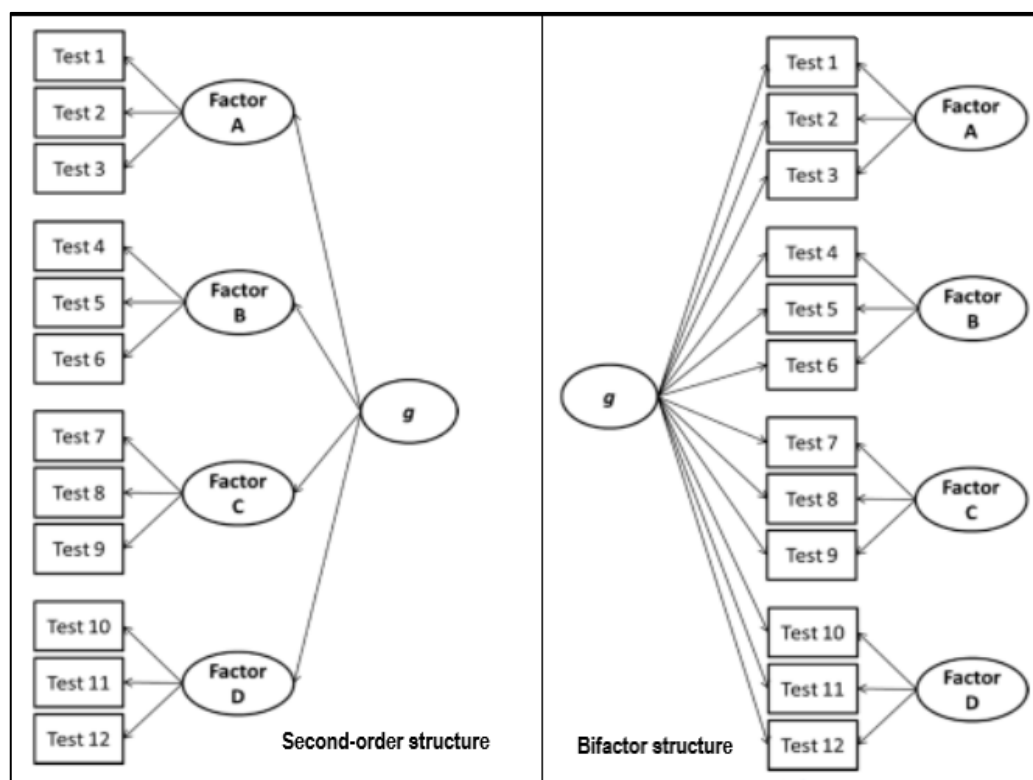


Figure 3 shows the second-order factor structure and the alternative: a bifactor structure, where factors are correlated because they share some common quality (e.g. item wording), *and* the individual items reflect the latent variable. The two differ in how they explain the relationship between the measure items, measure factors, and the latent variable. A second-order factor structure demonstrates that changes in respondents' answers to the items of the measure (illustrated as 'Test 1', 'Test 2' etc.), reflect changes in the more general factor ('Factor A' etc.), which are illustrative of changes in the wider latent variable: dissociation (illustrated as 'g' in Figure 3).

Figure 3. Second-order and bifactor structures. Adapted from figures in Cucina and Byle (2017).



The ČEFSA showed good psychometric properties (Table 6). There was good convergent validity with the DES-II ($r=0.802$, $p<0.001$), and excellent test-retest reliability over a week ($ICC=0.92$; 95% $CI=0.88-0.94$; $p<0.001$). Internal consistency within the seven subscales was excellent (Cronbach's alphas of 0.86 to 0.92), indicating little conceptual contradiction between the items of any given factor.

Further, CFAs were carried out after dividing cases in the whole non-clinical sample into two groups: those scoring above ($N=2836$), and those below ($N=4135$) the clinical cut off of 33 on the PCL-5 (above group: mean=50.38, $SD=11.07$; below group: mean=15.33, $SD=9.86$). (Only cases with less than 20% missing data for ČEFSA items and the PCL-5 were included in this analysis). Both CFAs demonstrated a good model fit, indicating that the factor structure of the ČEFSA is robust even in a population with significant trauma symptoms (high: Chi square=4758.673, $df = 553$,

$p < 0.001$, CFI=0.913, RMSEA=0.052, SRMR=0.054; low: Chi square=5487.204, $df=553$, $p < 0.001$, CFI=0.919, RMSEA=0.046, SRMR=0.050).

Global items: Global FSA Scale

The same methodology was followed to separately develop and validate the Global FSA scale: EFA with oblique rotation in the first and second subsamples indicated a single factor structure (1st EFA: Chi square=275.050, $df=9$, $p < 0.001$, CFI=0.975, RMSEA=0.100, SRMR=0.019; 2nd EFA: Chi square=301.402, $df=9$, $p < 0.001$, CFI=0.969, RMSEA=0.105, SRMR=0.021). After the second EFA, only five items were retained, following the same procedure as described for the main scale, above. Additionally, one item was reworded for clarity, and therefore the CFA was carried out in the test-retest subsample ($n=240$), as these participants answered the newer version of the item. The CFA indicated that the one-factor structure with 5 items was a good model fit (Chi square=13.454, $df=5$, $p < 0.019$, CFI=0.993, RMSEA=0.084, SRMR=0.012). The final scale can be found in Appendix 2.6.

The Global FSA scale was also found to have good psychometric properties (Table 6). Again, the scale demonstrated good convergent validity with the DES-II ($r=0.699$, $p < 0.001$), good test-retest reliability (ICC=0.84; 95% CI=0.78-0.89; $p < 0.001$), and excellent internal consistency (Cronbach's $\alpha=0.95$).

Table 6. Summarising the psychometric properties of the Černis Felt Sense of Anomaly scale: the final 35 items developed from the FSA matrix which make up the main body of the scale, and the 5 global felt sense of anomaly items which can act as a standalone brief measure.

Psychometric		Statistic
Černis Felt Sense of Anomaly (ČEFSA) scale (35 items, 7 factors):		
Test re-test reliability (n = 240)	ICC statistic	0.92
	Lower bound	0.88
	Upper bound	0.94
	Degrees of freedom	239; 239
	K	2
	P	<0.001
	F statistic	25
Internal consistency (n=2954)	Factor	Cronbach's alpha
	Anomalous Experience of the Self	0.87
	Anomalous Experience of the Body	0.91
	Altered Sense of Familiarity	0.90
	Anomalous Experience of Emotion	0.92
	Altered Sense of Connection	0.91
	Altered Sense of Agency	0.86
	Altered Sense of Reality	0.89
	Total (35 items)	0.97
Convergent validity (n=2954) (vs. DES-II)	Pearson's r	0.802
Global Felt Sense Of Anomaly Scale (5 items, 1 factor):		
Test re-test reliability (n=240)	ICC statistic	0.84
	Lower bound	0.78
	Upper bound	0.89
	Degrees of freedom	239; 239
	k	2
	p	<0.001
	F statistic	12
Internal consistency (n=240)	Cronbach's alpha	0.95
Convergent validity (n=240) (vs. DES-II)	Pearson's r	0.699

Relationship Between Measures

Correlations were carried out between the Global FSA scale and seven factors derived from the FSA matrix (Černis Felt Sense of Anomaly scale). These indicated a high level of correlation (Table 7).

Table 7. Summarising the correlation statistics (r) between the Global FSA scale and the factor scores and Černis Felt Sense of Anomaly (ČEFSA) scale total and factor scores

Factor	r statistic
ČEFSA total score	0.856
Anomalous Experience of the Self	0.797
Anomalous Experience of the Body	0.761
Altered Sense of Familiarity	0.767
Anomalous Experience of Emotion	0.674
Altered Sense of Connection	0.848
Altered Sense of Agency	0.682
Altered Sense of Reality	0.801

NB: All p values <0.001

Additionally, the internal consistency was high when the items of the main seven-factor scale and the Global FSA scale were analysed together (Cronbach's $\alpha=0.98$). This indicates that as well as being used independently as a 5-item 'screener' for FSA, the general items scale may potentially act as an optional 'eighth factor' when assessing FSA-type dissociation in full.

B. Measure validation (clinical group)

Methods

Study design

The design was a cross-sectional self-report questionnaire study: the *Exploring Unusual Feelings Study*. The Participant Information Sheet and Informed Consent Form can be found in Appendices 2.7 and 2.8 respectively. The study received ethical approval from the NHS Health Research Authority, London (City & East) Research Ethics Committee (ref: 19/LO/1394), and was supported by the National Institute of Health Research (NIHR) Clinical Research Network (CRN).

Procedure & Participants

Participants were recruited by CRN research assistants and clinical studies officers embedded in clinical teams and Research and Development departments across 36 NHS trusts in England. Research workers from these teams approached patients meeting the inclusion criteria, gained informed consent, and supported participants to complete the assessment pack. Inclusion criteria were broad: any person (age 16 years or over), currently under the care of an NHS mental health service, with a diagnosis of non-affective psychosis, who was willing and able to give informed consent to participate. Exclusion criteria were: insufficient English language to complete the questionnaires with support, and an affective psychosis diagnosis (i.e. psychotic depression, bipolar disorder).

Recruitment took place between 18th October 2019 and 19th March 2020. Datasets from 1038 participants were returned. For the validation analyses, only cases without high levels of missing data in the measure of interest (less than or equal to 20% missing) were retained. This resulted in a participant group of 1031 patients for the ČEFSA validation, and 1028 for the Global FSA measure validation analysis.

In the ČEFSA validation group (n=1031), the majority of participants were White (66.83%), male (69.74%), under the care of mental health services as an outpatient (74.30%) and had a diagnosis of Schizophrenia (64.60%). The mean age of the sample was 41.54 (SD=12.32) years. See Table 8 for full demographic details.

The Global FSA scale validation group (n=1028) did not differ significantly from the ČEFSA validation group in terms of any demographics presented in Table 8. Their mean score on the Global FSA scale was 7.85 (SD=5.61; range=0-20).

Table 8. Showing the demographic data for the clinical participant group (n=1031)

Demographic	n (% of group)
Gender	<i>Female:</i> 303 (29.39%)
	<i>Male:</i> 719 (69.74%)
	<i>Other:</i> 5 (0.48%)
Ethnicity	<i>White (any):</i> 689 (66.83%)
	<i>Black (any):</i> 176 (17.07%)
	<i>Asian (any):</i> 98 (9.51%)
	<i>Mixed / Multiple:</i> 44 (4.27%)
	<i>Other:</i> 18 (1.75%)
Diagnosis	<i>Schizophrenia</i> 666 (64.60%)
	<i>Schizoaffective</i> 153 (14.84%)
	<i>Delusional Disorder</i> 14 (1.36%)
	<i>Psychotic Disorder NOS*</i> 69 (6.69%)
	<i>First Episode Psychosis</i> 105 (10.18%)
	<i>Other psychosis disorder</i> 24 (2.33%)
Care team type	<i>Inpatient</i> 265 (25.70%)
	<i>Outpatient</i> 766 (74.30%)
	<i>Early intervention</i> 124 (12.03%)

Demographic	Range	Mean (Standard Deviation)
Age	18 - 74	41.54 (12.32)

Measure	Range	Mean (Standard Deviation)
Černis Felt Sense of Anomaly scale**	0 - 140	39.54 (30.48)

*including Unspecified Non-Organic Psychosis

** *t-tests for differences in mean scores between genders male and female found no significant statistical differences

Measures

Participants completed the Černis Felt Sense of Anomaly (ČEFSA) and the Global FSA scales as developed in the non-clinical group, above.

Statistical analysis

Analyses were conducted in R, version 3.6.3 (R Core Team, 2020) with packages psych (version 1.9.12.31; Revelle, 2019) and lavaan (version 0.6-5; Rosseel, 2019). The measure model fit was assessed using Confirmatory Factor Analysis (CFA) with

MLR robust maximum likelihood estimator. Due to restrictions within the study design, it was not possible to collect data for assessing convergent validity against another dissociation measure, nor test-retest reliability. Internal reliability was analysed using Cronbach's alpha.

Results

Černis Felt Sense of Anomaly (ČEFSA) scale

Confirming that factor analysis was appropriate, Bartlett's test of Sphericity was significant ($\chi^2=4269.89$, $df=595$, $p<0.001$) and the Kaiser-Meyer-Olkin test of sampling adequacy was high ($KMO=0.98$).

CFA indicated an adequate fit for an 7-factor second-order model ($\chi^2(553)=1623.641$, $p<0.001$, $CFI=0.927$, $TLI=0.921$, $RMSEA=0.043$, $SRMR=0.043$), with factor loadings as shown in Table 9. In this group, the ČEFSA had good internal consistency (whole scale Cronbach's alpha = 0.97).

Table 9. Summarising the factor loadings and internal consistencies of the Černis Felt Sense of Anomaly scale

Factor:	Factor loading onto the latent construct of dissociation	Internal consistency: Cronbach's alpha
Anomalous Experience of the Self	0.96	0.83
Anomalous Experience of the Body	0.89	0.85
Altered Sense of Familiarity	0.92	0.84
Anomalous Experience of Emotion	0.78	0.89
Altered Sense of Connection	0.98	0.87
Altered Sense of Agency	0.96	0.84
Altered Sense of Reality	0.92	0.85
Whole scale (35 items):		0.97

Global FSA scale

Confirming that factor analysis was appropriate, Bartlett's test of Sphericity was significant ($\chi^2=684.543$, $df=10$, $p<0.001$) and the Kaiser-Meyer-Olkin test of sampling adequacy was adequate ($KMO=0.89$).

CFA indicated an adequate fit for a 1-factor model ($\chi^2(5)=12.127$, $p=0.033$, $CFI=0.996$, $TLI=0.991$, $RMSEA=0.037$, $SRMR=0.011$). In this group, the global FSA scale had good internal consistency (whole scale Cronbach's $\alpha = 0.92$).

Discussion

The first aim of this chapter was to establish a working definition of dissociation for use within the subsequent chapters of this thesis. As illustrated by Chapters One and Two, dissociation has been used to describe a wide range of experiences and is currently poorly conceptualised. Clarity and precision regarding the definition of 'dissociation' is therefore particularly important for applying the Oxford Approach to this construct. Since some argue that symptoms currently labelled 'dissociative' lack a 'single, coherent referent' (Cardeña, 1994), this chapter took the 'bottom-up' approach of focusing on the phenomenological level. Aided by the qualitative data in Chapter Two and a novel systematic review, this chapter has demonstrated that a seemingly disparate set of common dissociative experiences are unified by the phenomenological common denominator of 'a felt sense of anomaly' (FSA).

The theoretical framework presented here posits that dissociative experiences sharing a core sensation of FSA feature an anomaly of a particular 'type' (e.g. unfamiliarity, unreality) and may occur in a particular 'domain' of experience (e.g. physical body, external world). The development of the Černis Felt Sense of Anomaly scale (ČEFSA; Appendix 2.5) constitutes the first empirical test of this theoretical framework, and answers the chapter's second aim: to operationalise the new working definition. The second-order seven-factor solution of the ČEFSA closely follows the structure of the FSA matrix. Four factors of the ČEFSA (Altered Sense of Familiarity, of Connection, of Agency, and of Reality) reflect nearly all 'type' columns of the matrix. The remaining three factors of the ČEFSA (Anomalous Experience of the Self, of the Body, and of Emotion) reflect three of the eight 'domain'

rows of the matrix – one might hypothesise that these are particularly salient domains in the context of FSA-type dissociation.

As a tool for the assessment of FSA-type dissociation, the ČEFSA is psychometrically robust, easy to read, and appropriate for both non-clinical respondents (including those reporting trauma symptoms) and clinical respondents with diagnoses of psychosis. The correlation between the ČEFSA and DES was high, likely because of the number of items within the DES that concern FSA. However, the ČEFSA has the additional benefit of being developed through a systematic delineation of the concept of FSA. Consequently, it reflects an underlying theoretical framework, and reflects this construct more comprehensively than does the DES. As a result, the ČEFSA includes less severe, or more difficult to articulate experiences that may not have received adequate attention previously such as ‘I feel like I don’t have a personality’ and ‘I can’t feel emotions’ in the Anomalous Experience of the Self and Anomalous Experience of Emotion factors.

Of course, it remains to be seen whether ‘FSA-type’ dissociative experiences represent a truly separable construct or type of dissociation with a shared aetiology. FSA-type dissociation is envisaged here as a set of experiences at the milder end of a dissociation spectrum (albeit causing considerable distress; Chapter Two), and currently stands only as a working definition for use within this thesis.

However, despite being a working hypothesis, the construct of FSA-type dissociation may nevertheless be useful in clinical and research settings because of its emphasis on the core lived experience of FSA. Centring the framework on this core experience distils the surface-level complexity of such presentations into a broad but nevertheless descriptive heuristic which could aid recognition of dissociative symptoms when they arise. Defining dissociation in terms of FSA would allow clinicians to pinpoint the problematic element of a person’s experience, regardless of

its specific content and context, enabling clarity about which experiences are included in this subtype of dissociation (by applying the FSA matrix). Further exploration of this construct and the factor structure of the ČEFSA within other clinical groups (particularly dissociative disorder groups) would therefore be an important next step for the development and validation of the ideas proposed here.

It is important to note that the construct of FSA-type dissociation does not preclude existing suggestions of dissociative subtypes. For example, domains relating to the self, the body and internal experiences also describe ‘depersonalisation’, and domains relating to the external world and other people describe ‘derealisation’. There is also feasible overlap between Holmes et al.’s (2005) detachment and the ‘disconnected’ (and possibly ‘unreal’ and ‘unfamiliar’) ‘type’ of FSA, and between compartmentalisation and the ‘automatic’ (and possibly ‘absent’) types (Figure 4). It would be of interest to explore this overlap using the ČEFSA and the recently published Detachment and Compartmentalization Inventory (DCI; Butler, Dorahy & Middleton, 2019).

There are, of course, limitations to the proposed theoretical framework. One major criticism may be the omission of ‘dissociative amnesia’ experiences from the FSA matrix. Whilst *detachment* or *unfamiliarity* of memory does fall within the framework, frank dissociative amnesia (such that another ‘part’ of the personality retains a memory that is entirely inaccessible by another ‘part’) is not. However, despite it being regarded as a cardinal symptom of dissociation by many, the topic of dissociative amnesia remains controversial (Lynn et al., 2019). Therefore, it is important to note that FSA-type dissociation does not preclude the possibility of dissociative amnesia, but includes itself only those experiences where memory is experienced with a subjective sense of strangeness. Experiences where the person completely loses awareness of their current surroundings or responds to content in memory as if it represented the present are also not captured by the ČEFSA scale.

Figure 4. The 'FSA matrix' with previous conceptualisations overlaid. (NB: Detachment and compartmentalisation refer to constructs outlined by Holmes et al. 2005)

	Unreal	Unfamiliar	Automatic	Disconnected	Absent	
Mind	My thoughts don't seem real.	Some of the things in my head don't seem to be mine.	I can't access my thoughts or memories at will.	I feel detached from my own mind.	My mind goes completely empty.	Depersonalisation
Affect	My emotions don't seem real	I have emotions that don't feel like they're mine.	My emotional reactions don't fit with the situation I am in.	I feel disconnected from my emotions.	I can't feel emotions.	
Physiology	My body (or parts of it) feels unreal or strange.	My body (or parts of it) feels like it doesn't belong to me.	My body (or parts of it) feels like it has a mind of its own.	I feel disconnected from the sensations in my body.	My body feels numb.	
Perception	The things happening around me seem unreal to me – like a dream or a movie.	One or more of my senses seem strange, distorted, or odd to me.	My sense of sight, touch, hearing (etc.) don't respond to me.	I feel as if I'm experiencing life from very far away.	I don't notice how much time passes.	
Identity	I feel that I'm not a real person.	I don't recognize myself.	I act like someone else without meaning to.	I feel disconnected from who I really am.	I feel like I don't exist.	
Behaviour	My actions feel fake or unreal.	Things I've done many times before seem new or unfamiliar.	I feel like I'm on automatic pilot.	I feel disconnected from my own actions.	I freeze, unable to do anything.	Derealisation
World	The world around me seems unreal.	Places that I know seem unfamiliar.	-	I feel that I'm not part of the world around me.	I am absorbed in my own world and do not notice what is happening around me.	
Others	Other people seem unreal.	People I know seem unfamiliar.	-	I feel detached from the people I am close to.	Other people stop existing when I can't see them.	

Compartmentalisation
Detachment

A key limitation of the measure development is the sampling method in the non-clinical group. Recruitment via Facebook ads attracted a sample which does not accurately reflect the general population, since it relies upon people who engage with social media and are willing to partake in online questionnaires. In particular, there is a large skew towards female gender and White ethnicity in the sample demographics, as well as a high level of self-reported mental health difficulties. People who have dissociative symptoms may also be overrepresented, likely resulting from self-selection bias due to the title of the study. It is a further limitation that test-retest data could not be collected for clinical participants.

Chapter Conclusions

This chapter has provided two valuable tools for the progression of the aims outlined in Chapter One: a clear working definition of the construct to be investigated, and a psychometrically-robust, comprehensive measure with which to detect the construct in subsequent studies.

In the absence of a widely accepted conceptualisation, this thesis will henceforth consider dissociation in terms of an empirically delineated, discrete subset of common dissociative experiences that are unified by a phenomenological common denominator: a 'felt sense of anomaly' (FSA). Focusing on this phenomenologically coherent set of experiences (FSA-type dissociation) fulfils the first stage of the Oxford Approach: to clearly define the phenomenon of interest. Specifically, this theoretical framework facilitates precision in the definition of dissociation, minimising the impact of construct heterogeneity on the results and conclusions of subsequent studies.

Further, the construct of FSA-type dissociation and its theoretical framework appear valid in the context of non-affective psychosis. Examples of common dissociative experiences from this subset, and their core phenomenology (FSA), were described by patients with psychosis in Chapter Two, and Chapter Three has demonstrated empirical support for the proposed theoretical framework in a psychosis group.

Therefore, the subsequent chapters of this thesis will define and measure dissociation in non-affective psychosis in terms of FSA.

4 Cognitive Appraisals of Dissociative Experiences¹

'I suppose you genuinely think you're just completely losing your mind.'
(Qualitative study participant 4)

'I started thinking I had brain cancer.'
(Qualitative study participant 7)

'I thought that I might have died and this is hell.'
(Qualitative study participant 12)

Chapter Abstract

Rationale

In order to develop a cognitive model of dissociation, cognitive appraisals of dissociative experiences must be considered. Catastrophic cognitive appraisals, similar to those in anxiety disorders, are implicated in depersonalisation, a form of dissociation. However, cognitive appraisals of dissociation have not been explored in psychosis and no scales exist to measure them. Therefore, the primary aim of this chapter is to identify and develop a measure of key appraisals of dissociation in psychosis.

Methods

An initial item pool of cognitive appraisals was generated from the transcripts analysed in Chapter Two. A novel measure was developed* and psychometrically validated via factor analysis of data from general population participants and patients with psychosis.

Results

A 13-item single factor measure was developed. The scale had good convergent validity with a rumination measure, and the measure of FSA-dissociation developed in Chapter Three. It explained variance in psychotic symptoms, including additional variance compared to FSA-dissociation alone.

Conclusions

This chapter identifies key cognitive appraisals of dissociation in psychosis. The resulting assessment measure contains appraisals common in anxiety and paranoia, as well as potentially distinctive concerns regarding selfhood and control. The measure is psychometrically valid within a psychosis group.

¹ This chapter is adapted from the paper attached in Appendix 7.3: Černis E, Bird J, Molodynski A, Ehlers A, Freeman D (in press). Cognitive appraisals of dissociation in psychosis: A new brief measure. *Behavioural and Cognitive Psychotherapy*. DOI: 10.1017/S1352465820000958

*The statistical analysis in Part 1 was carried out in collaboration with Dr J. C. Bird.

Introduction

Cognitive approaches to psychological disorders emphasise the importance of ‘idiosyncratic conceptualization[s]’ or appraisals in shaping a person’s affective and behavioural response to internal and external stimuli (Beck, 1971). Cognitive appraisals are a person’s automatic and instinctive (but not necessarily accurate) understanding of a stimulus – for example, interpreting ambiguous social cues to mean ‘they don’t like me’. Such responses are considered crucial to the development and maintenance of psychological disorders and are an important target in cognitive therapy. Therefore, to understand dissociation in non-affective psychosis from this perspective, and in order to build towards a cognitive model of this construct, this thesis must also consider the role of cognitive appraisals of dissociative experiences.

Hunter and colleagues (2003) outline a cognitive model for depersonalisation disorder (DPD), and Baker and colleagues (2007) for the dissociative experiences of ‘depersonalisation and feelings of unreality’. Both models highlight the role of ‘catastrophic attributions’ for the dissociative experience as central to the occurrence of the disorder, in a manner similar to that found in anxiety disorders, and particularly panic disorder (Clark, 1999). As in panic disorder, Hunter and colleagues propose that the transient symptoms experienced in DPD are misinterpreted as indicative of impending catastrophe. In panic disorder, this may be heart palpitations being mistaken as a sign of imminent heart attack; whilst in DPD a feeling of detachment may be taken as a sign of becoming ‘mad’. Cognitive appraisals of dissociative symptoms as dangerous therefore result in an increase in anxiety (further exacerbating the dissociative symptoms), and lead to behaviours intended to neutralise the threat, but which actually serve to heighten attention towards them – such as monitoring symptoms and increasing introspection (Hunter, Phillips, Chalder, Sierra & David, 2003). In the course of empirically testing this model, Hunter, Salkovskis and David (2014) demonstrated that a DPD group were less likely than a non-clinical group to make normalising attributions when

prompted to generate as many reasons in one minute why they might experience various DPD, anxiety, and neutral symptoms. In a second task, the DPD group were found to endorse catastrophic appraisals about mental illness or brain dysfunction in a manner similar to an anxiety disorder (OCD or panic disorder) comparison group. Both of these findings support the hypothesis that anxiety-like cognitive appraisals may be important in this form of dissociation. Further, consistent with the depersonalisation literature, anxiety processes have also been implicated in dissociation in psychosis (Freeman et al., 2013; Černis et al., 2014). However, to date, there has been no research into the specific cognitive appraisals that may be important in the maintenance of dissociation.

The aim of this chapter, therefore, is to identify which specific cognitive appraisals of dissociation may be key in the context of psychosis. Before research can investigate the role of these appraisals in the development and maintenance of dissociation, a method for eliciting and measuring them is required. Thus, this chapter's aim will be achieved via measure development. As in Chapter Three, data from a psychosis patient group will be used to validate a novel measure which is first developed via factor analysis of data from general population participants.

Part 1 - Developing the Measure

Method

Procedure & Participants

The design was an online cross-sectional self-report questionnaire study. Participants were recruited via social media, the majority via Facebook adverts (Appendix 3.1). The advertisements were titled "*Understanding dissociative experiences*" and stated that researchers were seeking participants to "*to complete questionnaires about different kinds of thoughts*", and that they need not have experienced dissociation to take part. The information sheet (Appendix 3.2)

described dissociation as a range of experiences “*where people describe feeling ‘strange’ or ‘disconnected’ – they might feel like they are ‘spacing out’, feel ‘unreal’, or feel emotionally detached from the world*”. Inclusion criteria were deliberately broad: any adult (age 18 years or over), usually resident in the United Kingdom. There were no exclusion criteria.

All responses were collected via online surveys using Qualtrics (2018). The survey landing page contained the participant information sheet and statements regarding informed consent (British Psychological Society, 2017). Surveys were accessible on desktop and mobile web browsers. Incomplete surveys were retrieved automatically after a week of non-activity and added to the dataset.

There were three phases of data collection. Data collection for Phase 1 (full item pool) ran from 11th to 21st January 2019; and for Phase 2 (refined item pool) from 30th January to 26th February 2019. Phase 3 (test-retest) data were collected from a sub-sample of Phase 2 participants between April 5th and 23rd 2019. Following the removal of cases with high levels of missing data in the item pool (greater than 20% missing), sample sizes for the three phases were $n=1615$, $n=8287$, and $n=140$, respectively. For all samples, the majority of participants were White (>94.00%) and female ($\geq 80.00\%$). The mean ages of the samples were 49.94 (SD=14.40), 45.84 (SD=14.86) and 46.69 (SD=15.27) years, respectively. See Table 1 for full demographic details.

Table 1. Demographic data and descriptive statistics for all groups.

Participant group		Phase 1	Phase 2	Test-Retest (subset of Phase 2)	Clinical	
N		1615	8287	140	1026	
Age Mean (SD)		49.94 (14.40)	45.84 (14.86)	46.69 (15.27)	41.49 (12.29)	
Gender N(%)	Female:	1433 (88.73%)	7103 (85.71%)	112 (80.00%)	300 (29.24%)	
	Male:	142 (8.79%)	962 (11.61%)	20 (14.29%)	717 (69.88%)	
	Other:	35 (2.17%)	165 (1.99%)	6 (4.29%)	5 (0.49%)	
Ethnicity N(%)	White (any):	1551 (96.04%)	7866 (94.92%)	133 (95.00%)	687 (66.96%)	
	Mixed / Multiple:	25 (1.55%)	175 (2.11%)	3 (2.14%)	43 (4.19%)	
	Asian (any):	12 (0.74%)	80 (0.97%)	2 (1.43%)	98 (9.55%)	
	Black (any):	3 (0.19%)	20 (0.24%)	0 (0%)	175 (17.06%)	
	Other:	6 (0.37%)	38 (0.46%)	0 (0%)	17 (1.66%)	
Measure Mean (SD)	CAD-P	19.05* (10.70)	16.58 (11.79)	Week 1: 20.12 (10.69) Week 2: 19.87 (11.17)	18.70 (13.35)	
	ČEFSA	-	41.76 (26.14)	-	39.65 (30.51)	
	PTQ	-	34.97 (13.83)	-	30.32 (16.38)	
Have you ever experienced mental health difficulties? N(%)	Yes	1222 (75.67%)	6584 (79.45%)	Diagnosis N(%)	Schizophrenia	662 (64.52%)
	No	360 (22.29%)	1557 (18.79%)		Schizoaffective	153 (14.91%)
If “yes”, are these ongoing? N(%)	Yes	886 (72.50%)	4919 (74.71%)		Delusional Disorder	14 (1.36%)
	No	312 (25.53%)	1520 (23.09%)		Psychotic Disorder NOS**	69 (6.73%)
					First Episode Psychosis	105 (10.23%)
					Other SSD	23 (2.24%)
CAD-P	Cognitive Appraisals of Dissociation in Psychosis					
ČEFSA	Černis Felt Sense of Anomaly scale					
PTQ	Perseverative Thinking Questionnaire					
SSD	Schizophrenia Spectrum Disorder					
			* Contains item “I’m so lonely” which was later amended to “I am all alone”			
			** Not Otherwise Specified (NOS) also includes Unspecified Non-Organic Psychosis			

* Contains item “I’m so lonely” which was later amended to “I am all alone”

** Not Otherwise Specified (NOS) also includes Unspecified Non-Organic Psychosis

Measures

Fifty items about cognitive appraisals of dissociation (Appendix 3.3) were developed from transcripts of interviews carried out for the qualitative study in Chapter Two. These largely consisted of phrases used by participants when answering direct questions about the thoughts that occurred to them when they noticed dissociation arising (e.g. *"This might be a dream"*). Additionally, a number of items encapsulated participants' beliefs and concerns about dissociation that could feasibly have been experienced in the form of a cognitive appraisal (e.g. *"There's no point fighting this"*).

Participants in the online measure development study rated the 50 items (Appendix 3.3) for the past two weeks on a Likert scale from *"0, Never"* to *"4, Always"* with the instruction *"Please rate how often you think the following when you are feeling strange, disconnected, unreal or 'dissociated'"*. Participants were prompted to answer to the best of their ability, and only to rate sensations that they believed were not caused by a physical health condition (e.g. migraine).

As well as a refined selection of the above items, participants in Phase 2 also completed two further measures:

Perseverative Thinking Questionnaire (PTQ; Ehring et al., 2011)

This measure was included to enable the assessment of the new measure's convergent validity. Without an existing measure of cognitive appraisals of dissociation available for comparison, a measure of proneness to more general ruminative negative thinking was judged to be an appropriate alternative. Indeed, Hunter et al. (2003) implicate 'compulsive self-scrutiny' (p.1459) in the maintenance of depersonalisation, suggesting a negative and ruminative quality to the cognitive processes involved in this form of dissociation.

The PTQ is a 15-item scale assessing trait ruminative negative thinking, such as *“I keep thinking about the same issues all the time”*. Items are rated from *“0 Never”* to *“4 Almost Always”* and refer to how the respondent *“typically think[s] about negative experiences or problems”*. The range of this scale is 0 to 60. Higher scores indicate greater severity of trait negative ruminative thinking.

Černis Felt Sense of Anomaly (ČEFSA) scale (Chapter Three; Appendix 2.5)

As described in Chapter Three, the ČEFSA is a 35-item scale assessing dissociative experiences taking the form of subjective experiences of strangeness (Felt Sense of Anomaly; FSA). This includes items such as *“I don't fully experience emotions”* and *“I feel like a stranger to myself”* rated for the past two weeks on a 5-point Likert scale from *“0: Never”* to *“4: Always”*. The range of this scale is 0 to 136. Higher scores indicate greater levels of FSA-type dissociative experiences.

Statistical Analysis

Analyses were conducted in R, version 3.5.1 (R Core Team, 2018) with packages psych (version 1.8.12; Revelle, 2018) and lavaan (version 0.6-3.1295; Rosseel, 2018). Exploratory Factor Analyses (EFA) with oblimin rotation and maximum likelihood estimator were carried out to assess the structure of items and refine the item pool by discarding poor-fitting items. Items were judged to fit poorly if they loaded weakly to a factor (less than 0.3), had communalities less than 0.3, or loaded with similar strength onto multiple factors (loadings within 0.2). Note this latter criterion only applied during Phase 1, as Phase 2 analysis indicated a one-factor structure. The number of factors to extract was determined through parallel analysis and inspection of the scree plot.

The final measure model was assessed using Confirmatory Factor Analysis (CFA) with MLR robust maximum likelihood estimator. The measure's psychometric

properties were also assessed, including a test-retest reliability statistic, which used the test retest phase data collected specifically for this purpose. Convergent validity with the ČEFSA and PTQ were also assessed via Pearson's correlation, and internal reliability using Cronbach's alpha. Test-retest reliability was examined using the intra-class correlation (ICC) between Week 1 and Week 2 data collected specifically for this purpose (Test Retest group).

Results

Measure Development

Phase 1

Confirming that factor analysis was appropriate for the general population group data, Bartlett's test of Sphericity was significant ($\chi^2=51166.67$, $df=1225$, $p<0.001$) and the Kaiser-Meyer-Olkin test of sampling adequacy was high ($KMO=0.97$).

Following the criteria for removing poor-fitting items, and after removing items with inconsistent theoretical content (e.g. appraisals referring to oneself, rather than to dissociative experiences), EFA of Phase 1 data ($n=1615$) led to 27 of the original 50 items being discarded. Additionally, two items were re-worded at this stage to improve clarity of meaning (shown in Appendix 3.3): *"I'm so lonely"* became *"I am all alone"*, and *"This must mean I'm not human"* was re-worded to *"This must mean I'm an alien, ghost, or not human"*.

Phase 2

In Phase 2, a new sample of general population respondents ($n=8287$) completed the refined pool of 23 items. Confirming that factor analysis was appropriate, Bartlett's test of Sphericity was significant ($\chi^2=123890.00$, $df=253$, $p<0.001$) and the Kaiser-Meyer-Olkin test of sampling adequacy was high ($KMO=0.97$). This sample was split

using R's random sampling function into a development (n=4143) and validation (n=4144) sample for analysis.

In the development sample, the scree plot and parallel analysis tests indicated that a one-factor structure was the most appropriate fit for the data. Following factor analysis, a further six items were discarded for poor-fit, and four items due to high correlated residuals with other items. The resulting 13-item one-factor model explained 52% of the variance.

CFA in the validation sample demonstrated a good fit for this model ($\chi^2=900.639$, $df=65$, $p<0.001$, CFI=0.962, TLI=0.955, RMSEA=0.056, SRMR=0.025). Factor loadings of the final items in this sample are shown in Table 2.

Table 2. Factor loadings for the final items of the measure for the non-clinical and clinical validation groups.

Item	Participant Group	
	Non-Clinical (Phase 2, validation sample) (N=4144)	Clinical (N=1026)
1 I can't trust my own mind.	0.78	0.69
2 Someone has done something to me.	0.58	0.64
3 Something is terribly wrong.	0.78	0.76
4 I'm losing my mind.	0.82	0.78
5 I'm not really "me".	0.76	0.77
6 I am all alone.	0.71	0.66
7 I don't look right to other people right now.	0.75	0.71
8 I must be sick.	0.76	0.70
9 I'm not in the same world as everyone else.	0.65	0.73
10 This is because I am evil.	0.55	0.58
11 Now I won't be able to do the things I wanted.	0.72	0.68
12 It's not me in control right now.	0.73	0.74
13 This might last forever.	0.73	0.72

Measure Reliability and Validity

The 13-item Cognitive Appraisals of Dissociation in Psychosis (CAD-P) measure had excellent internal consistency ($n=4144$, Cronbach's $\alpha = 0.93$). It was also found to have excellent one-week test-retest reliability ($n=140$, ICC=0.90, 95% CI=0.85-0.94, $p<0.001$).

Further, good convergent validity was found when tested by Pearson's correlation with the PTQ ($n=8287$, $r=0.71$, $p<0.001$), and with the ČEFSA ($n=8287$, $r=0.81$, $p<0.001$). As there was a significant difference between genders on the PTQ ($p=0.023$; females: mean=34.97, SD=13.85; males: 33.85, SD=13.96), convergent validity was also tested for females and males separately. Both indicated high correlation between the CAD-P and PTQ (females: $n=7103$, $r=0.71$, $p<0.001$; males: $n=962$, $r=0.72$, $p<0.001$).

Part 2 - Validating the Measure

Method

Procedure & Participants

The data for this analysis were collected as part of the *Exploring Unusual Feelings Study* (Appendices 2.7 & 2.8) – a national cross-sectional self-report study recruiting NHS patients with non-affective psychosis aged over 16 years, as outlined in Chapter Three. Of the 1038 datasets returned, only cases without high levels of missing data in the CAD-P measure ($\leq 20\%$ missing) were retained for this analysis. This resulted in a participant group of 1026 patients.

In this group, the majority of participants were White (66.96%), male (69.88%), and had a diagnosis of Schizophrenia (64.52%). The mean age of the sample was 41.49 (SD=12.29) years. See Table 1 (above) for full demographic and descriptive details.

For the regression analyses, only cases without high levels of missing data (less than or equal to 20% missing) on the CAD-P, ČEFSA, and the two psychosis symptom measures were retained. This resulted in a subgroup of n=1015. The demographic details and descriptive statistics for this subgroup can be found in Table 3.

Table 3. Showing the demographic data and descriptive statistics for the clinical subgroup used in the regression analyses (n=1015)

Multiple regression analyses (N = 1615)			
Demographic	Mean (Standard Deviation)		Range
Age	41.44 (12.29)		18 - 74
Demographic	n (% of group)		
Gender	Female:	297 (29.26%)	
	Male:	709 (69.85%)	
	Other:	5 (0.49%)	
Ethnicity	White (any):	681 (67.09%)	
	Mixed / Multiple:	43 (4.24%)	
	Asian (any):	96 (9.46%)	
	Black (any):	172 (16.95%)	
	Other:	17 (1.67%)	
Diagnosis	Schizophrenia	657 (64.73%)	
	Schizoaffective	149 (14.68%)	
	Delusional Disorder	14 (1.38%)	
	Psychotic Disorder NOS*	68 (6.70%)	
	First Episode Psychosis	104 (10.25%)	
	Other Schizophrenia Spectrum Disorder	23 (2.27%)	
Measure	Group Mean (SD)	Range	Test for gender differences
Cognitive Appraisals of Dissociation in Psychosis	18.86 (13.22)	0 - 52	Females: 20.00 (13.86) Males: 18.36 (12.89) t-test: p=0.082 non sig.
Černis Felt Sense of Anomaly scale	40.54 (30.39)	0 - 140	Females: 40.97 (31.42) Males: 40.25 (29.93) t-test: p=0.737 non sig.
Revised Green Paranoid Thoughts Scale (Persecution subscale)	24.06 (12.10)	10 - 50	Females: 24.00 (12.26) Males: 23.94 (11.99) t-test: p=0.945 non sig.
Specific Psychotic Experiences Questionnaire (Hallucinations subscale - adapted)	17.11 (15.99)	0 - 55	Females: 18.27 (16.62) Males: 16.61 (15.65) t-test: p=0.143 non sig.

Measures

Participants answered the 13-item version of the CAD-P developed in Part 1 (Appendix 3.3), as well as the Perseverative Thinking Questionnaire (Ehring et al., 2011) and the Černis Felt Sense of Anomaly (ČEFSA) scale (Chapter Three; Appendix 2.5), as previously described. Participants also completed measures of paranoia and hallucinations:

Revised Green Paranoid Thoughts Scale (R-GPTS Persecution; Freeman et al., 2019)

The R-GPTS is a scale assessing paranoia via ideas of reference and persecution subscales. The persecution subscale of the R-GPTS was used in this study. This subscale comprises ten items (e.g. *“Certain individuals have had it in for me”*), rated over the past month on a five-point Likert scale from ‘0 - not at all’ to ‘4 - totally’. Higher scores indicate higher levels of paranoia, with a score above 18 indicating ‘severe’ levels of perceived persecution.

Specific Psychotic Experiences Questionnaire (SPEQ-H; Ronald et al., 2013)

The SPEQ comprises four scales which each assess a key psychotic experience. The hallucinations scale (SPEQ-H) was used in this study. This asks respondents to rate how frequently they have recently had particular experiences (e.g. *‘How often do you: hear noises or sounds when there is nothing about to explain them?’*) using a six-point Likert scale (‘0 - not at all’ to ‘5 - daily’). Higher scores indicate higher levels of hallucinatory experiences. This scale was adapted to include two further items assessing voice hearing: *‘How often do you... hear voices saying words or sentences when there is no one around that might account for it’* and *‘...hear two or more unexplained voices talking to each other’*. Indicating that the additional items are consistent with the original items, the Cronbach’s alpha for the adapted SPEQ-H in this group (n=1026) was high (0.93).

Statistical Analysis

Analyses were conducted in R, version 3.6.3 (R Core Team, 2020) with packages psych (version 1.9.12.31; Revelle, 2019) and lavaan (version 0.6-5; Rosseel, 2019).

Psychometric validation

The single factor model identified in Part 1 was assessed using Confirmatory Factor Analysis (CFA) with MLR robust maximum likelihood estimator in the clinical subsample (n=1026). Convergent validity of the scale with the ČEFSA and PTQ were assessed via Pearson's correlation, and its internal reliability via Cronbach's alpha. Test-retest data were not collected for this population.

Relationship to psychosis variables

Additionally, analysis was undertaken to determine the additional benefit of considering the cognitive appraisals of dissociation to psychosis research. Regression models were used to determine whether cognitive appraisals of dissociation explained more variance in psychotic symptoms (paranoia and hallucinations) than dissociative experiences alone.

Data from a subgroup of 1015 participants with low ($\leq 20\%$) missing data on the CAD-P, ČEFSA, R-GPTS and SPEQ-H were used for this analysis. Missing data for all four scales were imputed using the mice package (version 3.8.0; van Buuren & Groothuis-Oudshoorn, 2020) in order to obtain total scores. Simple and multiple regression analyses were then carried out entering the ČEFSA and CAD-P measures as independent variables and the R-GPTS and SPEQ-H measures as dependent variables. As well as inspecting and comparing the statistics of each regression model, models were also formally tested for significant difference using ANOVA analyses.

Results

Psychometric validation

CFA in the clinical group indicated a single factor model had a good fit to the data ($\chi^2=253.630$, $df=65$, $p<0.001$, CFI=0.959, TLI=0.950, RMSEA=0.053, SRMR=0.029).

Factor loadings for the final items in this group are shown in Table 2 (above).

In this sample, the CAD-P had good internal consistency (Cronbach's $\alpha=0.93$) and good convergent validity with the ČEFSA ($r=0.80$, $p<0.001$) and the PTQ ($r=0.73$, $p<0.001$). As there was a significant difference between genders for the PTQ ($t=2.74$, $p=0.006$; females: mean=32.57, SD=16.98; males: 29.36, SD=16.09), convergent validity between the PTQ and CAD-P was also confirmed for females and males separately (females: $r=0.70$, $p<0.001$; males: $r=0.75$, $p<0.001$).

Relationship to psychosis variables

Paranoia

With the R-GPTS Persecution scale as the dependent variable, simple regression analysis with the ČEFSA as the independent variable found that ČEFSA scores explained 34.3% of the variance in R-GPTS scores ($\beta=0.586$, CI (95% confidence interval):0.566-0.606, $p<0.001$). On its own, CAD-P explained 36.4% of the variance in R-GPTS ($\beta=0.604$, CI:0.559-0.649, $p<0.001$).

When both ČEFSA and CAD-P were entered as independent variables, the multiple regression model explained 39.6% of the variance in R-GPTS scores (ČEFSA: $\beta=0.291$, CI:0.260-0.322, $p<0.001$; CAD-P: $\beta=0.374$, CI:0.303-0.446, $p<0.001$): an increase of 5.3% compared to ČEFSA alone. An ANOVA confirmed that this model was a significantly better fit to the data than either simple regression model ($F=53.72$, $df=1$, $p<0.001$).

Hallucinations

A simple linear regression model with SPEQ-H as the dependent variable and ČEFSA as the independent variable explained 40.1% of the variance in SPEQ-H scores ($\beta=0.634$, CI:0.609-0.659, $p<0.001$). A simple linear regression model with CAD-P as the independent variable explained 35.0% of the variance ($\beta=0.593$, CI:0.532-0.653, $p<0.001$).

Including both variables in a multiple regression model explained 42.4% of variance in SPEQ-H scores (ČEFSA: $\beta =0.441$, CI:0.401-0.481, $p<0.001$; CAD-P: $\beta=0.245$, CI:0.153-0.337, $p<0.001$): an increase of 2.3% compared to the simple regression model of ČEFSA alone. An ANOVA found that the multiple regression model was a statistically significantly better fit to the data than either simple regression model ($F=129.28$, $df=1$, $p<0.001$).

Discussion

This chapter explicitly addresses cognitive appraisals of dissociative experiences in the context of psychosis. The resulting measure (Appendix 3.4) identifies 13 key cognitive appraisals, all loading onto a single factor. The Cognitive Appraisals of Dissociation in Psychosis (CAD-P) scale has good psychometric properties in both non-clinical and clinical (psychosis) groups: the model-fit is robust, internal reliability is high, and convergent validity with related measures is also good. Where test-retest reliability was assessed, this was also high for a one-week interval. When added to regression models, the CAD-P explained additional variance in both paranoia and hallucinations scores in a clinical group, above and beyond that explained by a dissociation measure alone. In general, therefore, the novel scale appears to fulfil the aim of providing a method for assessing cognitive appraisals relevant to dissociation in psychosis for the purposes of this thesis.

Items of the CAD-P, such as *"I must be sick"* and *"I'm losing my mind"* are consistent with the proposed similarities between dissociation and anxiety appraisals (Hunter, Salkovskis & David, 2014; Hunter et al., 2003; Baker et al., 2007). These appraisals reflect concerns about dissociative experiences being inherently dangerous, or a sign of imminent danger. However, the results also suggest that a number of other appraisals may be important to the experience of dissociation in psychosis. Items reflecting negative beliefs about self (*"This is because I'm evil"*) and other people (*"Someone has done something to me"*) reflect current understanding of beliefs common in patients experiencing high levels of paranoia (Collett, Pugh, Waite & Freeman, 2016; Stopa, Denton, Wingfield & Newman-Taylor, 2013). Further, and of particular note, a number of items indicate concerns about control and ownership over oneself and one's actions (*"I can't trust my own mind"*, *"I'm not really 'me'"*, and *"It's not me in control right now"*). Whilst maladaptive beliefs about control are a feature of a number of mental health disorders, these statements suggest that the phenomenological experience of one's self and internal world as "other" can directly lead people to doubt their autonomy and control. Following Maher (1974), who proposed that within a context of particular beliefs and cognitive biases, anomalous experiences 'demand explanation' which may culminate in the adoption of an explanatory delusional belief, it is understandable how the above appraisals might result in delusions of control or passive influence. It is interesting to note that these particular psychotic symptoms have been found to be more common in dissociative identity disorder than in psychosis patients (Laddis & Dell, 2012). These items of the CAD-P, therefore, appear to capture concerns which are specific to the experience of dissociation, but which may be highly relevant to the 'fuzzy' boundary between dissociation and psychosis (Renard et al., 2017). Further exploration of dissociation – and cognitive appraisals of such experiences – may therefore be particularly appropriate in clinically high-risk (CHR) or prodromal presentations. This broad range of items might be considered a strength of the measure.

Another strength of the CAD-P is its good psychometric properties in both the non-clinical and clinical populations. Regarding convergent validity, it is promising that the CAD-P correlated highly in both participant groups with the Perseverative Thinking Questionnaire (PTQ; Ehring et al., 2011). The PTQ measures ruminative negative thinking style, which may be expected to occur as a result of catastrophic cognitive appraisals. Rumination can also be seen as a form of intense internal focus, which Hunter and colleagues (2003) propose may be common in depersonalisation. The current study determined a correlational relationship between cognitive appraisals of dissociation and rumination. This result indicates both that perseverative thinking could be considered as a candidate maintenance mechanism for dissociative experiences (this is explored further in the second half of the thesis), and that the CAD-P appears to be a valuable tool for research questions such as this.

The utility of the CAD-P for this research was further demonstrated by the findings that cognitive appraisals of dissociation explained additional variance in paranoia (persecution) and hallucinations over and above dissociation alone. Importantly, there were differences between the results for hallucinations and paranoia, highlighting the importance of taking a single-symptom approach to psychosis (Bentall, Jackson & Pilgrim, 1988). For paranoia, cognitive appraisals of dissociation explained approximately the same proportion of variance as FSA-dissociation when entered in the same regression model. However, for hallucinations, cognitive appraisals of dissociation explained closer to half the proportion of variance as did dissociative symptoms. Tentatively, these findings could be interpreted as reflecting the robust relationship between dissociative experience and hallucinations (Longden et al., 2020), and the importance of cognition in the development of paranoia (Freeman, 2016). These results demonstrate that consideration of cognitive appraisals adds significantly more detail to our understanding of the relationship between dissociation and psychosis symptoms.

Limitations of the current study include the manner in which items were developed. Whilst item development drew upon clinical interviews, it is possible that important cognitions were not elicited and therefore not added to the item pool. For example, cognitive appraisals regarding brain damage or functional impairment have been demonstrated as important in PTSD patients (Samuelson, Bartel, Valadez & Jordan, 2017), and may also be relevant to dissociation or psychosis.

The sampling method presents another potential limitation. Whilst providing large sample sizes – a strength of the study which allowed for rigorous analysis – recruitment via Facebook Ads in Part 1 resulted in a biased sample. As in Chapter Three's online participant group, the non-clinical groups in this chapter were drawn from the general population of the United Kingdom only, and contained a very high proportion of female and White respondents, with notably high levels of self-reported ongoing mental health difficulties. Despite also including a large number of male respondents and respondents from different ethnic groups, the participant pool was therefore not representative of the general population. It is likely that this is again the result of self-selection bias due to the title and description of the study, and the location of the adverts in an online environment.

Further, test-retest data were not collected from the clinical participants in Part 2. As a result, despite the strong test-retest result in the non-clinical sample (Part 1), this property of the scale remains unknown in clinical contexts and requires further validation.

Nonetheless, the CAD-P scale will be a valuable tool for the purposes of this thesis, and may also be useful for researchers and clinicians. For example, clinicians may wish to use the scale to elicit further appraisals and begin a conversation with their client about which are the most relevant or cause the most distress.

Chapter Conclusions

This chapter has provided another vital tool for the progression of the aims outlined in Chapter One: a psychometrically robust measure with which to identify and assess cognitive appraisals of dissociative experiences. This is important for the thesis aims because cognitive approaches state that cognitive appraisals have a key role in the development and maintenance of the psychological problem of interest. Therefore, measuring cognitive appraisals of dissociation is crucial for the development of an evidence-based cognitive model of dissociation in psychosis, as it allows their contribution to be investigated empirically.

Indeed, the importance of considering the contribution of cognitive appraisals to the relationships between dissociation and psychotic experiences is evident in this chapter. Here, factoring in appraisals revealed valuable further detail: that dissociation has differential relationships with hallucinations and paranoia, and that the cognitive appraisals of symptoms may be equally influential in the relationship with paranoia as the symptoms themselves.

The development of the CAD-P measure therefore completes this first part of the thesis, which focused on providing the understanding and tools required to begin a robust exploration of dissociation in non-affective psychosis. In the second part of the thesis, state-of-the-art quantitative analysis methods and theory-practice links will be used to begin to identify psychological mechanisms that may underpin dissociation.

PART 2:

**Understanding the Psychological Mechanisms of
Dissociation**

5 Dissociation in Relation to Other Mental Health Conditions¹

‘But it’s tricky because of course then [dissociative symptoms] tend to trigger other mental health symptoms, at which point you have a bit of a chicken and egg scenario.’
(Qualitative Study Participant 11)

Chapter Abstract

Rationale

Dissociation has been implicated as a cause or effect of numerous mental health conditions, including as a cause of psychotic symptoms. Identifying plausible maintenance mechanisms for this subset of dissociative experiences may be aided by understanding how FSA-type dissociation relates to other conditions.

Methods

Undirected (Gaussian graphical) and Bayesian inference with Directed Acyclic Graphs (DAGs) network models were estimated from general-population online survey respondent data (n=6943). The networks were used to identify key relationships between dissociation and mental health symptoms, and to hypothesise their direction of effect.

Results

Dissociation was found to be highly connected in both network models. In the DAGs analysis, the direction of influence between dissociation and hallucinations, anxiety, and depression was unclear. However, it was found to be probable that dissociation has a direct moderate causal effect on post-traumatic stress symptoms, and highly probable that dissociation also directly influences the psychotic symptoms of paranoia, cognitive disorganization, and grandiosity.

Conclusions

Dissociation is connected to many mental health conditions and may influence a number of presentations – particularly psychotic experiences. Therefore, the current study supports the hypothesis that dissociation is important in psychosis, and indicates its significance more broadly.

¹ This chapter is adapted from the paper attached in Appendix 7.4: Černis E, Evans R, Ehlers A, Freeman D (2021). Dissociation in relation to other mental health conditions: An exploration using network analysis. *Journal of Psychiatric Research*, 136, 460-467. DOI: 10.1016/j.jpsychires.2020.08.023

*The DAGs analysis was carried out in collaboration with Assoc. Prof. R. Evans.

Introduction

Arguments have been made both for dissociation having a causal role in other mental health symptoms and for dissociation being a result of other conditions. Among many others, dissociation has been linked with depression (Baker et al., 2007), anxiety (Evren, Şar & Dalbudak, 2008), panic disorder (Fikretoglu et al., 2007), paranoia (Černis et al., 2014), worry (Freeman et al., 2013), sleep difficulties (Giesbrecht & Merckelbach, 2004), and is considered transdiagnostic by many researchers (Schimmenti & Caretti, 2014). Understanding how dissociation, particularly FSA-dissociation, relates to other mental health conditions may be helpful in identifying its causes and maintenance mechanisms, thus informing the development of a cognitive model. Network analysis may be an appropriate method for exploring these relationships.

Dissociation and Other Mental Health Presentations

Affective symptoms: Depression & Anxiety

Dissociation has consistently been found to positively correlate with anxiety and depression. For example, Maaranen et al. (2005) explored ‘pathological’ dissociation in a sample of 2001 people from the general population of Finland and found significant associations with depression. When dividing their sample into four ‘levels’ of depression, they found a statistically significant number of their ‘high dissociators’ were in the most severe depression level. Their subsequent regression analysis found that a clinically significant depression score incurred a nine-fold greater risk of experiencing pathological dissociation. Similarly, Lee, Kwok, Hunter, Richards and David (2012) found associations between depression and depersonalisation in a UK population-based birth cohort sample of 3275 people. Further, for the subgroup of 33 people classified as having depersonalisation, both present-day and childhood (teacher-rated) anxiety and depression were significantly associated with adulthood depersonalisation scores. Logistic regression highlighted childhood anxiety as a strong predictor for adult depersonalisation. This supports

the finding by Evren, Sar and Dalbudak (2008) that both trait anxiety and depression predicted dissociative experiences in male alcohol-dependent patients.

Based on these and similar findings, it is reasonable to hypothesise that depression and anxiety may have direct relationships with FSA-type dissociation. However, the direction of effect in these relationships is less clear since conclusions have largely relied upon correlation and regression analyses.

Post-traumatic Stress

Dissociation has long been linked with trauma (van der Hart & Dorahy, 2009) and continues to be understood within this framework. There is therefore no doubt that trauma and dissociation have a strong association. However, the direction of the causal relationship between post-traumatic stress symptoms (PTSS) and dissociation may depend on how dissociation is conceptualised. For instance, there is consistent evidence from prospective studies that dissociation during trauma (peri-traumatic dissociation) predicts subsequent PTSD symptoms (Ozer, Best, Lipzey & Weiss, 2003). Yet, evidence supporting the widely regarded “Trauma Model” of dissociation (e.g. Dalenberg et al., 2012) proposes that trauma – particularly complex trauma early in life – is the main cause of subsequent dissociative symptoms. Results such as Becker-Blease and Freyd’s (2007) – that peri-traumatic and post-traumatic dissociation are positively correlated – are intriguing, therefore, as they allow for the possibility of PTSS and dissociation having a shared cause (peri-traumatic dissociation), which would parsimoniously explain both sets of evidence. It is unclear how FSA-dissociation might fit into the dynamic between dissociation and post-traumatic symptomatology.

Positive Psychotic Symptoms

As described in Chapter One, many studies find positive correlations between psychotic symptoms and dissociation (Longden et al., 2020), and existing models of

positive psychotic symptoms (e.g. Maher & Ross, 1984; Garety, Kuipers, Fowler, Freeman & Bebbington, 2001) implicate anomalous experiences as contributing to the formation of these difficulties.

Worry

In one of the few experimental design studies in the field of dissociation, Freeman et al. (2013) demonstrate that worry has a causal effect on depersonalisation. A sample of 67 people with non-affective psychosis and high paranoia were randomised to either a worry reduction, worry induction, or neutral mood manipulation. Significant differences were found between the groups: the worry induction group experienced higher scores on a depersonalisation measure and on the non-hallucination anomalies subscale of the Cardiff Anomalous Perceptions Scale. The worry reduction group showed the opposite pattern on these scales.

Insomnia

Sleep difficulties are one of the key 'transtheoretical' factors highlighted by Lynn et al. (2019) as a potential cause of dissociation. This assertion is based on the work of researchers such as van Heugten-van der Kloet, Giesbrecht and Merckelbach (2015), who found that experimentally restricted sleep led to increases in dissociation in undergraduates, and that feelings of sleepiness may precede dissociative experiences. Both this study and a recent systematic review by Barton, Kyle, Varese, Jones and Haddock (2018) suggest that insomnia has a causal effect on dissociation.

Network Analyses

Arising from the network approach to conceptualising mental health presentations (Borsboom, 2017), network analyses have grown in popularity over the past decade as a method for exploring and visualising complex systems of symptoms (Robinaugh, Hoekstra, Toner & Borsboom, 2019). Estimated network psychometrics (Epskamp, Maris, Waldorp & Borsboom, 2016) model the covariance

and pairwise interactions between variables in a network, and can be plotted graphically to visualise these statistical relationships as ‘edges’ between variables (‘nodes’) in order to ‘uncover data patterns’ at the ‘initial stages of phenomena detection’ (Robinaugh et al., 2019). The exploratory value of network analysis methods has seen them rise in popularity in empirical studies. Whilst the majority of these have used ‘undirected’ partial correlation networks, several recent studies have used Bayesian inference with Directed Acyclic Graphs (DAGs) (e.g. Moffa et al., 2017; Kuipers, Moffa, Kuipers, Freeman & Bebbington, 2018). Unlike undirected networks, DAGs estimate and incorporate information about the likely direction of the conditional dependence relationships between variables. For example, Bird, Evans, Waite, Loe and Freeman (2019) found that negative affect was a likely cause of paranoia in adolescents, which in turn was likely to influence peer relationships. Researchers have therefore begun using this information to make hypotheses about causal relationships. Although there are several caveats to using DAGs in this way – particularly in mental health (Dawid, 2010), interpreted cautiously, this exploratory method can also be highly valuable where it may be helpful to ‘visualise and quantify complex dependencies in the data’ (Robinaugh et al., 2019).

Chapter Aims

Network analyses, therefore, may be helpful to explore how FSA-dissociation relates to psychotic symptoms and other mental health conditions. To date, only Schimmenti and Şar (2019) have applied these methods specifically to dissociation: to visualise relationships between items of the Dissociative Experiences Scale. Like that study, this chapter will use two network analyses: an undirected network to estimate the conditional associations between variables, and DAGs to hypothesise the possible directions of these relationships. Undirected analyses are easily parameterised and well-identified, giving a sufficiently robust estimation of the true underlying structure of relationships between variables, whilst DAGs are more difficult to identify but are valuable for hypothesis-generation.

The relationships explored here will be those between dissociation and other mental health presentations: post-traumatic stress symptoms (PTSS), depression, anxiety, worry, insomnia, paranoia, grandiosity, hallucinations and cognitive disorganisation. Distress tolerance will also be included in the analysis as a psychological process. Dissociation has been conceptualised as a way of coping with distressing internal or external stimuli; the suggestion being that dissociation is used consciously or via automatic conditioned behaviour to avoid the need to tolerate the distress. This forms the basis of many of the “Trauma Model”-family theories of dissociation (e.g. Dorahy, 2006). Therefore, according to this conceptualisation, low distress tolerance may also be a causal factor for dissociation.

In summary, the primary aim of this chapter is to use network analyses to explore whether any mental health presentations may have a causal influence on FSA-dissociation. A secondary aim is to test whether this subset of dissociative experiences has a casual influence on psychotic symptoms, as discussed in Chapter One.

Methods

Design

The design was an online cross-sectional self-report questionnaire study: the *“Mapping dissociation in mental health”* survey described in Chapter Three.

Procedure and Participants

As described in Chapter Three, the survey landing page contained the participant information sheet and statements regarding informed consent (Appendix 2.3).

Informed consent and assessment were both carried out online using Qualtrics (Qualtrics, 2018).

During the recruitment period (May 24th 2018 to July 23rd 2018), 13186 responses were recorded by Qualtrics. 144 (1.09%) did not consent to participate, and 307 (2.33%) indicated consent but left the survey without continuing to the first page of measures. After removing participants who did not meet the inclusion criterion, or had high levels of missing data (greater than 20% in any of the measures), a sample of 6943 was obtained for the DAGs analysis.

Of the 6943 participants, the majority were female (87.2%, $n=6052$; male: $n=646$; other: $n=183$) and White (93.7%; $n=6508$). The mean age of the sample was 40.3 years ($SD=15.7$), with a range from 18 to 86. Additionally, 85.5% of the sample answered “yes” to the question “*have you ever experienced mental health difficulties?*”. Of these, 77.0% indicated that these difficulties were ongoing. Dissociation measure scores differed significantly between mental health status subgroups (Appendix 4.1).

Measures

Cronbach’s alphas for each scale are shown in Table 1. All scales demonstrated ‘good’ or ‘excellent’ internal consistency in this sample.

Černis Felt Sense of Anomaly scale (ČEFSA; Chapter Three; Appendix 2.5)

As described in Chapter Three, the ČEFSA is a 35-item scale assessing dissociative experiences taking the form of a ‘felt sense of anomaly’ (FSA) and comprises seven factors. The factors are: anomalous experiences of the self (“*I feel like a stranger to myself*”), of the body (“*My body feels numb*”), and of emotion (“*I don’t fully experience emotions*”), and altered senses of familiarity (“*Places that I know seem unfamiliar*”), connection (“*I feel disconnected from the world around me*”), agency (“*I freeze, unable to do anything*”), and of reality (“*The world seems like it is fake*”). All items are rated in

reference to the past two weeks on a Likert scale from “0, Never” to “4, Always”. Higher scores indicate higher levels of FSA-dissociative experiences. In this sample, the internal consistency of the scale was excellent (Cronbach’s $\alpha=0.97$).

The Hospital Anxiety and Depression Scale (HADS; Zigmond & Snaith, 1983)

The HADS is a 14-item scale comprising two subscales assessing anxiety and depression in the past week. Items such as “*I feel tense or ‘wound up’*” (anxiety) and “*I feel as if I am slowed down*” (depression) are rated on a 0 to 3 scale. Higher scores indicate more severe anxiety or depression.

Penn State Worry Questionnaire (PSWQ; Meyer, Miller, Metzger & Borkovec, 1990)

The PSWQ comprises 16 items assessing worry (“*I have been a worrier all my life*”), rated on a 5-point Likert scale from “1 Not at all typical of me” to “5 Very typical of me”. Higher scores indicate higher levels of worry. Respondents are instructed to consider the past two weeks.

Insomnia Severity Index (ISI; Morin, 1993)

The ISI assesses insomnia and its impact on day-to-day life over the past two weeks using seven items scored on a 0 to 4 Likert scale. Higher scores indicate more problematic sleep.

Specific Psychotic Experiences Questionnaire (SPEQ; Ronald et al., 2013)

The SPEQ comprises four scales which each assess a key psychotic experience: paranoia, hallucinations, grandiosity, and cognitive disorganization. The *paranoia* and *hallucinations* scales ask respondents to rate how frequently they have recently had particular thoughts (e.g. ‘How often have you thought: I am under threat from others’) or experiences (e.g. ‘How often do you: hear noises or sounds when there is nothing about to explain them?’), respectively, using a six-point Likert scale (‘not at all’ to ‘daily’). The *grandiosity* scale asks respondents how much they agree with the

statements (e.g. ‘I have a special mission’) for the past month, on a four-point Likert scale (‘not at all’ to ‘completely’). Finally, the *cognitive disorganization* scale also assesses the past month, asking for ‘yes/no’ responses to items such as ‘are you easily confused if too much happens at the same time?’. For all scales, higher scores indicate more severe psychotic experiences.

Post-Traumatic Symptom Disorder Checklist (PCL-5; Weathers et al., 2013)

To assess trauma symptoms over the past month, the PCL-5 contains 20 items such as “feeling very upset when something reminded you of the stressful experience”, rated on a five-point Likert scale from “0 not at all” to “4 extremely”. Participants were asked to rate “the most upsetting event” they had experienced, which included traumatic and other upsetting life events as indicated via selecting from a list including “end of a relationship”, “natural death of a significant other”, and “severe accident”. Higher scores indicate greater post-traumatic symptomatology.

Distress Tolerance Scale (DTS; Simons & Gaher, 2005)

Using a five-point Likert scale from “1, strongly agree” to “5, strongly disagree”, the DTS measures beliefs and responses to strong emotions, such as “feeling distressed or upset is unbearable to me”. Higher scores indicate less tolerance of strong emotions. Respondents are asked to ‘think of times that you feel distressed or upset’, rather than a specific timeframe when answering.

Statistical analysis

Analyses were conducted in R, version 3.6.3 (R Core Team, 2020). Multiple imputation (using ‘mice’ package; version 3.8.0; van Buuren & Groothuis-Oudshoorn, 2020) was used for missing data to allow calculation of scale total scores. The proportion of imputed data was very low: less than 0.1% of the data for each scale. Visual inspection of variable histograms revealed a non-normal distribution.

Therefore, data were transformed to a normal distribution ('gaussianized') using the 'DAGtools' (v0.1.0011) package prior to analysis.

Undirected network

As a first step in exploring the relationships within the data, a Gaussian Graphical model was estimated. These undirected networks can also be visualised using the qgraph package such that the strength of the conditional relationship between variable (node) pairs (once all other variables have been conditioned upon) are represented by the weight of the edge between them (i.e. line width and shading). In this way, the absence of an edge between two nodes indicates conditional independence between those two variables, once all other variables have been conditioned upon.

Undirected networks are more easily parameterised and make no assumptions regarding the direction of relationships between nodes. These qualities are helpful in estimating the true underlying structure of the data ('identification'), as it eliminates the problem of Markov equivalence: one of the key limitations of DAGs. Markov equivalence refers to cases where the same set of conditional independence parameters could be represented by numerous different configurations between nodes, including contradictory information about directions of effect. Without additional knowledge, it would be unclear which model most closely represented the real-world situation from which the data was collected. Undirected networks also do not assume acyclicity (that nodes do not have reciprocal relationships – an assumption that is particularly unlikely to be true in mental health research). These networks can therefore provide a more robust estimate of the true structure of the relationships within the data than DAGs.

To estimate and visualise the undirected network, the packages 'bootnet' (v1.3) and 'qgraph' (Epskamp, Cramer, Waldorp, Schmittmann & Boorsboom, 2012) were used.

Due to the large sample size, `ggmModSelect` was used to fit a Gaussian graphical model to the data via stepwise model selection in order to optimise model fit. The argument ‘principal direction’ was used during estimation to recode all variables in the same direction: i.e. in order that higher scores for all variables indicated more severe negative outcomes. Non-parametric bootstrapping (5000 bootstraps) was used to assess the accuracy and stability of the estimated network. In the final graph, positive partial correlations are shown by a blue and negative correlations by a red line. The strength of the pairwise partial correlations between nodes is indicated in both cases by the weight of the edge.

Bayesian inference with directed acyclic graphs

An advantage of the Bayesian inference with DAGs method is that it can hypothesise the direction of direct and indirect pathways between nodes. This is valuable in a field where much is unknown. In a DAG, if variable B is directly dependent on variable A, this is indicated by a directed edge ($\rightarrow$) between the nodes, such that ‘ $A \rightarrow B$ ’. This can be interpreted both as “controlling for other parents of B, B is dependent upon A”, and “A is a direct cause of B”. As in undirected networks, nodes not joined by an edge can be interpreted as being (conditionally) independent from each other given some subset of the other variables.

There are important limitations to this method, in addition to the problems of assumed acyclicity and Markov equivalence discussed above. Firstly, it is important to note that mathematical independence is not necessarily indicative of real-world causal independence (Dawid, 2010) and therefore these networks require careful interpretation: they should be considered hypothesis-generating when the true underlying causal structure is unknown. This method also assumes causal sufficiency: that there are no hidden common causes shared by nodes, and that all important causal variables have been included in the network.

An advantage of incorporating Bayesian inference into the DAGs methodology is that it enables the probability of each edge to be estimated. Whilst this does not remove the problems and limitations described above, it does provide further detail with which to better interpret the network. In this analysis, the final graph was calculated by averaging the results of 50,000 sample DAGs, obtained by using the BiDAG package to run the partition Markov Chain Monte Carlo algorithm (Kuipers & Moffa, 2017; Kuipers, Suter & Moffa, 2018) for 10 million iterations. The exact method of this analysis and the preceding transformation of the data follows the same protocol as detailed in Bird et al. (2019). For this study, a directed edge (i.e. $A \rightarrow B$) in the final graph indicates that this specific direction occurred in over 90% of the sampled DAGs for which that edge was present. Only these cases were considered as sufficient for drawing hypotheses about probable direction of influence. Edges are shown as undirected (i.e. $A-B$) where the edge was present in over 50% of cases, but the above criterion regarding direction was not met. Causal effects are shown as z-scores with 90% credible intervals (CIs). In practice, a credible interval may be interpreted in a similar manner to a confidence interval, but it is calculated according to the probability distribution given the data. The results of the DAGs analysis therefore provide information both about how often a directed relationship between two variables is found, and the strength of this causal effect.

Results

Table 1 shows the mean scores for each scale. Generally, scores were within the non-clinical range, with mildly elevated anxiety, worry, and sleep difficulties according to scale cut-offs.

Table 1. Showing the means and standard deviations of the sample for each scale in the survey.

Scale	Sample mean (SD)	Cronbach's alpha for this sample	Scale min – max score	Scale caseness cut-off score
Černis Felt Sense of Anomaly scale	41.64 (28.27)	0.97	0 – 140	-
Hospital Anxiety and Depression Scale: <i>Anxiety</i>	11.17 (4.83)	0.87	0 – 21	8
Hospital Anxiety and Depression Scale: <i>Depression</i>	7.63 (4.68)	0.85	0 – 21	8
Penn State Worry Questionnaire	57.43 (15.71)	0.95	16 – 80	45
Insomnia Severity Index	11.90 (6.33)	0.88	0 – 28	10
Specific Psychotic Experiences Questionnaire: <i>Paranoia</i>	23.73 (18.08)	0.95	0 – 75	-
Specific Psychotic Experiences Questionnaire: <i>Hallucinations</i>	7.21 (8.64)	0.91	0 – 45	-
Specific Psychotic Experiences Questionnaire: <i>Grandiosity</i>	3.11 (3.66)	0.86	0 – 40	-
Specific Psychotic Experiences Questionnaire: <i>Cognitive disorganisation</i>	7.09 (3.20)	0.84	0 – 11	-
Post-Traumatic Symptom Disorder Checklist	29.61 (20.09)	0.95	0 – 80	33
Distress Tolerance Scale	45.74 (14.58)	0.91	15 – 75	-

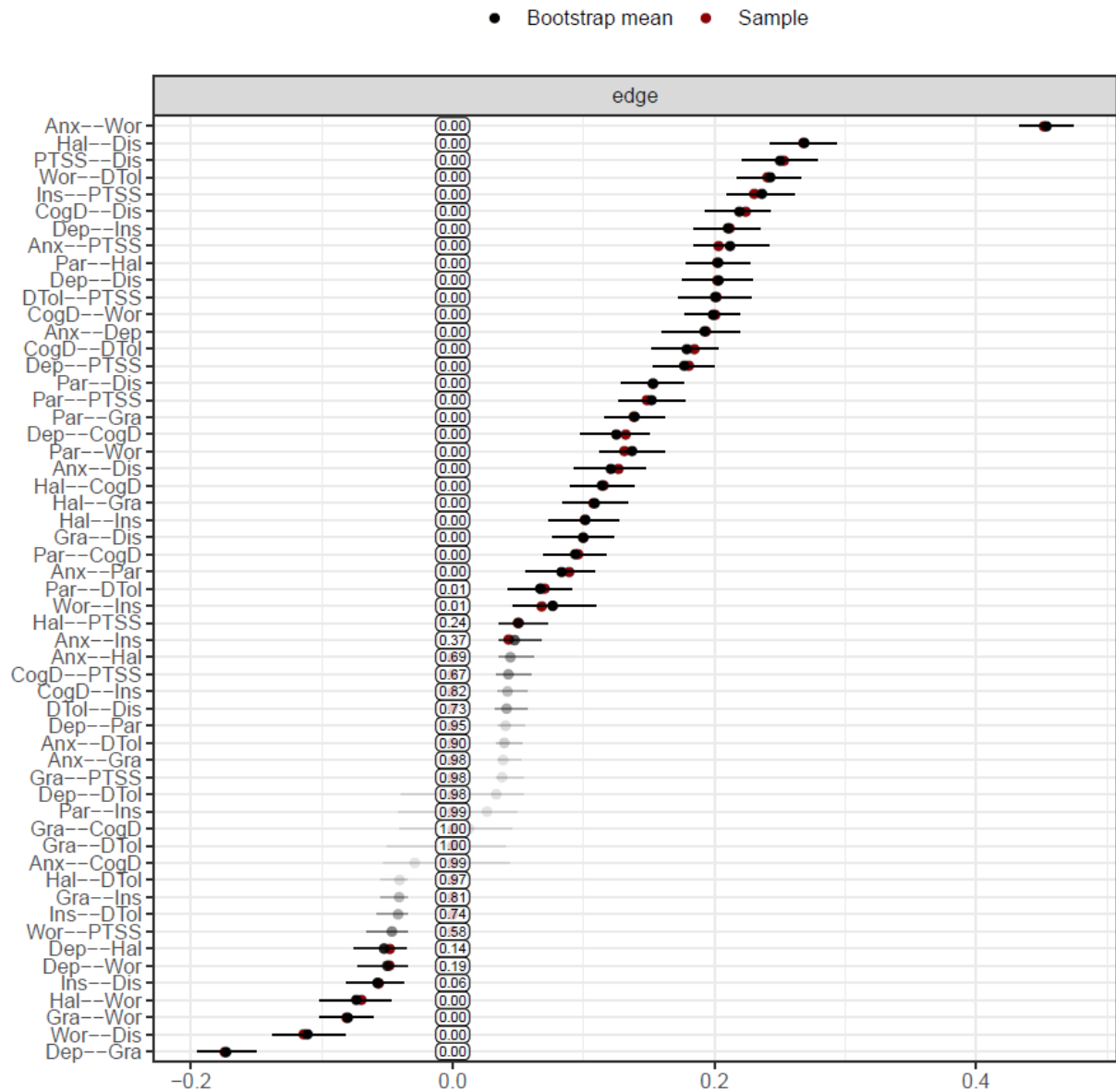
NB: Cronbach's alphas above 0.8 are considered to indicate 'good' internal consistency, and above 0.9 'excellent'.

Undirected Network

The undirected network was estimated as described (see Appendix 4.2 for correlation matrix). To assess the accuracy of the connections in the estimated network, bootstrapped confidence intervals (CIs) for each edge were calculated using non-parametric bootstrapping (5000 bootstraps) using bootnet (v1.3).

Bootstrapped confidence intervals for all edges in the undirected network are shown in Figure 1.

Figure 1. Showing sample edge-weights and bootstrapped confidence intervals of edge-weights obtained via non-parametric bootstrapping (5000 bootstraps) for all edges in the undirected network



The figure indicates some level of overlap between CIs of edges in the network (except for the edge between worry and anxiety which was significantly stronger than all others in the network). Nevertheless, the strongest edges (anxiety-worry; dissociation-hallucinations; dissociation-PTSS) are significantly stronger than the majority of others, and the network appears to be estimated with good accuracy.

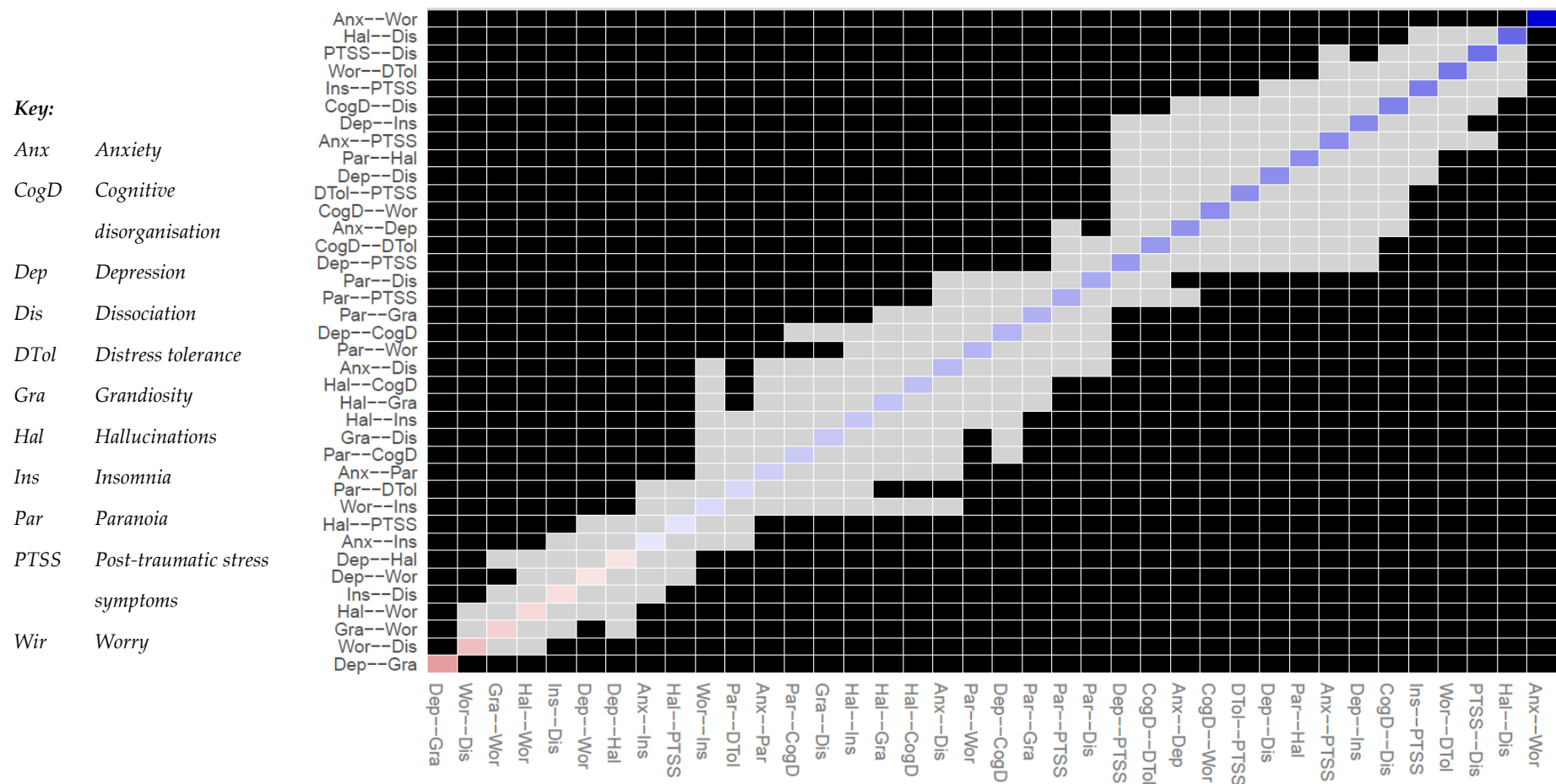
Table 2 shows the edge-weights and their bootstrapped confidence intervals for edges between dissociation and all other variables. These results indicate that the strongest edge between dissociation and another variable is between dissociation and hallucinations. This edge-weight is not significantly stronger than that between dissociation and post-traumatic stress symptoms (PTSS), but is significantly stronger than all other edges with dissociation.

Table 2. Edge-weights and their bootstrapped confidence intervals for edges between dissociation and each other variable

Variable	Edge-weight	C.I.
Hallucinations	0.268	0.243 – 0.293
Post-Traumatic Stress Symptoms	0.250	0.224 – 0.282
Cognitive Disorganisation	0.224	0.198 – 0.250
Depression	0.202	0.175 – 0.229
Paranoia	0.153	0.128 – 0.178
Anxiety	0.127	0.0994 – 0.154
Worry	-0.114	-0.142 – -0.0855
Grandiosity	0.100	0.0763 – 0.123
Insomnia	-0.0565	-0.0915 – -0.0215
Distress Tolerance	0 (no edge)	-0.0373 – 0.0373

Edge-weight difference tests for all edges are shown in Figure 2. This indicates that many edges are statistically significantly different from others.

Figure 2. Differences between edge-weights: statistically significant differences indicated by a black square, non-significant differences by a grey square



Centrality estimates (strength, closeness and betweenness) were calculated for all variables (Table 3 & Figure 3). Tests were carried out to assess for statistically significant differences between centrality estimates (summarised in Figure 4).

Table 3. Centrality measures for all variables, with the highest scores shown in bold

Variable	Strength (Degree)	Closeness	Betweenness
Dissociation	1.50	0.0148	16
Worry	1.41	0.0127	6
Post-Traumatic Stress Symptoms	1.27	0.0154	20
Paranoia	1.03	0.0114	0
Insomnia	0.710	0.0120	0
Hallucinations	0.962	0.0112	0
Grandiosity	0.601	0.00936	0
Distress Tolerance	0.697	0.0110	0
Depression	1.19	0.0140	12
Cognitive Disorganisation	0.953	0.0119	0
Anxiety	1.11	0.0133	6

Node strength (degree centrality): This centrality measure estimates how strongly a node is connected with the network by summing all edges it has with all other nodes. Dissociation has the highest node strength in the network. Difference tests found that it is significantly higher than for PTSS (3rd highest), but not statistically significantly higher than for worry (2nd highest).

Closeness: This centrality measure estimates how strongly a node is connected indirectly with the network using information about the shortest path lengths between the node and all other nodes. Dissociation has the second highest closeness score in the network, with the highest being PTSS. Again, there was no statistically significant difference between these two scores. The closeness score for dissociation was statistically significantly higher than that for depression (3rd highest).

Betweenness: This centrality measure uses information about the shortest path lengths in the network to determine how often a node is a point along a shortest pathway

between other nodes. This indicates how often the node acts as a connector node. Dissociation has the second highest betweenness score of the nodes in the network, with PTSS the highest. Difference tests found no significant difference between the two. The betweenness for dissociation was also not statistically different from that for depression (3rd highest) or worry (4th highest).

Figure 3. Showing centrality scores for all variables in the network

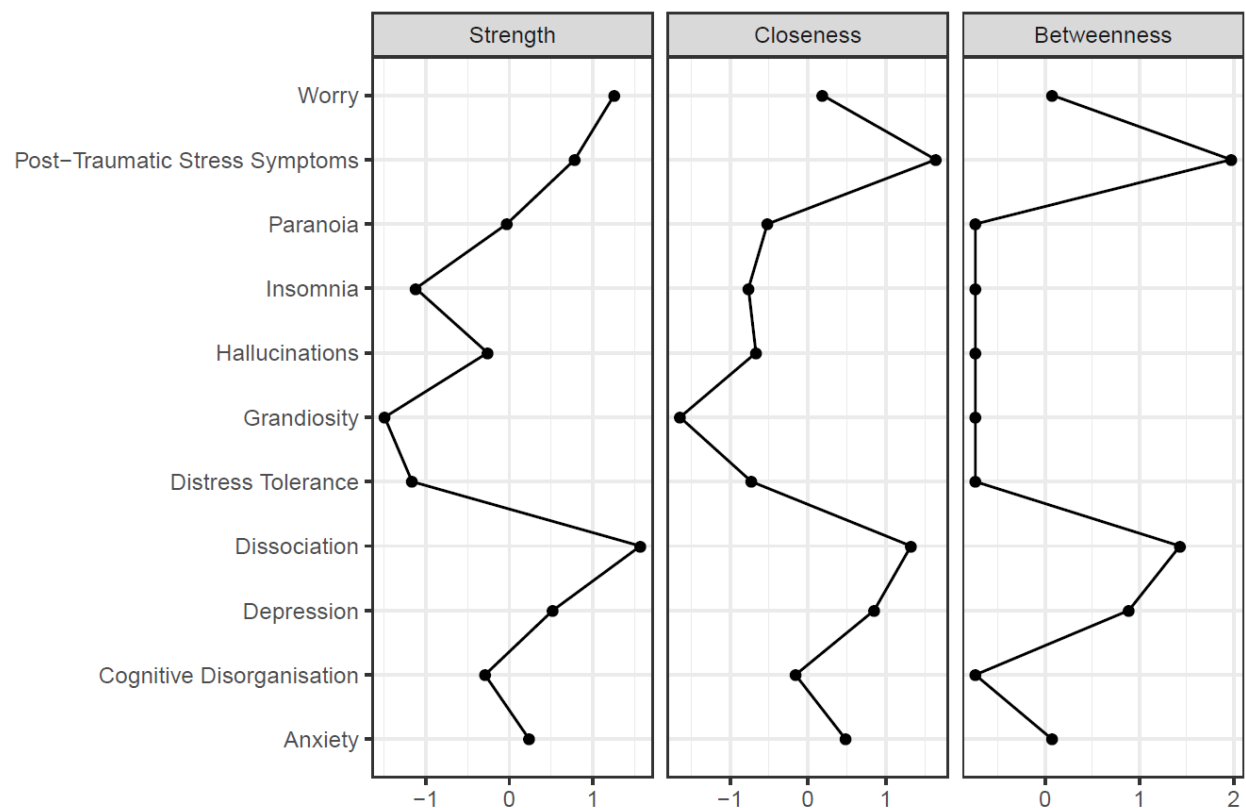
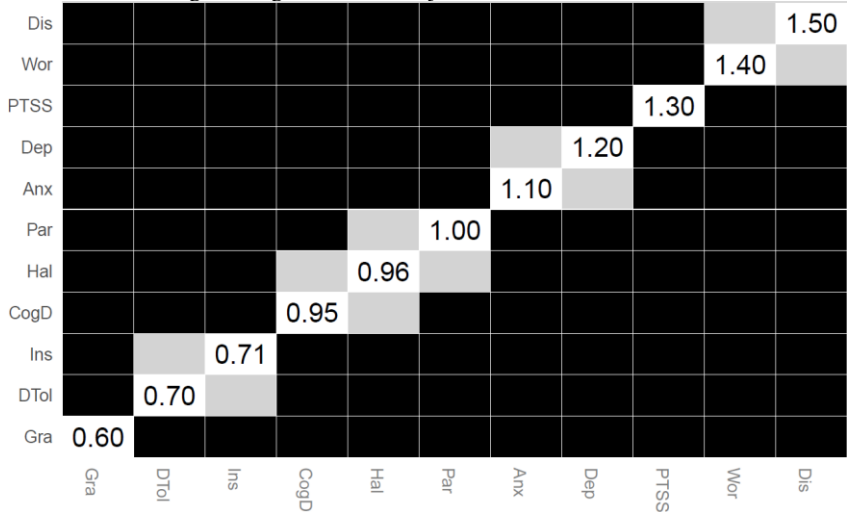
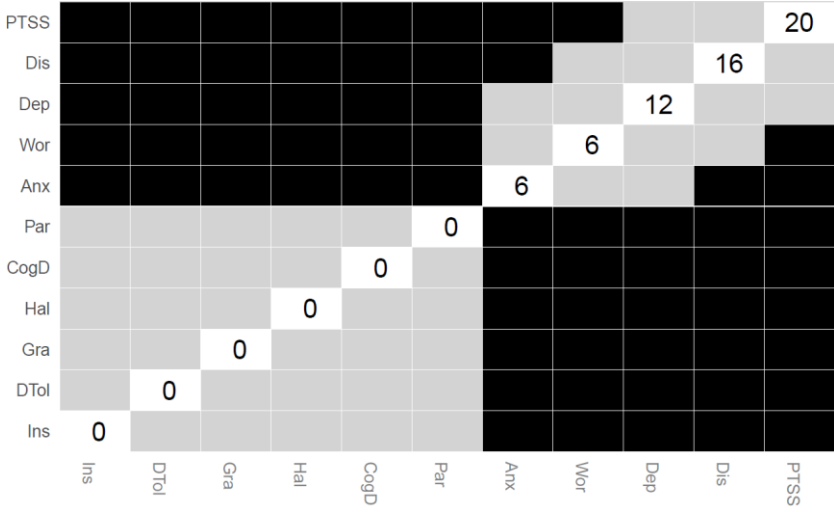


Figure 4. Differences between centrality estimates: statistically significant differences indicated by a black square, non-significant differences by a grey square

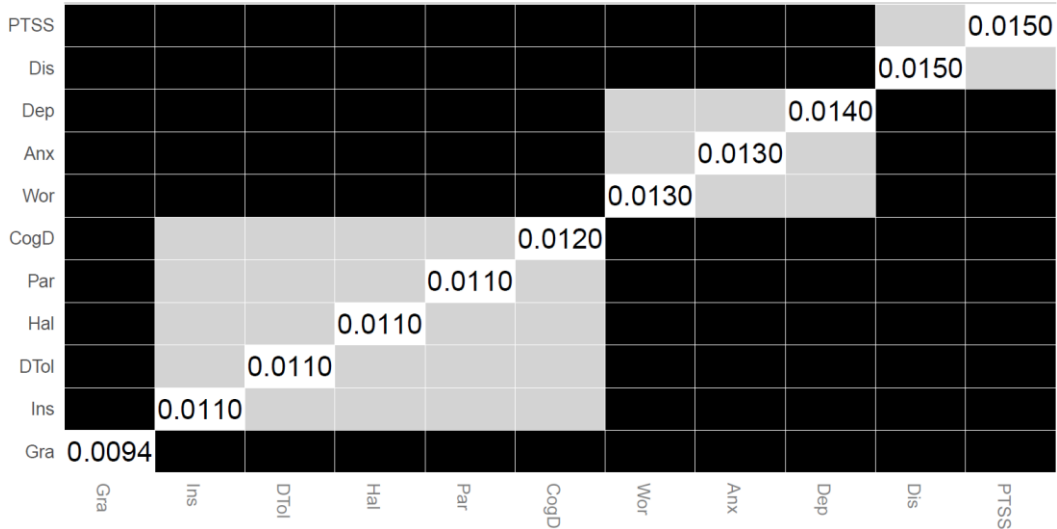
Panel 4a: Strength (degree centrality)



Panel 4c: Betweenness



Panel 4b: Closeness



- Key:**
- Anx Anxiety
 - CogD Cognitive disorganisation
 - Dep Depression
 - Dis Dissociation
 - DTol Distress tolerance
 - Gra Grandiosity
 - Hal Hallucinations
 - Ins Insomnia
 - Par Paranoia
 - PTSS Post-traumatic stress symptoms
 - Wor Worry
 - Anx Anxiety

The stability of centrality estimates was calculated using case-dropping subset bootstrapping (Figure 5). This indicated that the stability for all three centrality measures was good. Correlation stability coefficients for all centrality estimates were 0.75, which meets the recommendation that this figure should be above 0.50.

Figure 5. Showing the results of the case-drop subset bootstrapping

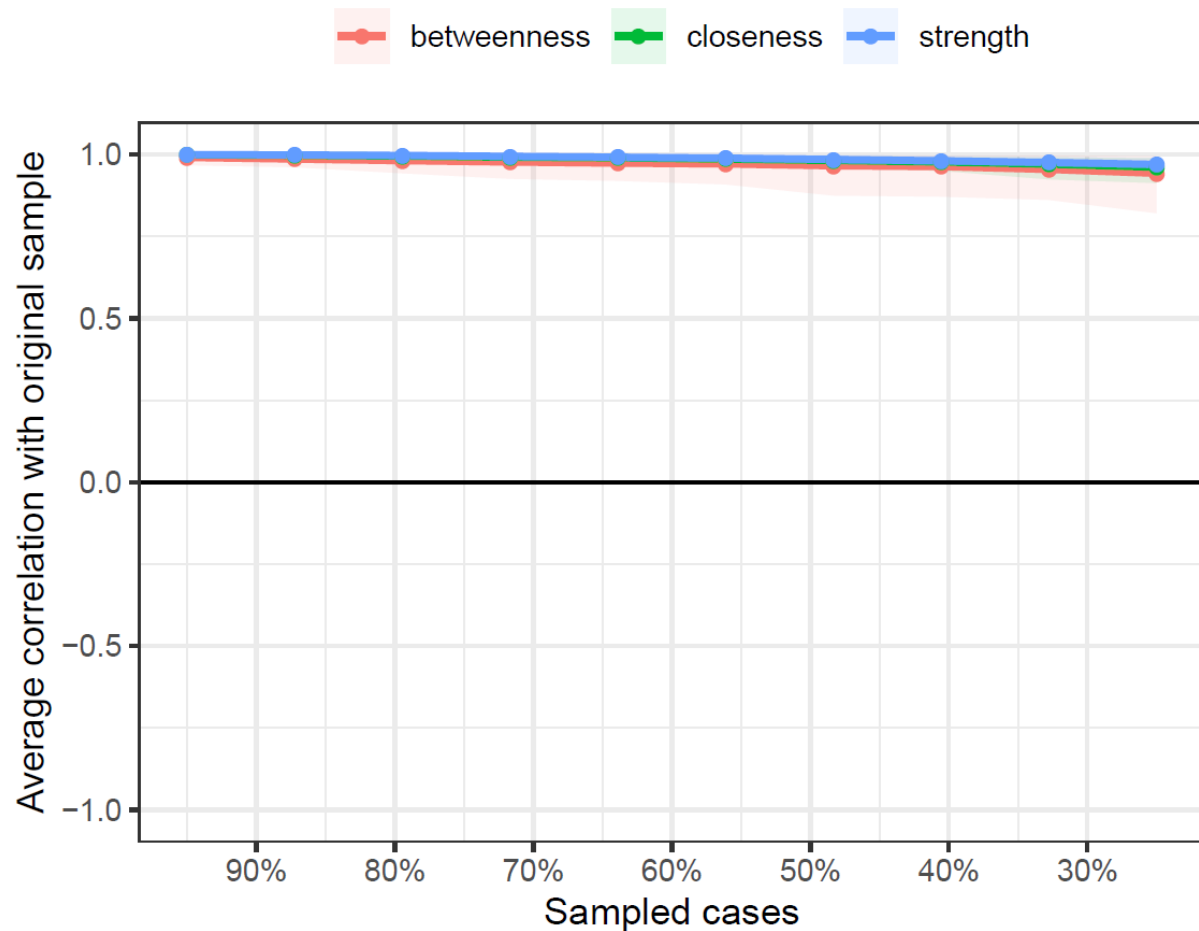


Figure 6 shows the undirected network. In summary, dissociation had direct relationships with all variables except distress tolerance and was highly central in the network. The stability of centrality estimates was very high and the accuracy of network estimation was good.

Bayesian inference with Directed Acyclic Graphs (DAGs)

Table 4 summarises the results of the DAGs analysis for the relationships between dissociation and all other variables.

Table 4. Summarising the average causal effects between dissociation and all other variables (Percentages to 2 d.p., causal effects & CIs to 2 s.f.).

	Causal effects: Pathway present (direct or indirect) %	Causal effect	90% CI	Direct edge present %	Direct causal effect	90% CI
Variable to dissociation (i.e. variable causing dissociation)						
Anxiety	48.19	0.53	0.37 - 0.63	100	0.43	0.20 - 0.63
Hallucinations	32.19	0.55	0.35 - 0.65	100	0.46	0.30 - 0.65
Depression	28.19	0.53	0.35 - 0.64	100	0.45	0.30 - 0.63
Post-traumatic Stress	9.19	0.57	0.40 - 0.72	100	0.49	0.39 - 0.72
Worry	11.23	0.29	0.012 - 0.46	30.25	0.082	-0.020 - 0.46
Insomnia	6.43	0.24	0.035 - 0.46	23.91	0.041	-0.00 - 0.25
Grandiosity	3.70	0.17	0.07 - 0.21	100	0.16	0.06 - 0.21
Paranoia	3.48	0.42	0.20 - 0.65	100	0.28	0.18 - 0.53
Distress Tolerance	0.88	-0.27	-0.51 - -0.062	100	-0.10	-0.23 - -0.053
Cognitive Disorganization	0.08	0.55	0.40 - 0.66	100	0.27	0.26 - 0.27
Dissociation to variable (i.e. dissociation causing variable)						
Anxiety	51.81	0.51	0.18 - 0.63	100	0.43	0.16 - 0.62
Hallucinations	67.81	0.53	0.46 - 0.58	100	0.50	0.41 - 0.57
Depression	71.81	0.48	0.27 - 0.62	100	0.37	0.24 - 0.61
Post-traumatic Stress	90.81	0.51	0.35 - 0.71	100	0.32	0.29 - 0.44
Worry	84.22	0.22	0.0063 - 0.45	4.29	<0.01	-
Insomnia	92.11	0.24	0.067 - 0.44	5.29	<0.01	-
Grandiosity	96.30	0.18	0.06 - 0.31	100	0.15	0.12 - 0.19
Paranoia	96.52	0.46	0.28 - 0.64	100	0.21	0.17 - 0.25
Distress Tolerance	99.12	-0.31	-0.50 - -0.092	14.71	<0.01	-
Cognitive Disorganization	99.92	0.45	0.30 - 0.61	100	0.25	0.23 - 0.28
Key:						
'Pathway present'		The proportion of sampled DAGs which found this pathway.				
'Causal effect'		Average total causal effect when that pathway was present.				
'Direct edge present'		The proportion of DAGs that found direct pathways of those where some pathway was found to be present.				
'Direct causal effect'		Average total causal effect of the direct pathways.				
CI		Credible interval.				

Affective symptoms

The table can be interpreted as follows: from anxiety to dissociation, there was a pathway (direct or indirect) present in 48.19% of the 50,000 DAGs sampled – that is, anxiety influences dissociation in 48.19% of sampled graphs. The average strength of the causal effect within these 48.19% of graphs was 0.53 (with a 90% credible interval (CI) 0.37–0.63). In 100% of the 48.19% of DAGs sampled which showed a pathway from anxiety to dissociation, a *direct* edge between anxiety and dissociation was present, and this had an average strength of 0.43 (90% CI=0.20–0.63). The opposite direction, from dissociation to anxiety, was present in 51.81% of sampled graphs, with average strength 0.51 (CI=0.18-0.63). Again, 100% of the 51.81% of sampled DAGs showing a pathway from dissociation to anxiety contained a direct pathway. The average strength of this direct pathway was 0.43 (CI=0.16-0.62). Therefore, there is a significant direct relationship between anxiety and dissociation but no clear direction of influence, as roughly equal proportions of the 50,000 DAGs sampled showed each direction.

Depression and PTSS also show significant direct relationships with dissociation. The direction is unclear in depression (71.81% dissociation influences depression; 28.19% vice versa) and does not meet the guideline described above for drawing hypotheses about probable direction of influence (i.e. direction present in at least 90% of sampled DAGs). However, the result with PTSS does meet this criterion (90.81% dissociation influences PTSS; 9.19% vice versa).

Psychotic Symptoms

For cognitive disorganization 0.08% of the sampled DAGs found an edge from cognitive disorganization to dissociation, but 99.92% showed the opposite, with 100% of these showing a direct pathway with average strength 0.25. This can be interpreted as suggesting that the probability that dissociation contributes to cognitive disorganization is close to 1.

It was found to be highly probable that dissociation also influences two other psychotic experiences (rather than vice versa): 96.52% and 96.30% of sampled DAGs found that dissociation influences paranoia and grandiosity respectively. The exception was hallucinations, where the direction of the relationship was less clear: 67.81% of sampled DAGs found that dissociation influences hallucinations, but the remaining 32.19% found the opposite direction. This proportion is insufficient to draw inferences about direction of effect.

Indirect Relationships

Relationships between dissociation and insomnia, worry, and distress tolerance were strongly indicated to follow the direction of dissociation influencing each of these variables (insomnia: 92.11%; worry: 84.22%; distress tolerance: 99.12%). However, the majority of influence came from indirect pathways with small effect sizes (see Table 5).

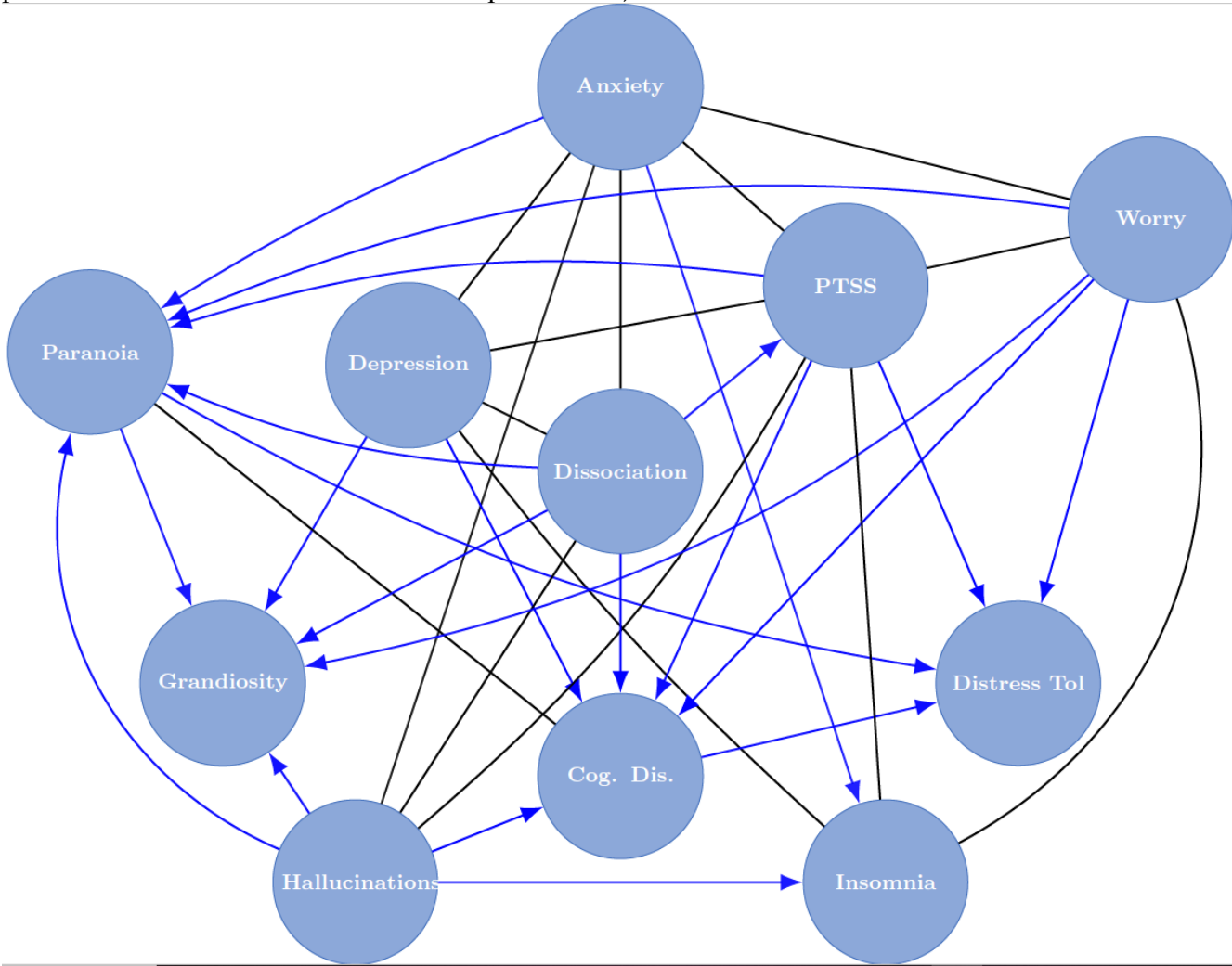
Graphical representation

Figure 7 summarises the results of Table 4. Edges are shown when the relationship between the variables was present in over 50.00% of the 50,000 sampled DAGs. Where the edges are directed (blue, with arrowheads), the indicated direction of influence was present in over 90.00% of the DAGs where the edge was present. Therefore, black edges without arrowheads show a relationship where the direction is more ambiguous, and edges with arrowheads indicate a more probable direction (in the direction shown by the arrowhead).

Table 5. Summarising the indirect pathways between dissociation and worry, insomnia, and distress tolerance and their causal effects.

	Dissociation to Worry: 84.20% of sampled DAGs		Dissociation to Insomnia: 91.49% of sampled DAGs		Dissociation to Distress Tolerance: 99.32% of sampled DAGs	
	Pathway present (% of 84.22%)	Causal effect	Pathway present (% of 92.11%)	Causal effect	Pathway present (% of 99.12%)	Causal effect
Direct pathway	4.29	0.0037	5.29	0.0027	14.71	-0.0086
Indirect pathway via:						
Anxiety	51.20	0.19	48.11	0.08	50.37	-0.09
Hallucinations	65.62	0.01	66.94	0.06	67.55	-0.03
Depression	62.94	0.03	61.04	0.11	70.15	-0.04
PTSS	7.50	0.01	11.41	0.03	91.39	-0.15
Worry	<i>Direct pathway</i>		9.09	<0.01	84.16	-0.07
Insomnia	88.04	0.20	<i>Direct pathway</i>		90.04	-0.02
Grandiosity	4.20	<0.001	2.73	<0.001	5.50	-
Paranoia	1.14	<0.01	3.19	<0.01	92.76	-0.04
Distress Tolerance	0.62	<0.001	0.59	<0.001	<i>Direct pathway</i>	
Cognitive Disorganisation	-	-	0.11	-	95.89	-0.09

Figure 7. Mixed graph (i.e. with both directed and undirected edges) showing relationships between dissociation, psychotic-like experiences, and other presentations measured in the online survey. (Undirected lines (black, no arrows) show relationships that were present in over 50.00% of the 50,000 sampled DAGs. Blue lines with arrowheads show relationships (and the probable direction of causation) where these were present in over 90.00% of the 50,000 sampled DAGs).



Comparison of networks

Both networks indicate that dissociation is highly connected to all the other mental health variables, with the exception of distress tolerance. The absence of an edge between dissociation and distress tolerance in the undirected network is supported by the DAGs analysis, where very few direct pathways between the two were found in the 50,000 sampled DAGs.

In terms of the strength of the direct relationships with dissociation, hallucinations and PTSS have the highest edge-weights with dissociation in the undirected network and the strongest direct causal effects in the DAGs analysis. Therefore, both networks find that these variables have robust relationships with dissociation.

For other relationships, the two network models did not yield identical results. For example, whilst the direct causal effects for depression (0.53 influence on dissociation and 0.48 influence from dissociation) and anxiety (0.53 and 0.51) appear similar to those for PTSS (0.57 and 0.51) and hallucinations (0.55 and 0.53) in the DAGs analysis, their edge-weights with dissociation in the undirected analysis do not support this. Anxiety in particular has a significantly lower edge-weight (0.127; CI: 0.0994 – 0.154) than that for depression (0.202; CI: 0.175 – 0.229), which is in turn significantly lower than those for hallucinations (0.268; CI: 0.243 – 0.293) and PTSS (0.250; CI: 0.224 – 0.282) (which were not statistically significantly different). Indirect pathways between these variables may have influenced the results in the undirected network, since anxiety and depression are likely to be highly associated

Similarly, at first glance, the relationships between dissociation and worry and dissociation and insomnia appear to differ between models. The undirected network model shows a weak negative relationship between dissociation and these two variables (worry: -0.114, CI: -0.142 – -0.0855; insomnia: -0.0565, CI: -0.0915 – -0.0215), whilst the DAGs analysis found small positive effects. However, both models agree

that the strength of the direct relationships is low, perhaps too weak to estimate reliably. The DAGs analysis result is influenced by the indirect pathways from dissociation to both variables, which appear robust (i.e. they were found in more than 50% of sampled DAGs, and the indirect effects of dissociation on insomnia exceeds the 90% threshold for drawing tentative conclusions regarding direction of influence).

Discussion

In this chapter, state-of-the-art network analysis methods are used to explore the position of dissociation in the wider constellation of mental health. One of the most striking results of the analysis is that both networks indicate that dissociation is highly connected with other mental health conditions, including post-traumatic stress symptoms (PTSS), anxiety and depression. Dissociation was found to be a probable moderate causal influence on PTSS, consistent with previous findings in the trauma literature regarding the predictive nature of dissociation for the occurrence of PTSD symptoms (Ozer et al., 2003). Further, dissociation is also likely to influence paranoia, grandiosity, and cognitive disorganisation, consistent with existing models of positive psychotic symptoms (Maher & Ross, 1984; Garety et al., 2001; Freeman, 2016). Whilst experimental work is required to verify the directions of effect found in this cross-sectional analysis, the results presented here nevertheless indicate that dissociation may have been under-recognised in terms of its causal significance in psychiatry.

There were some results of particular interest that are important to highlight. First, robust relationships between dissociation and hallucinations, anxiety and depression featured in both networks, but in all of these, the direction of influence between dissociation and the other presentation was unclear. This may indicate some level of

interconnection: by sharing a common cause not represented in the networks, through a reciprocal relationship (as these are not represented in DAGs), or both of these. For example, anxiety is implicated in the feedback loop proposed by Hunter et al. (2003) to explain depersonalisation; indicating a potential reciprocal relationship. Shared common causes may include specific psychological processes, such as attentional biases. Alternatively, high conceptual overlap may also produce an ambiguous result. For example, of relevance to the result for hallucinations, Moskowitz and Corstens (2008) suggest that auditory hallucinations are a form of dissociation.

Second, the direct relationships from worry to dissociation, and from insomnia to dissociation found in previous experimental manipulation studies (worry: Freeman et al., 2013; insomnia: van Heugten–van der Kloet et al., 2015) were not replicated in this study. Rather, the DAGs analysis was unable to find a clear direction of influence between worry and dissociation, and indicated that there was a high probability of dissociation indirectly influencing insomnia. Further, the undirected network found weak negative relationships between these variables and dissociation. The discrepancy between networks and the contrast with existing literature may be due to several factors: the direct relationships being too weak to be estimated reliably, the influence of other variables within the indirect pathways, the limitations of network analysis for representing such complexity, and the limitations of these methods for exploring reciprocal relationships. Indeed, for worry, the relationship with dissociation was found to be mediated by anxiety in the DAGs analysis, and Freeman et al. (2013) did find increased anxiety ratings in their worry induction condition. Regarding the result for insomnia, Lynn et al. (2019) suggest that mediation of the relationship between sleep and dissociation by other variables is an important consideration. One such consideration could be negative affect, since Reeve, Emsley, Sheaves and Freeman (2018) highlight the mediating role of this in the relationship between insomnia and psychotic symptoms.

Third, the results for dissociation and cognitive disorganization are important conceptually. A robust relationship between the two was found in both networks, with high probability that dissociation influences cognitive disorganization. This suggests that these are distinct concepts and that confusion, loosening of associations, thought disruption, and other hallmarks of cognitive disorganization are not analogous to dissociation, but may result from it.

Finally, analysis strongly supported the interpretation that distress tolerance is indirectly related to dissociation, most likely as a downstream effect. This echoes anecdotal reports that dissociation sometimes helps individuals to better tolerate distress when under extreme stress. However, it does not support the theoretical position that dissociation is selected as a coping strategy as a result of a person's low distress tolerance. Interestingly, a very large proportion of indirect pathways from dissociation to distress tolerance included paranoia and cognitive disorganisation. This suggests that the subjective experiences of threat and thought disruption may be particularly likely to overwhelm people's capacity to tolerate distress. Taken together with the results indicating that dissociation influences paranoia, grandiosity and cognitive disorganisation, this study implies an important role for dissociation in the symptomatology and lived experience of psychosis.

A limitation of the study is its sampling method: as previously discussed (Chapter Three and Chapter Four) recruitment via Facebook attracted a predominately White female sample who engage with social media and are willing to participate in online research. This may be unrepresentative of the wider population. However, in the present study, it is an advantage that the participant group has higher levels of self-reported mental health difficulties than expected for a general population sample. Since affective and psychotic symptoms are believed to exist along a spectrum of severity, having a broad range of responses may mean that these results are more likely to be generalisable to patient populations. Nevertheless, replication in a group

of participants with verified psychiatric diagnoses is required in order to test the assumption that clinically significant levels of the variables interact in a manner analogous to subclinical levels.

As previously discussed, there are also multiple limitations inherent in the DAGs methodology. Acyclicity is a fundamental assumption of the analysis, therefore DAGs cannot estimate reciprocal relationships and feedback loops which are likely to be important when considering psychological variables. DAGs based on cross-sectional data assume all relevant variables are included and cannot contain information about longitudinal effects between variables. These limitations, and the problems inherent in assuming that mathematical causality reflects real-world causal structure, lead some to argue DAGs are suitable only for describing networks where the underlying causal structure is already known. However, Robinaugh et al. (2019) state that DAGs can *'provide valuable but incomplete information about the relationships between symptoms [nodes]'* (p.6) and that the resulting *'interesting causal conjectures'* (p.83; Dawid, 2010) may still be valuable. Indeed, such conjectures may be particularly valuable in a field such as dissociation, where the underlying causal structure is very much unknown. Furthermore, the similarities between the undirected and DAG networks and the parsimony between these results and the existing literature are heartening and suggest that the *'interesting causal conjectures'* presented here warrant further exploration.

Chapter Conclusions

This chapter illustrates the importance of dissociation to the wider field of mental health. Further, the argument for focusing on dissociation as a clinical target in psychosis is supported by findings that dissociation is a probable cause of psychotic symptoms (paranoia, grandiosity, and cognitive disorganization).

In terms of the thesis aim of identifying causal and maintenance mechanisms of dissociation in psychosis, whilst no variables were found to be highly probable direct causes of dissociation, the results nevertheless suggest that anxiety, depression, and hallucinations may be particularly important. In the directed network model, these relationships were directionally ambiguous, which may indicate that they have reciprocal relationships with dissociation, or that psychological processes involved in these presentations are also relevant to the development and maintenance of dissociative experiences. Chapter Six will therefore focus on identifying plausible maintenance mechanisms of dissociation.

6 Identifying Potential Psychological Mechanisms of Dissociation

'Well, my theory, based on just my personal experience would be that often it's an excessive amount of sensory stimuli triggers it; an excessive amount of emotional distress.'
(Qualitative Study Participant 11)

Chapter Abstract

Rationale

In this chapter, the focus moves from locating dissociation across mental health symptoms to understanding what may cause or maintain dissociation. A review of the current literature revealed a large number of mechanisms have been proposed to underlie dissociation, including many relating to processing of affect. Following this review, and incorporating the results of Chapters Five and Two, potential causal relationships between dissociation and cognitive factors are explored in this chapter. The factors explored are those frequently found to be associated with dissociation, which may be amenable to treatment, and which were feasible to test via an online survey.

Methods

An undirected and a partially directed network model were estimated using data from an online survey with 6161 respondents. The networks were used to identify relationships between dissociation and candidate mechanisms: cognitive appraisals, safety behaviours, affect intolerance, alexithymia, attentional control, body vigilance, anxiety sensitivity, general self-efficacy, perseverative thinking, and beliefs regarding stress.

Results

Both models indicated a highly connected network where dissociation had direct relationships with cognitive appraisals, safety behaviours, perseverative thinking, alexithymia, general self-efficacy, and beliefs about being overwhelmed. Only the latter reached the threshold for inferring direction of influence (dissociation causing beliefs). The strongest relationship in both networks was between dissociation and cognitive appraisals of dissociative experiences.

Conclusions

Both networks indicate that factors relating to affect intolerance may be important in dissociation. This study generates a hypothesis that FSA-dissociation arises from affect intolerance (conferring high sensitivity to affect, and low self-rated coping), in which context threat-based appraisals of dissociative experiences are formed and ruminated upon, maintained by safety behaviours.

Introduction

The identification of plausible mechanisms of dissociation is an essential step in developing an evidence-based cognitive model that can be used in treatment.

Therefore, the aim of this chapter is to explore the relationships between dissociation and specific psychological factors that may reasonably be hypothesised to play a role in dissociative experiences and that may be amenable to psychological intervention.

Chapter Two highlighted a number of potentially important processes in the occurrence of dissociation, and Chapter Five indicated that dissociation may have close relationships with anxiety, depression, and hallucinations in particular. The current chapter first uses a systematic literature review to identify plausible cognitive variables that have often been found to be associated with dissociation or are otherwise considered important in the existing literature. The relationships between dissociation and the selected psychological processes are then examined using network analyses, since these methods are well-suited to exploring and visualising complex sets of inter-correlated variables. As in Chapter Five, the inter-correlations will first be explored with an undirected network, to robustly estimate the underlying structure of the data, before proceeding to a DAGs analysis, which can generate tentative hypotheses about probable directions of relationships.

The use of network analysis methods in this chapter marks a point of difference from the existing literature, where the majority of evidence consists of correlations between dissociation and a very small number of – or even a single – mechanism of interest. Importantly, since network analysis methods make use of conditional dependence, the most influential variables are more easily identified, as mediation effects are incorporated into the network estimation. This complexity is untested in simple correlation analyses, potentially resulting in over-inflated estimations of the importance of the mechanisms assessed. Exploring multiple relevant variables simultaneously, whilst accounting for their inter-correlations therefore advances the

understanding gained in previous literature, and facilitates the identification of plausible mechanisms of dissociation involving a felt sense of anomaly (FSA). These may then be tested more robustly in future – for example, via longitudinal and experimental studies – according to the stages of the Oxford Approach described in Chapter One.

Psychological processes related to dissociation

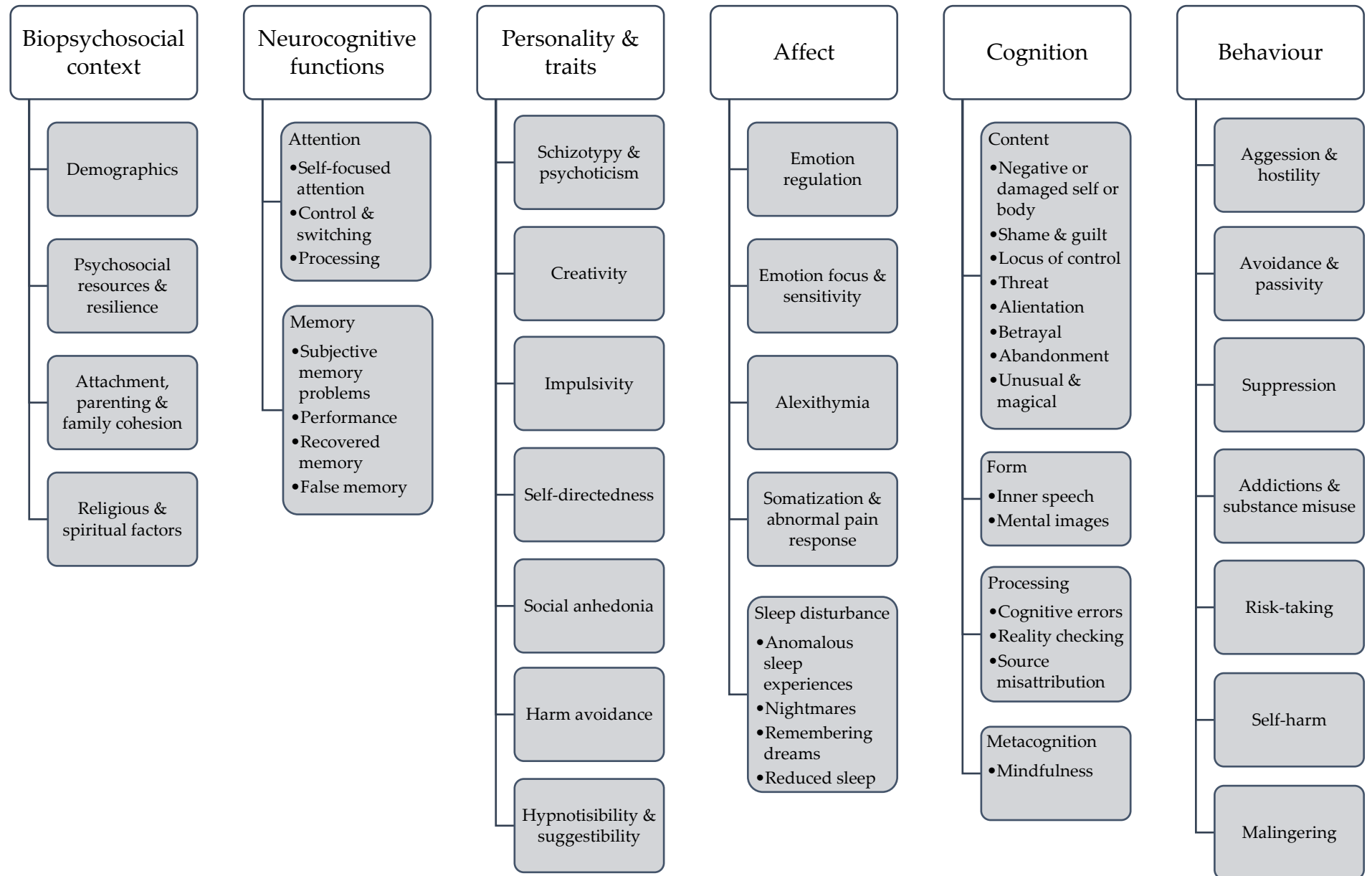
First, a thorough literature review was undertaken to identify psychological factors that may relate to dissociation. A search run on 5th September 2018 using the method outlined in Table 1 identified 13476 papers, resulting in a subgroup of 560 papers that explored the relationship between a specific psychological factor and a form of dissociation.

The findings of the 560 papers were synthesised by extracting their key findings into an Excel database, which was then imported into NVivo (version 12; QSR International, 2018) where each psychological factor was coded. Codes were then grouped in a method similar to thematic analysis. The synthesised results (Figure 1) demonstrate that a very broad range of factors have been found to be associated with dissociation.

Table 1. Summarising the method for the literature review of factors related to dissociation

<i>Method</i>
<i>Initial (Broad) Search</i> The search was run on 5th September 2018 in Ovid Medline using the search terms: dissociation; dissociative; depersonali*; dereali*; "intrusi* + memor*"; flashback*; unreality; fugue; reliving; "conversion+disorder". (Note that the wildcard "dissociat*" was not used as this returns many papers entitled "Dissociating... [X] and [Y]..." which are not in the dissociation or wider clinical psychology literature). The search was limited to English language, and to journal article or review formats. Due to the occurrence of the word 'dissociation' used in other contexts (as above), search terms were limited to the title and abstract of the paper, ensuring that a full-text search did not pick up irrelevant uses of the terms. Despite the conservative approach to search criteria, a large number of irrelevant results were produced. Therefore, a total of 13476 papers were retrieved meeting the above criteria.
<i>Secondary (Refined) Search</i> Titles and abstracts of the 13476 papers were searched by hand using Mendeley Reference Manager (v.1.19.2; Mendeley Ltd, 2018) to determine the relevance of papers. Papers were disregarded if they were irrelevant (e.g. the word 'dissociation' was used, but not in reference to the construct of dissociation). Further, papers were not included in the review if they: pertained to dissociation within the context of sports science; pertained to depersonalization in the context of workplace burnout; explored the relationships between two or more forms of dissociation; carried out correlations solely for the purpose of measure validation; or compared diagnostic groups on the basis of dissociation scores (i.e. no specific psychological process was explored). Finally, papers exploring the relationship of PTSD, trauma, abuse, or perpetrator characteristics to dissociation were also disregarded if they did not consider a specific psychological mechanism involved in this relationship.

Figure 1. A visual summary of the findings of the literature review.



Psychological processes considered in this chapter

Variables which were repeatedly found to be associated with dissociation in the systematic review, or otherwise indicated to be important, and that were cognitive in nature (particularly those likely to be amenable to psychological treatment) or highly plausible mechanistically were selected. Additionally, particular consideration was given to factors that had been identified during participant interviews in Chapter Two. For example, problematic processing of affect was highlighted in Chapter Two and the above literature review (e.g. alexithymia: Berenbaum & James, 1994; affect dysregulation: Briere & Runtz, 2015; repressive coping: Farber & Sacco, 1999; anxiety sensitivity: Nixon & Bryant, 2006; ‘increased influence of emotion on thinking’: Cicero & Kerns, 2010).

The limitations of the online methodology were also considered. For example, it was not feasible to incorporate experimental tasks into the online survey, which therefore omitted variables such as the ‘jumping to conclusions’ reasoning bias, where assessment is via task performance rather than self-report. Further, variables relating to sleep were omitted due to the results of Chapter Five, which indicated a high probability that dissociation influences insomnia, rather than vice versa.

Subsequently, the following psychological processes were chosen for consideration in the current study:

Cognitive appraisals and safety behaviours:

According to general CBT theory, cognitive appraisals of events, and actions taken to mitigate anticipated ill-effects (‘safety behaviours’), are crucial to the maintenance of a psychological difficulty. Catastrophic cognitive appraisals of dissociation (Chapter Four) may heighten the significance and subjective threat posed by the dissociative experience, and drive behavioural and cognitive responses such as avoidance. Such responses provide short-term relief but prevent longer-term learning, or development of coping skills which could lead to a sustained reduction in the feared

experience. Therefore, cognitive appraisals and common behavioural responses to dissociation were included as potential mechanisms in this study.

Factors relating to problematic processing of emotion:

Alexithymia

Alexithymia – the inability to recognise or name subjective experiences of affect – has often been linked with dissociation. Robust correlations have been demonstrated by numerous researchers, such as Evren, Çınar and Evren (2012) who found a correlation of 0.48 between alexithymia and dissociation scales in a group of 200 inpatients. Similarly, Sayar, Kose, Grabe and Topbas (2005) report a correlation of 0.47 in a group of 173 high school students. It is possible, therefore, that alexithymia plays a role in dissociation – perhaps by contributing to the sense of anomaly, or providing a context in which endogenous (i.e. internal, rather than external) signals may be misinterpreted as odd or unusual. Panayiotou et al.'s (2015) results also suggest that when considered as a state (rather than trait) construct, alexithymia may be considered a learned behaviour, employed in order to avoid unwanted emotions (the 'coping hypothesis'; Sayar et al., 2005). In this way, alexithymia may also overlap with affect intolerance in the context of dissociation.

Affect intolerance

Affect intolerance describes the avoidance or even fear of experiencing emotions (whether negative or positive). In Chapter Two, many participants described beliefs about stress and emotion that could be interpreted as consistent with this construct (e.g. *'If I feel a large charge of emotion, I have to back off'*). Few empirical research studies measure affect intolerance specifically. However, Ó Laoide, Egan and Osborn (2018) report that negative attitudes towards emotion predicted clinical levels of depersonalisation, and Baslet, Tolchin and Dworetzky (2017) that affect intolerance was related to altered responsiveness during dissociative seizures. This pattern of results could be interpreted in accordance with the conceptualisation of dissociation

as an avoidance or defence strategy protecting the person from danger or distress. That is, for a person with high affect intolerance (for example, following trauma), the experience of emotion may be threatening enough to trigger a dissociative 'coping response'.

Anxiety sensitivity

Related to affect intolerance (Bernstein, Zvolensky, Vujanovic & Moos, 2009), anxiety sensitivity has also been found to correlate with dissociation. Yılmaz, Bilgiç, Akça, Türkoğlu and Hergüner (2016) demonstrated that anxiety sensitivity scores partially predicted somatoform dissociation in young people diagnosed with conversion disorder (also known as functional neurological disorder, and largely considered to be dissociative). Similarly, anxiety sensitivity predicted dissociative reactions to a hyperventilation procedure in participants with acute stress disorder (Nixon & Bryant, 2006). Furthermore, when participants in Chapter Two described beliefs and behaviours relating to affect intolerance, the most commonly cited emotion was stress or anxiety, implicating anxiety sensitivity as a specific example of affect intolerance that may be particularly important in dissociation.

Meta-emotion (negative)

Also related to affect intolerance, meta-emotion is defined as the emotional response to experiencing affect (Mitmansgruber, Beck, Höfer & Schüßler, 2009). For example, Mitmansgruber et al. outline that responses to experiencing emotion might include anger, interest, shame, self-compassion, or other responses. Since Ó Laoide, Egan and Osborn (2018) suggest that negative attitudes towards emotion may be relevant to dissociation, negative emotional responses may also be important. For example, having a (negative) secondary emotional response to affect may increase arousal, potentially overloading an already heightened or sensitised system. Such responses may even act as aversive conditioning thereby increasing anxiety sensitivity or affect

intolerance. Therefore, negative meta-emotions (such as anger or shame) were also considered.

Beliefs about feeling overwhelmed with stress

Many interviewees in Chapter Two spoke of themselves as people who were easily (negatively) affected by stress and strong affect. Amongst these descriptions were explanations that becoming 'overwhelmed' was a feared outcome, and one that was linked to ideas that dissociation may be a natural 'shutting off' response to such an experience (a concept proposed by a number of early theorists; Young, 1988).

Therefore, it was judged that beliefs about being overwhelmed were also important to include in the current study.

Self-efficacy

When describing the impact that becoming 'overwhelmed' may have on them, participants in Chapter Two, frequently made judgements about their capacity to cope with stress and heightened emotion when it arose. Specifically, interviewees described a perceived profound lack of ability to cope. The construct of self-efficacy (belief in one's capabilities) may therefore be relevant to avoidance of emotion in the context of dissociation. For example, low self-efficacy may underlie cognitive appraisals of dissociative experiences as signs of 'losing control'. Anticipating being unable to cope may also result in a greater anxiety response to even mild stressors – this is important since Hunter, Phillips, Chalder, Sierra and David (2013) consider anxiety symptoms to be a key part of the cycle maintaining depersonalisation.

Factors relating to altered attention:

Attentional control

Attention has frequently been discussed in relation to dissociation. For example, De Bellis, Woolley and Hooper (2013) found a negative correlation between dissociation and the attention domain of a neuropsychological battery in young people with

PTSD (with or without a history of maltreatment) and controls. Similarly, Weiss and Low (2017) found that whilst mood was the greatest predictor of dissociation, selective and divided attention were also significant predictors. Yet more specifically, Segal and Lynn's (1993) findings implicate poor attentional control in particular. In their group of 85 undergraduate students, a measure of poor attentional control had a moderate correlation with dissociation. It is feasible that poor attentional control could result in incomplete processing of stimuli, or contribute to sensory overload, either of which may plausibly result in a felt sense of anomaly.

Body vigilance

Hunter et al. (2003) suggest that, analogous to the cognitive-behavioural therapy (CBT) conceptualisation of health anxiety, attending to dissociative experiences may exacerbate their presentation. Symptom monitoring is therefore a key process in their model of depersonalisation. Since FSA-dissociation can be experienced in relation to the physical body, body vigilance may therefore have the same effect. It is feasible that a person who is high in body vigilance may be more likely to notice sensations that feel anomalous (FSA), and more likely to engage in symptom monitoring as a well-rehearsed process.

Perseverative thinking

Wolfradt and Engelmann (1999) report a correlation of 0.46 between depersonalisation and rumination, suggesting a strong positive relationship between perseverative thinking and dissociative experiences. Analogous to symptom monitoring (Hunter et al., 2003), perseverative thinking is likely to direct attention towards dissociative experiences, creating greater opportunity for these to be noticed when they arise. However, it is also feasible that perseverative thinking may directly influence the occurrence of dissociative experiences. It has been suggested that 'obsessive focus' on a topic (e.g. the self) may produce sensations of unreality with

respect to that domain (Jaspers, 1963; as cited in Hunter et al., 2003). Therefore, one may hypothesise that if perseverative thinking occurs at a sufficient intensity, this could induce FSA. Whilst the effects of excessive scrutiny of internal stimuli have not been experimentally tested, previous research has found that staring at an object induces feelings of derealisation (e.g. Möllmann, Hunger, Schulz, Wilhelm & Buhlmann, 2020; van den Hout et al., 2009). It is possible, therefore, that as well as ensuring attention is directed towards dissociative experiences (and hence driving a positive feedback loop), perseverative thinking may also directly induce feelings of unreality if it results in sufficiently intense attentional focus.

Following Chapter Five's finding that the effect of worry on dissociation found by Freeman et al. (2013) was best explained by the mediating effect of anxiety, it is perhaps important to briefly establish the difference between perseverative thinking and worry. The Metacognitive Therapy Institute notes that worry describes a form of persistent, recurrent, negative thinking which typically concerns anticipated danger in the future (i.e. is closely linked to anxiety) (MCT Institute, 2020). Therefore, the aim in this chapter was to explore the relationship of the general process of repetitive negative thinking to dissociation, particularly as this may involve focusing on current sensations and stimuli.

Methods

Design

The design was an online cross-sectional self-report questionnaire study: the *"Understanding dissociative experiences"* survey described in Chapter Four.

Procedure and Participants

As described in Chapter Four, the majority of participants were recruited via Facebook advertisements (Appendix 3.1) and the survey landing page contained the

participant information sheet and statements regarding informed consent (Appendix 3.2). Informed consent and assessment were both carried out online using Qualtrics (Qualtrics, 2019).

During the recruitment period (January 30th 2019 to February 25th 2019), 10520 responses were recorded by Qualtrics (Qualtrics, 2019). Of these, 361 (3.43%) indicated consent but then left the survey without continuing on to the first page of measures. After removing participants who did not meet the inclusion criteria, had high levels of missing data (greater than 20% in any of the measures), or recorded an age more than two standard deviations above the mean age of the sample (i.e. 76 years or above), a sample of 6161 was obtained for the DAGs analysis.

Of the 6161 participants, the majority were female (85.6%, $n = 5274$; male: $n = 717$; other: $n = 128$; prefer not to say: $n = 42$) and White (95.3%; $n = 5872$). The mean age of the sample was 45.6 years ($SD = 14.7$). Additionally, 80.6% of the sample reported that they had experienced mental health difficulties. As before, significant differences were found in dissociation scores between mental health status groups (Appendix 4.1).

Measures

Cronbach's alphas for each scale are shown in Table 2. All scales demonstrated good or excellent internal consistency in this sample.

Černis Felt Sense of Anomaly scale (ČEFSA; Chapter Three; Appendix 2.5)

As described in Chapter Three, the ČEFSA measures dissociative experiences which share a core experience of a felt sense of anomaly (FSA) using 35 items rated according to the past two weeks. Higher scores indicate higher levels of FSA-dissociation.

Cognitive Appraisals of Dissociation (CAD-P; Chapter Four, Appendix 3.4)

As described in Chapter Four, the CAD-P measures cognitive appraisals of dissociative experiences using 13 items rated according to the past two weeks. Higher scores indicate more frequent occurrence of catastrophic appraisals in response to dissociative experiences.

Responses to Dissociation (RTD)

In Chapter Two, participants described a number of safety behaviours they carried in response to experiencing dissociation. Twenty items were generated using transcripts from this chapter (Appendix 5.1). Iterative exploratory factor analysis (EFA) with half of the full “*Understanding dissociative experiences*” sample described in Chapter Four (n=4143) resulted in a two-factor scale comprising six items (Appendix 5.2). Factors in the final scale were “engage in something else” (e.g. “I try to keep busy”) and “disengage and avoid” (e.g. “I stay away from other people”). Confirmatory factor analysis (CFA) in the second half of the full sample (n=4144) demonstrated a good fit for this model ($\chi^2=165.768$, $df=8$, $CFI=0.972$, $TLI=0.948$, $RMSEA=0.079$, $SRMR=0.049$) and good internal reliability (Cronbach’s alpha = 0.66). Higher scores on the RTD therefore indicate greater use of safety behaviours in response to dissociation. Items are rated from 0 “never” to 4 “always” for how the respondent typically acts when feeling dissociated.

Affect Intolerance Scale (AIS; Stapinski, Abbott & Rapee, 2014)

The Affect Intolerance Scale comprises 30 items rated on a Likert scale from 1 “strongly disagree” to 6 “strongly agree” which ask about the respondents’ beliefs and responses to negative emotions. Items form two factors: “threat expectancy” (e.g. “Once I have negative feelings, I worry that they will get worse”) and “avoid/suppress” (e.g. “I should avoid negative feelings”). Higher scores indicate greater intolerance of negative affect.

Anxiety Sensitivity Index (ASI; Deacon, Abramowitz, Woods & Tolin, 2003)

The Anxiety Sensitivity Index contains 18 items which ask about concerns people may experience as a result of anxiety: these may be physical (“It scares me when my heart beats rapidly”), cognitive (“When I cannot keep my mind on a task, I worry that I might be going crazy”), or social (“It is important for me not to appear nervous”). Items are rated from 0 “very little” to 4 “very much”. Higher scores indicate greater sensitivity to anxiety.

Attentional Control Scale (ATC; Derryberry & Reed, 2002)

The Attentional Control Scale contains 20 items and asks respondents to rate from 1 “almost never” to 4 “always” items such as “My concentration is good even if there is music in the room around me” and reverse items such as “I have trouble carrying on two conversations at once”. Higher scores indicate greater attentional control.

Body Vigilance Scale (BVS; Schmidt, Lerew & Trakowski, 1997)

The Body Vigilance Scale measures sensitivity to physiological sensations such as faintness or vision changes. Three questions such as “I am the kind of person who pays close attention to internal body sensations” are rated from 0 “never” to 10 “extremely” for the past week, then a fourth item asks respondents to rate how much attention they have paid to a list of different sensations over the same timeframe. Higher scores indicate greater vigilance for bodily sensations.

General Self-Efficacy scale (GSE; Schwarzer & Jerusalem, 1995)

The General Self-Efficacy scale comprises ten items such as “I can always manage to solve difficult problems if I try hard enough” and “I can usually handle whatever comes my way”. Items are rated on a four-point Likert scale from 1 “not at all true” to 4 “exactly true”. Higher scores indicate greater self-efficacy.

Meta-Emotion Scale (MES; Mitmansgruber, Beck, Höfer & Schüßler, 2009)

The Meta-Emotion Scale measures emotional reactions to one's own emotions, and comprises of six subscales: "anger", "compassionate care", "interest", "contempt/shame" [sic], "tough control" and "suppression". For this study, only negative meta-emotions were considered (i.e. anger, contempt/shame, tough control and suppression), following the rationale outlined in the introduction section, above.

To ensure the resulting abridged measure was psychometrically valid, EFA was carried out with the first half of the full *"Understanding dissociative experiences"* sample (n=4143), and the resulting factor structure assessed using CFA in the second half (n=4144). This analysis found that the three original factors of anger, contempt/shame and tough control remained. The suppression factor was not replicated in this analysis: one of the original factor's two items was discarded for poor fit ("I cannot come to grips with strong emotions"), and the other ("I fight strongly against my emotions") loaded instead onto the new tough control factor. Additionally, one other item ("I often think my emotional reaction is wrong") was also discarded for poor fit. The resulting three-factor, 11-item adaptation of the measure was a good fit to the data in the second half of the sample ($\chi^2=372.289$, $df=41$, CFI=0.972, TLI=0.962, RMSEA=0.050, SRMR=0.028) and had high internal reliability (Cronbach's $\alpha=0.89$).

Therefore, the adapted version of the MES used in this study (Appendix 5.3) consisted of 11 items measuring anger, contempt/shame and tough control in response to having emotions (e.g. "I repeatedly get angry about my emotional reactions"). Items are rated from 1 "is not at all true for me" to 6 "is completely true for me", with higher scores indicating stronger negative emotional responses to one's emotions.

Online Alexithymia Questionnaire (OAQ-G2; Thompson, 2007)

For this study, only three of the Online Alexithymia Questionnaire's seven factors were considered: "difficulty identifying feelings" (e.g. "When asked which emotion I'm feeling, I frequently don't know the answer"); "difficulty describing feelings" (e.g. "I can describe my emotions with ease"); and "externally-oriented thinking" (e.g. "I prefer doing physical activities with friends rather than discussing each others' emotional experiences"). These were chosen as they most closely relate to the construct of alexithymia as difficulty identifying emotions, whereas the other four factors ("vicarious interpretation of feelings", "restricted imaginative processes", "problematic interpersonal relationships", and "sexual difficulties and disinterest") were felt to overlap conceptually with other presentations, such as autistic spectrum disorder (e.g. "When other people are hurt or upset, I have difficulty imagining what they are feeling").

To ensure that the resulting abridged measure was psychometrically valid, EFA was carried out with the first half of the full *"Understanding dissociative experiences"* sample (n=4143), and the resulting factor structure assessed using CFA in the second half (n=4144). The resulting three-factor structure, comprising 11-items (i.e. discarding six items for poor fit), had good fit to the data in the second half of the sample ($\chi^2=433.982$, $df=41$, $CFI=0.968$, $TLI=0.957$, $RMSEA=0.053$, $SRMR=0.034$) and high internal reliability (Cronbach's $\alpha=0.84$). The three factors in the adapted version corresponded to the original factors of "difficulty identifying feelings", "difficulty describing feelings", and "externally-oriented thinking".

Therefore, the adapted version of the OAQ used in this study (Appendix 5.4) consisted of 11 items rated from 1 "strongly agree" to 5 "strongly disagree" (with one reverse-coded item). Higher scores indicate greater difficulty identifying, naming and acknowledging one's emotional state.

Perseverative Thinking Questionnaire (PTQ; Ehring et al., 2011)

The Perseverative Thinking Questionnaire is a 15-item measure of repetitive negative thinking. Items relate to how the respondent ‘typically’ thinks about negative experiences or problems and are rated from 0 “Never” to 4 “almost always”. Higher scores indicate higher levels of ruminative thinking.

Beliefs about being overwhelmed (Overwhelm)

As described above, beliefs about feeling overwhelmed were considered to be potentially important to include in the current study. However, no existing measure of this concept was found, and therefore 12 items were generated using transcripts from Chapter Two (Appendix 5.5) in order to develop a measure for the purposes of the current study. EFA with half of the full “*Understanding dissociative experiences*” sample described in Chapter Four (n=4143) resulted in a two-factor scale comprising eight items (Appendix 5.6). Factors in the final scale were “can’t cope” (e.g. “I can’t cope with stress”) and “shut off” (e.g. “If there’s too much to deal with, I just shut off”). CFA in the second half of the full “*Understanding dissociative experiences*” sample (n=4144) demonstrated a good fit for this model ($\chi^2=360.358$, $df=19$, CFI=0.966, TLI=0.951, RMSEA=0.075, SRMR=0.031) and excellent internal reliability (Cronbach’s $\alpha=0.93$). Items are rated from 0 “not at all like me” to 4 “very much like me”. Higher scores indicate greater endorsement of the belief that stress or emotion can lead to cognitive “overwhelm”, potentially resulting in mental “shut down”.

Statistical analysis

Analyses were conducted in R, version 3.6.1 (R Core Team, 2019). The ‘mice’ package (version 3.8.0; van Buuren & Groothuis-Oudshoorn, 2020) was used to carry out multiple imputation for missing data. Network estimation followed the procedure described in Chapter Five: first, data were transformed to a normal distribution

(using ‘gaussianize’) before an undirected partial correlation network and a Bayesian inference with directed acyclic graphs (DAGs) network were estimated.

Undirected partial correlation network

The undirected (Gaussian Graphical model) network was estimated and visualised using ‘bootnet’ (v1.3) and ‘qgraph’ (Epskamp, Cramer, Waldorp, Schmittmann & Borsboom, 2012). Again, due to the large sample size, the ggmModSelect method was used to obtain optimum model fit. Unlike Chapter Five, the principal direction argument was not used. Non-parametric bootstrapping (5000 bootstraps) was used to assess the accuracy and stability of the estimated network. In the final graph, positive partial correlations are shown by a blue and negative correlations by a red line. The strength of the pairwise partial correlations between nodes is indicated in both cases by the weight of the edge.

Bayesian inference with directed acyclic graphs

As in Chapter Five, the final causal graph was calculated by averaging the results of 50,000 sample DAGs, obtained by using the BiDAG package to run the partition Markov Chain Monte Carlo algorithm (Kuipers & Moffa, 2017; Kuipers, Suter & Moffa, 2018) for 10 million iterations. The final graph shows edges that were present in over 50% of the 50,000 sampled DAGs and those which showed a specific direction in over 90% of cases are directed (i.e. contain an arrowhead in the probable direction of effect). Causal effects (z-scores with credible intervals; CIs) were also calculated. (As described in Chapter Five, a credible interval may be interpreted in a similar manner to a confidence interval, but it is calculated according to the probability distribution given the data.)

Results

Table 2 shows the mean scores of the participants for each scale. The correlation matrix showing intercorrelations between all variables can be found in Appendix 5.7.

Table 2. Showing means and standard deviations of the sample for each scale in the survey

Scale	Sample mean (SD)	Cronbach's alpha in this sample	Scale min – max score
Černis Felt Sense of Anomaly scale	43.86 (27.05)	0.97	0 – 140
Cognitive Appraisals of Dissociation	16.91 (11.86)	0.93	0 – 52
Responses to Dissociation	14.67 (4.13)	0.67	0 - 24
Affect Intolerance Scale	120.70 (30.68)	0.95	30 - 180
Anxiety Sensitivity Index	31.56 (16.81)	0.93	0 – 72
Attentional Control Scale	48.99 (9.89)	0.87	20 - 80
Body Vigilance Scale	19.15 (8.71)	0.93	0 – 40
General Self-Efficacy Scale	27.48 (6.07)	0.92	10 - 40
Meta-Emotion Scale <i>*(subset of 11 items)</i>	44.24 (11.79)	0.89	11 – 66*
Online Alexithymia Questionnaire <i>*(subset of 11 items)</i>	33.47 (8.48)	0.84	11 – 55*
Perseverative Thinking Questionnaire	35.41 (13.78)	0.97	0 – 60
Beliefs About Being Overwhelmed	19.01 (8.38)	0.90	0 - 32

Undirected network

Bootstrapped confidence intervals (CIs) for each edge were calculated to assess the accuracy of the connections in the estimated undirected network. These were calculated using non-parametric bootstrapping (5000 bootstraps) using bootnet (v1.3) and are shown in Figure 2. Overall, the network appears to be estimated with good accuracy, despite overlap of CIs between edges in the network. The edge between dissociation and cognitive appraisals was very strong, and did not overlap with the CIs for any other edge.

Figure 2. Showing sample edge-weights and bootstrapped confidence intervals of edge-weights obtained via non-parametric bootstrapping (5000 bootstraps) for all edges in the undirected network

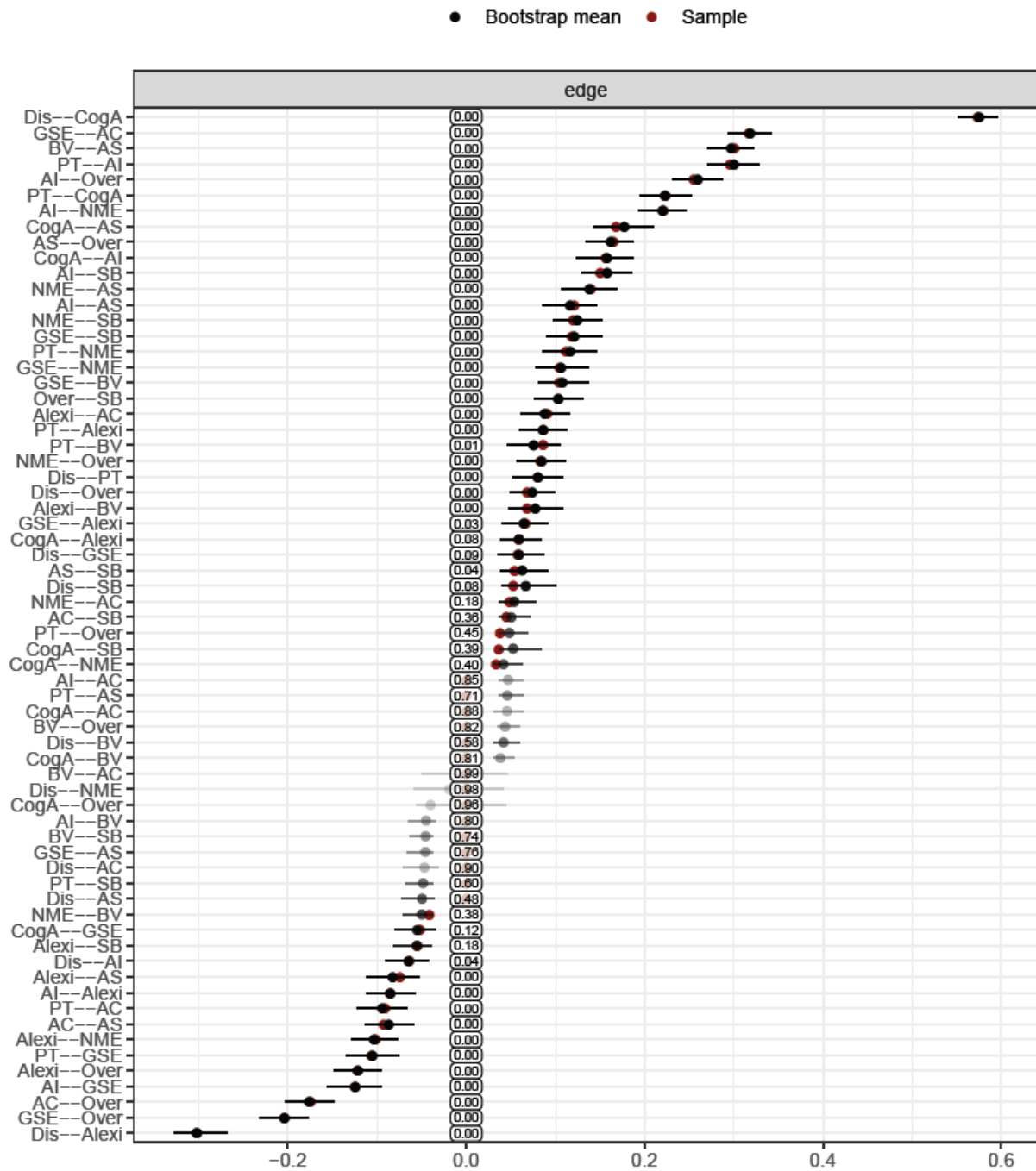


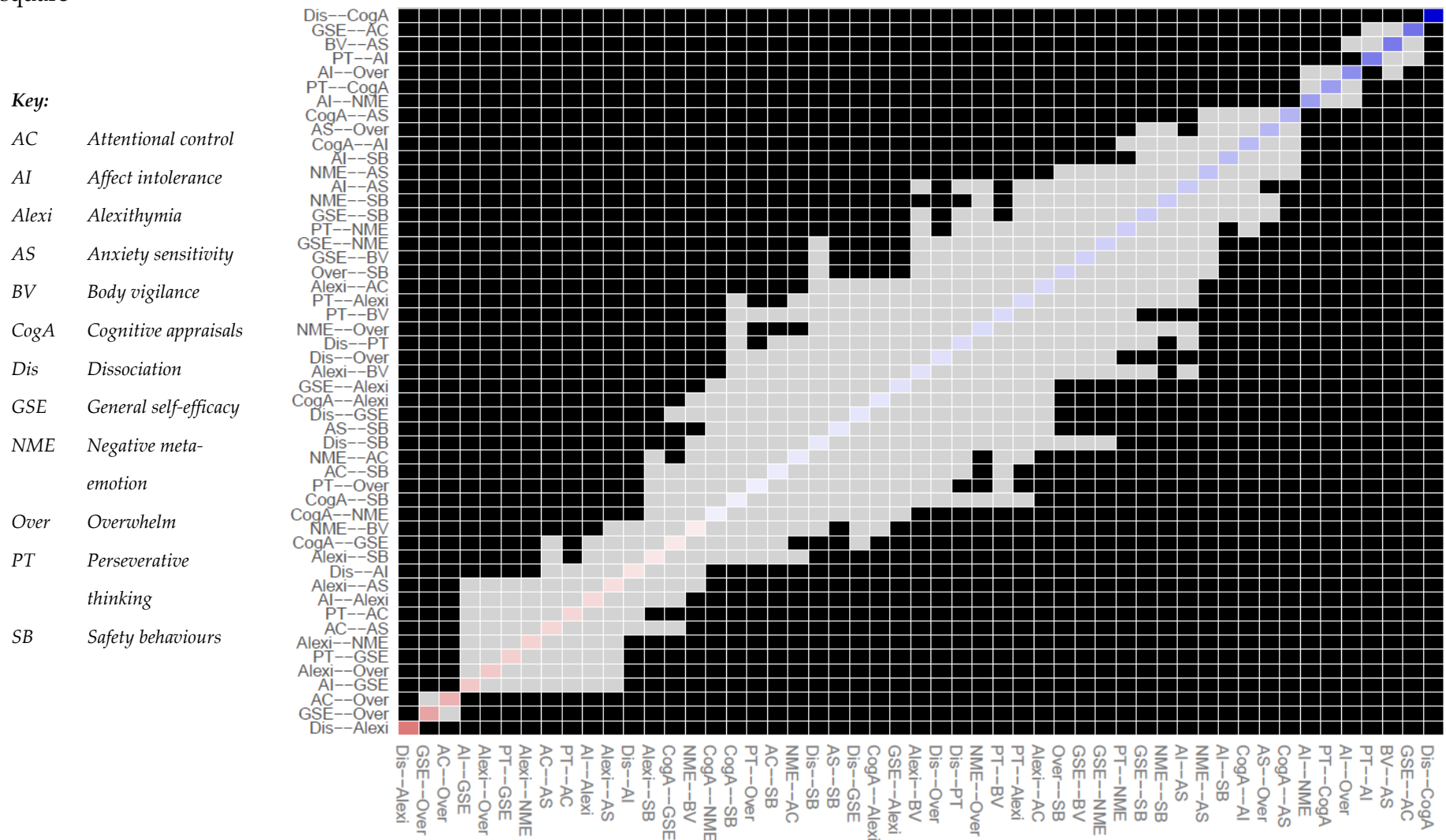
Table 3 shows the edge-weights and their bootstrapped confidence intervals for edges between dissociation and all other variables. This again indicates that the edge between dissociation and cognitive appraisals is statistically significantly stronger than any other edge involving dissociation. The next strongest edge is the negative relationship between dissociation and alexithymia, which is also statistically significantly stronger than other edges involving dissociation (apart from that between dissociation and cognitive appraisals).

Table 3. Edge-weights and their bootstrapped confidence intervals for edges between dissociation and each other variable (3 s.f.)

Variable	Edge-weight	C.I.
Perseverative Thinking	0.0803	0.0511 – 0.109
Cognitive Appraisals	0.573	0.551 – 0.595
Affect Intolerance	-0.0636	-0.0992 – -0.0280
General Self-Efficacy	-0.0576	-0.0155 – 0.100
Alexithymia	-0.302	-0.330 – -0.273
Negative Meta-Emotion	0 (no edge)	-0.0127 – 0.0127
Body Vigilance	0 (no edge)	-0.0426 – 0.0426
Attentional Control	0 (no edge)	-0.0293 – 0.0293
Anxiety Sensitivity	0 (no edge)	-0.0514 – 0.0514
Overwhelm	0.0688	0.0423 – 0.0952
Safety Behaviours	0.0527	0.00337 – 0.102

The results of the edge-weight difference tests for all edges are shown in Figure 3.

Figure 3. Differences between edge-weights: statistically significant differences indicated by a black square, non-significant differences by a grey square



Centrality estimates (strength, closeness, and betweenness) were calculated for all variables. The results are shown in Figure 4 and Table 4. The results of difference tests for all centrality estimates for all variables are shown in Figure 5.

Figure 4. Showing centrality scores for all variables in the network

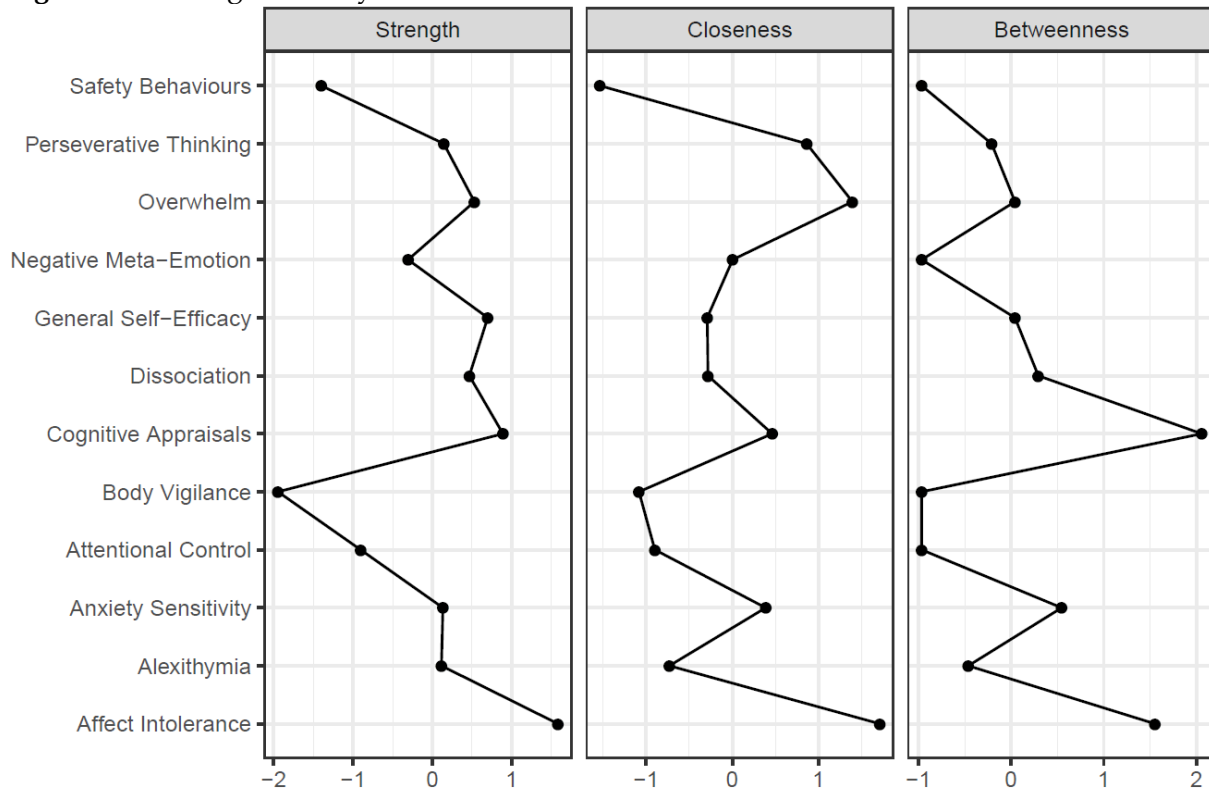
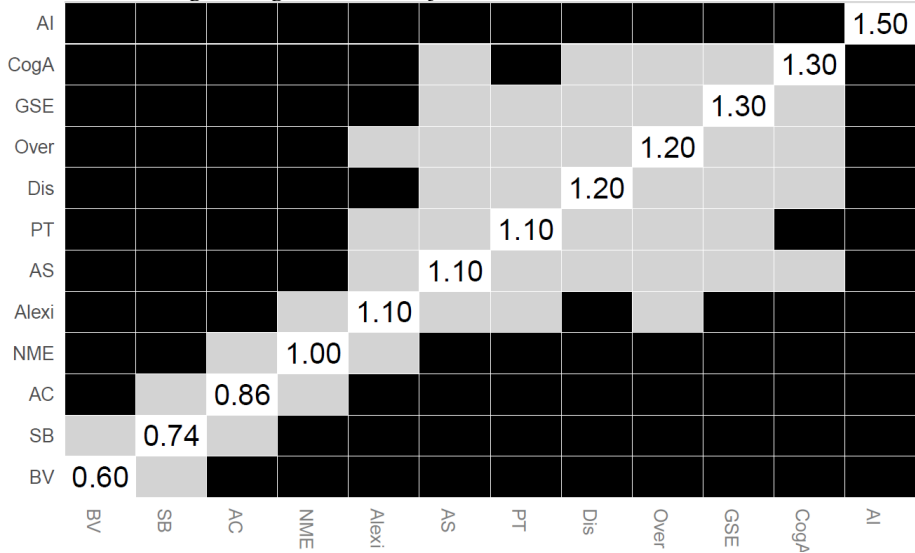


Table 4. Centrality measures for all variables. (Degree centrality and closeness to 3 s.f.)

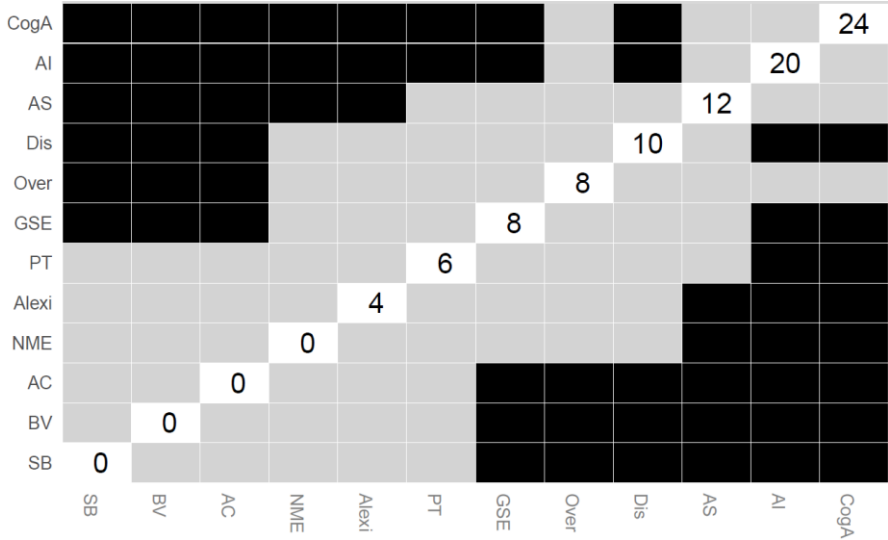
Variable	Strength (Degree)	Closeness	Betweenness
Dissociation	1.20	0.00930	10
Perseverative Thinking	1.12	0.0110	6
Cognitive Appraisals	1.30	0.0104	24
Affect Intolerance	1.47	0.0122	20
General Self-Efficacy	1.26	0.00929	8
Alexithymia	1.11	0.00865	4
Negative Meta-Emotion	1.01	0.00971	0
Body Vigilance	0.601	0.00814	0
Attentional Control	0.859	0.00841	0
Anxiety Sensitivity	1.12	0.0103	12
Overwhelm	1.21	0.0117	8
Safety Behaviours	0.736	0.00749	0

Figure 5. Differences between centrality estimates: statistically significant differences indicated by a black square, non-significant differences by a grey square

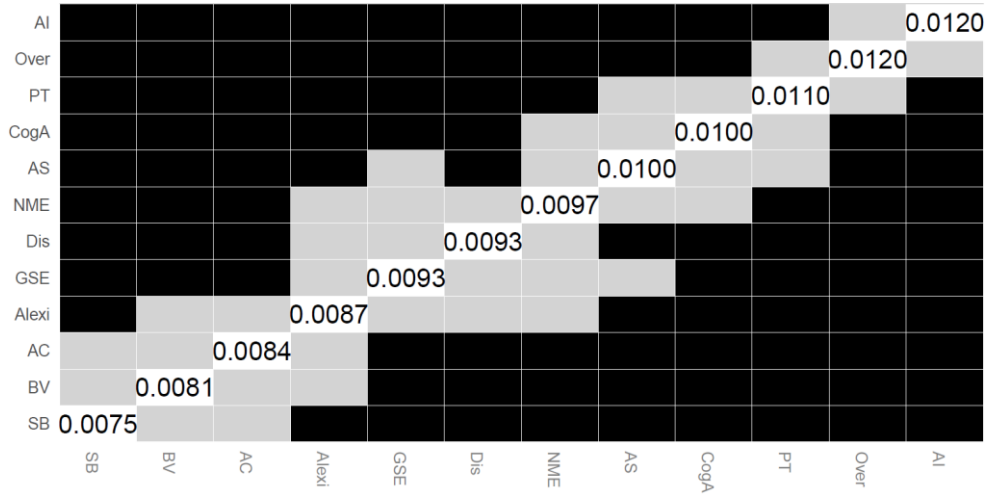
Panel 5a: Strength (degree centrality)



Panel 5c: Betweenness



Panel 5b: Closeness



Key:

- AC *Attentional control*
- AI *Affect intolerance*
- Alexi *Alexithymia*
- AS *Anxiety sensitivity*
- BV *Body vigilance*
- CogA *Cognitive appraisals*
- Dis *Dissociation*
- GSE *General self-efficacy*
- NME *Negative meta-emotion*
- Over *Overwhelm*
- PT *Perseverative thinking*
- SB *Safety behaviours*

The results of the centrality estimates indicate that affect intolerance has the highest node strength and closeness estimates in the network. Difference tests found that its node strength is significantly higher than any other variable and its closeness estimate significantly higher than for all other variables except overwhelm. The variable of cognitive appraisals was found to have the highest betweenness score. However, difference tests found that this was not significantly greater than those for affect intolerance, anxiety sensitivity, or overwhelm. Overall, these results suggest a high level of inter-connectivity within the network, with affect intolerance being particularly important in terms of direct and indirect pathways.

Finally, the stability of centrality estimates was calculated using case-dropping subset bootstrapping (Figure 6). This indicated that the stability for all three centrality measures was good. Correlation stability coefficients for betweenness was 0.59 and for closeness and strength were 0.75, which meets the recommendation that coefficients should be above 0.50.

Figure 6. Showing the results of the case-drop subset bootstrapping

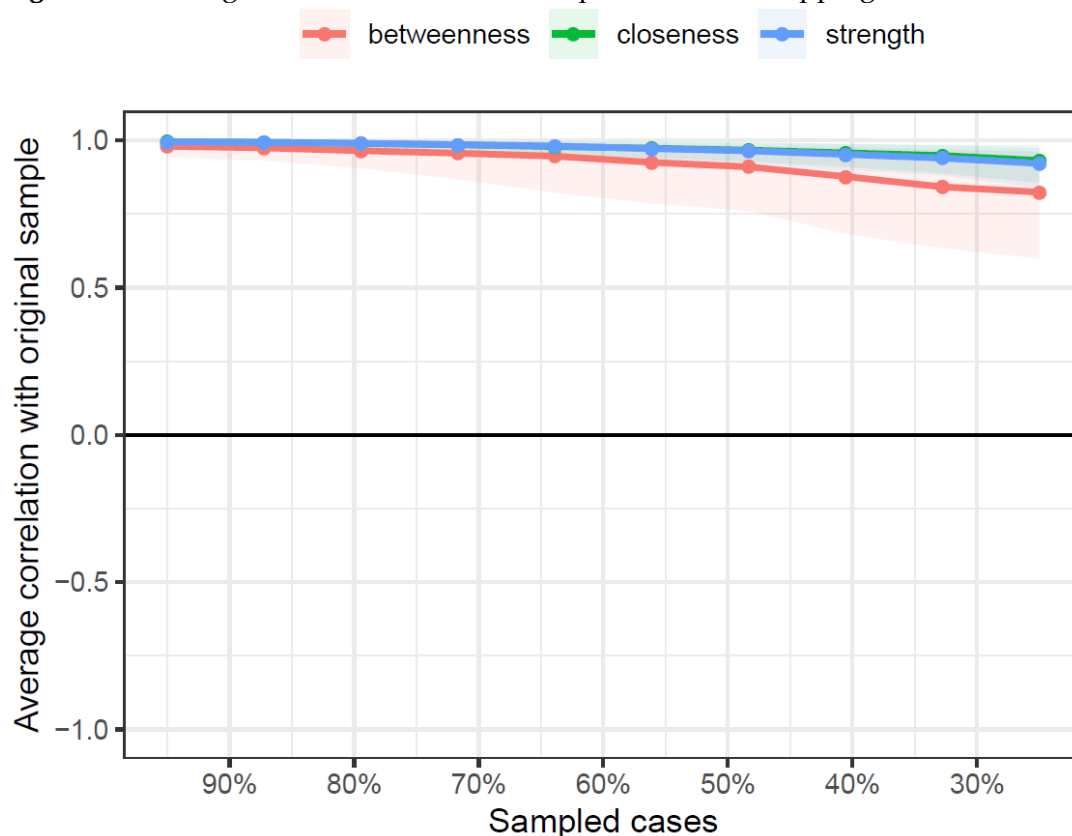


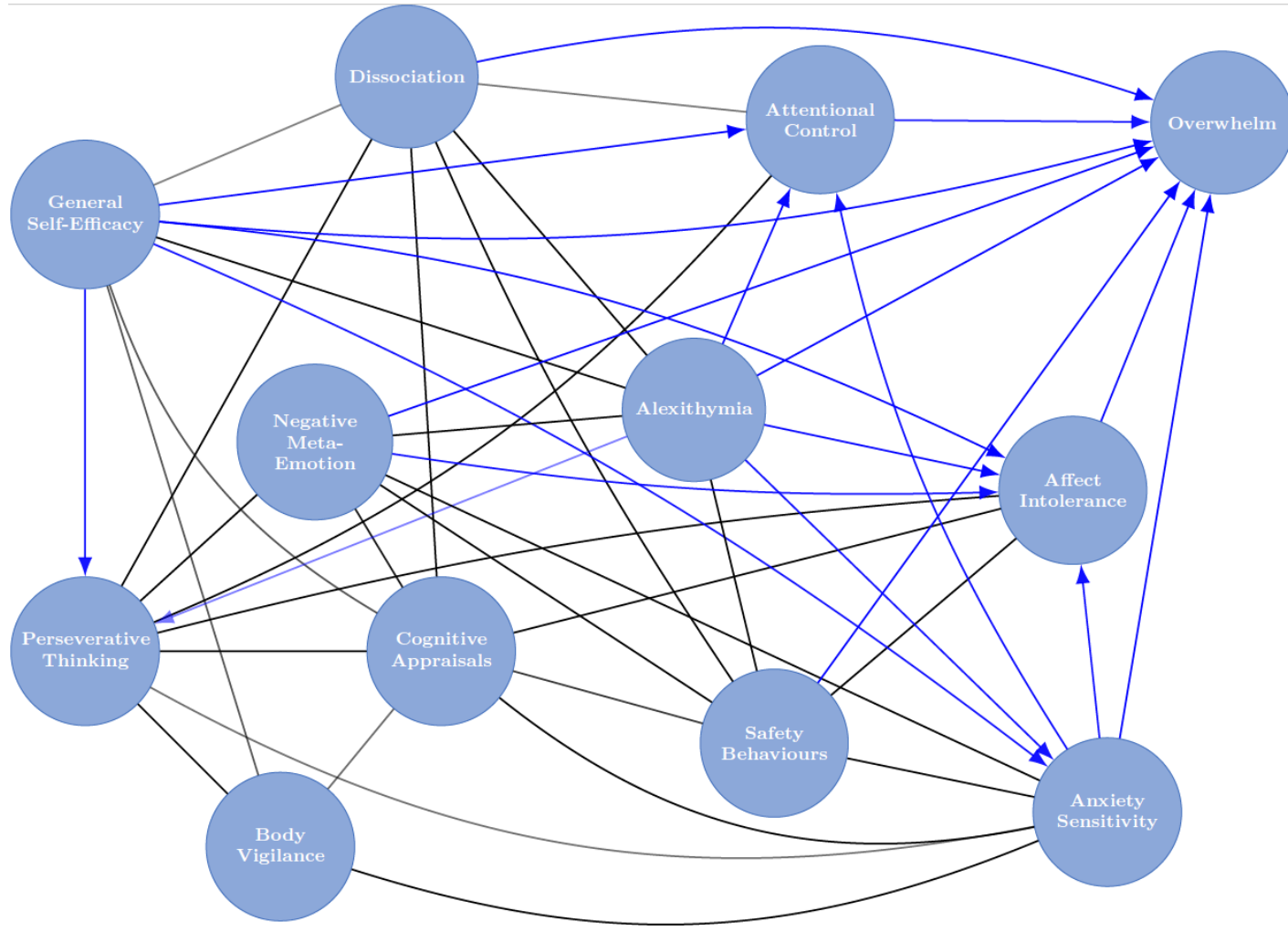
Figure 7 shows the undirected network. In summary, dissociation had direct relationships with most variables, but not with attentional control, anxiety sensitivity, body vigilance, or negative meta-emotion. Dissociation was most strongly connected to cognitive appraisals about dissociation (CAD): this edge was statistically significantly stronger than any other edge in the network. Like dissociation, CAD also did not have a direct edge with attentional control or body vigilance, but did with negative meta-emotion and anxiety sensitivity. The expected direct edge between CAD and safety behaviours was found, with a weak edge.

Centrality estimates indicated a highly inter-connected network, where affect intolerance was particularly important in terms of direct and indirect pathways. Cognitive appraisals also had a high betweenness centrality score, suggesting that it may act as a connector node between dissociation and other variables in the network. The stability of centrality estimates was high and the accuracy of network estimation was good.

Bayesian inference with Directed Acyclic Graphs (DAGs)

The results of the Bayesian inference with DAGs estimation is shown in Figure 8. As in Chapter Five, only direct pathways (edges) which were present in over 50.00% of the 50,000 sampled DAGs are represented. Edges which were present *and* showed the same direction of influence in over 90.00% of the sampled DAGs are shown with an arrowhead indicating the direction of effect. Edges without arrowheads can therefore be interpreted as direct relationships that were present in over 50.00% of the sampled DAGs but have less clear direction of effect.

Figure 8. Mixed graph (i.e. with both directed and undirected edges) showing relationships between dissociation and psychological mechanisms that may plausibly be related to dissociation, as measured in the online survey. Undirected lines show direct relationships that were present in over 50.00% of the 50,000 sampled DAGs. Lines with arrowheads show the probable direction of influence if this was present in over 90.00% of the 50,000 sampled DAGs.



Focusing on the variable of dissociation within the network in order to identify potential causal factors, Table 5 summarises the directions of relationships between dissociation and all other variables.

Table 5. Summarising the average causal effects between dissociation and all other variables (Percentages to 2 d.p., causal effects & CIs to 2 s.f.).

Causal effects:	Pathway present (direct or indirect) %	Causal effect	90% CI	Direct edge present %	Direct causal effect	90% CI
Variable to dissociation (i.e. variable causing dissociation)						
General Self-Efficacy	57.96	-0.24	-0.38 - -0.021	64.08	<0.01	-
Cognitive Appraisals	72.77	0.73	0.64 - 0.82	100	0.72	0.63 - 0.82
Perseverative Thinking	42.74	0.31	0.090 - 0.61	100	0.093	0.054 - 0.29
Body Vigilance	52.29	0.15	0.0099 - 0.21	3.32	<0.01	-
Anxiety Sensitivity	37.38	0.32	0.19 - 0.53	10.53	0.013	0.00 - 0.063
Negative Meta-Emotion	38.18	0.16	0.055 - 0.47	9.79	0.011	0.00 - 0.054
Alexithymia	39.12	-0.54	-0.61 - -0.34	100	-0.27	-0.53 - -0.22
Safety Behaviours	43.32	0.20	0.072 - 0.44	99.95	0.11	0.034 - 0.43
Affect Intolerance	34.75	0.26	0.19 - 0.30	44.45	-0.021	-0.066 - 0.00
Attentional Control	11.43	-0.045	-0.091 - -0.016	49.83	-0.014	-0.040 - 0.00
Overwhelm	1.46	0.27	0.09 - 0.59	100	0.12	0.071 - 0.15
Dissociation to variable (i.e. dissociation causing variable)						
General Self-Efficacy	27.45	-0.27	-0.38 - -0.035	48.98	-0.080	-0.37 - 0.00
Cognitive Appraisals	27.23	0.74	0.55 - 0.80	100	0.70	0.54 - 0.80
Perseverative Thinking	52.26	0.31	0.088 - 0.62	100	0.096	0.064 - 0.12
Body Vigilance	30.21	0.16	-0.0062 - 0.22	10.52	0.016	0.00 - 0.21
Anxiety Sensitivity	62.14	0.25	0.061 - 0.56	5.98	<0.01	-
Negative Meta-Emotion	61.28	0.23	0.081 - 0.50	7.21	0.010	0.00 - 0.084
Alexithymia	60.88	-0.50	-0.60 - -0.44	100	-0.46	-0.53 - -0.42
Safety Behaviours	56.68	0.24	0.11 - 0.44	100	0.18	0.088 - 0.42
Affect Intolerance	65.01	0.26	0.054 - 0.62	6.27	<0.01	-
Attentional Control	68.17	-0.20	-0.41 - -0.055	70.40	-0.054	-0.11 - 0.00
Overwhelm	98.54	0.24	0.072 - 0.58	100	0.081	0.062 - 0.10

Key:

'Pathway present'	The proportion of sampled DAGs which found this pathway.
'Causal effect'	Average total causal effect when that pathway was present.
'Direct edge present'	The proportion of DAGs that found direct pathways of those where some pathway was found to be present.
'Direct causal effect'	Average total causal effect of the direct pathways.
CI	Credible interval.

The table can be interpreted as with the following example: from general self-efficacy (GSE) to dissociation, there was a pathway (direct or indirect) present in 57.96% of the 50,000 DAGs sampled – that is, GSE influences dissociation in 57.96% of the 50,000 sampled graphs. The average strength of the effect of GSE on dissociation within these 57.96% of graphs was -0.24 (with a 90% credible interval - 0.38– -0.021). In 64.08% of the 57.96% of DAGs sampled which showed a pathway from GSE to dissociation, a *direct* edge between GSE and dissociation was present, and this had an average strength of less than 0.01. In the opposite direction, from dissociation to GSE (bottom half of Table 5), there was a pathway present in 27.45% of the 50,000 sampled graphs, and the average strength of this effect was -0.27 (CI= - 0.38– -0.035). Again, 48.98% of the 27.45% of sampled DAGs contained a direct pathway (edge) from dissociation to GSE. The average strength of this direct pathway was -0.080 (CI= -0.37-0.00). Therefore, for the relationship between GSE and dissociation, there is a non-significant indication (i.e. found in more than 50% but less than 90% of sampled DAGs) that GSE has a small negative influence on dissociation. The direction of influence whereby dissociation affects GSE was found in fewer than 50% of sampled DAGs, indicating a low probability of this direction of effect.

The majority of the effect of GSE on dissociation is via the direct pathway but had an effect not significantly different from 0. This indicates the importance of the indirect pathways. Within the indirect pathways, a pathway from GSE to dissociation via CAD was found in 83.39%, and a pathway via perseverative thinking was found in 65.63% of the 57.96% of DAGs with a GSE-dissociation pathway. Pathways via affect intolerance, anxiety sensitivity, and negative meta-emotion were also present in over 50% of sampled DAGs showing a pathway between GSE and dissociation.

Only GSE, body vigilance, and CAD were found to influence dissociation in over 50% of sampled DAGs (none reach the threshold of this direction being found in

over 90% of the graphs). Consistent with the results of the undirected network, the effect sizes of the relationships between dissociation and CAD were the highest in the network (moderate effect size). By contrast, nearly all other variables were found to be more likely to be influenced by dissociation, albeit with only the effect on 'overwhelm' reaching the 90% threshold for drawing inferences about direction of effect.

Since CAD and dissociation are highly (directly) connected, and CAD may be acting as a connector node between other variables and dissociation, the directions of relationships between CAD and other variables were also calculated (Table 6).

The results for CAD are similar to those for dissociation in that only two variables – GSE and body vigilance – were found to influence CAD in over 50% of sampled DAGs; and neither reach the 90% threshold. The effect size for body vigilance is less than 0.2 and small to medium (-0.31) for GSE. Unlike the result for dissociation, the minority of the effect of GSE on CAD is via the direct pathway (45.68% of the 60.36% of DAGs that found a pathway). Similar to the result for dissociation, the direct pathway itself has very small (less than 0.2) causal effect.

Again, the results indicate that for all other variables, the opposite direction of effect is more likely (that CAD is causal). As with dissociation, only the effect on 'overwhelm' reached the 90% threshold for drawing inferences about direction of effect, and this was almost exclusively via indirect pathways.

As expected, a direct pathway between CAD and safety behaviours was found. The results indicate that it is more probable (although not reaching the 90% threshold) that CAD is a causal influence on safety behaviours, with the direct pathway alone constituting a small causal effect (0.21).

Table 6. Summarising the average causal effects between cognitive appraisals about dissociation (CAD) and all other variables. (Percentages to 2 d.p., causal effects & CIs to 2 s.f.).

Causal effects:	Pathway present (direct or indirect) %	Causal effect	90% CI	Direct edge present %	Direct causal effect	90% CI
Variable to CAD (i.e. variable causing CAD)						
Dissociation	27.23	0.74	0.55 – 0.80	100	0.70	0.54 – 0.80
General Self-Efficacy	60.36	-0.31	-0.44 – -0.15	45.68	-0.12	-0.44 – 0.00
Perseverative Thinking	40.30	0.38	0.32 – 0.69	100	0.35	0.30 – 0.58
Body Vigilance	51.93	0.19	0.025 – 0.26	34.01	0.064	0.00 – 0.25
Anxiety Sensitivity	37.98	0.44	0.26 – 0.62	100	0.21	0.18 – 0.29
Negative Meta-Emotion	36.70	0.22	0.12 – 0.52	75.94	0.042	0.00 – 0.10
Alexithymia	43.22	-0.41	-0.53 – -0.042	80.72	-0.10	-0.15 – 0.00
Safety Behaviours	38.04	0.23	0.074 – 0.46	97.06	0.15	0.054 – 0.46
Affect Intolerance	34.55	0.37	0.33 – 0.41	100	0.21	0.17 – 0.23
Attentional Control	6.69	-0.058	-0.17 – -0.0099	1.19	-	-
Overwhelm	1.44	0.25	0.052 – 0.63	6.94	0.017	0.00 – 0.095
CAD to variable (i.e. CAD causing variable)						
Dissociation	72.77	0.73	0.64 – 0.82	100	0.72	0.63 – 0.82
General Self-Efficacy	39.64	-0.42	-0.47 – -0.21	99.95	-0.40	-0.47 – -0.20
Perseverative Thinking	59.70	0.61	0.47 – 0.72	100	0.31	0.25 – 0.58
Body Vigilance	46.57	0.25	0.15 – 0.30	86.92	0.23	0.00 – 0.30
Anxiety Sensitivity	62.02	0.54	0.39 – 0.66	100	0.36	0.25 – 0.40
Negative Meta-Emotion	63.30	0.44	0.26 – 0.57	98.83	0.22	0.088 – 0.31
Alexithymia	56.66	-0.36	-0.55 – -0.044	2.82	<0.01	-
Safety Behaviours	61.96	0.31	0.075 – 0.47	66.69	0.21	0.00 – 0.47
Affect Intolerance	65.45	0.57	0.30 – 0.72	100	0.26	0.16 – 0.30
Attentional Control	67.95	-0.27	-0.44 – -0.040	1.53	<0.001	-
Overwhelm	98.48	0.31	0.048 – 0.63	1.34	<0.001	-
Key:						
<i>'Pathway present'</i>		The proportion of sampled DAGs which found this pathway.				
<i>'Causal effect'</i>		Average total causal effect when that pathway was present.				
<i>'Direct edge present'</i>		The proportion of DAGs that found direct pathways of those where some pathway was found to be present.				
<i>'Direct causal effect'</i>		Average total causal effect of the direct pathways.				
CI		Credible interval.				

Discussion

In this study, state-of-the-art network analyses were used to begin to clarify which of many possible psychological variables identified in the literature may maintain dissociation. The highly interconnected nature of both network models indicates that all of the variables included were relevant in some way to the broader picture of FSA-dissociation and its context: no factors were very sparsely connected. In both network analyses, the variable with the strongest relationship to dissociation was that of cognitive appraisals of dissociation, which is perhaps unsurprising since this measure specifies that the items relate to dissociative experiences. Dissociation was also found in both analyses to have direct relationships with safety behaviours, perseverative thinking, low general self-efficacy, lower levels of alexithymia, and beliefs about being overwhelmed. Of these, only the result for alexithymia is inconsistent with prior hypotheses (at least in that the direction of the relationship is opposite to expected). The second network analysis (using Bayesian inference with DAGs) suggested that dissociation was most likely to cause beliefs about being overwhelmed, whilst the other relationships were ambiguous in direction, which may indicate bidirectional effects. Together, these results form a tentative hypothesis that dissociation may be maintained by rumination on catastrophic thoughts about dissociative experiences in the context of subjectively low coping ability and subjectively high emotion sensitivity and hypervigilance. These results are consistent with previous research, but also extend current understanding of dissociative experiences.

The relationships found between dissociation, cognitive appraisals of dissociative experiences, and responses to dissociation (safety-seeking behaviours) are consistent with general cognitive behavioural therapy (CBT) theory. The well-established reciprocal relationships between the psychological construct of interest (in this case, dissociation), and its related cognitive appraisals and safety behaviours could not be

modelled by the DAGs analysis due to its specification of acyclic relationships. However, this analysis did find undirected direct relationships between all three variables, which is consistent with the general CBT model.

Also consistent with the general cognitive model, both networks found direct relationships between cognitive appraisals, dissociative experiences, and perseverative thinking. Again, the directions of the relationships were ambiguous, which may indicate reciprocal influence. For example, appraisals of dissociative experiences as dangerous or concerning may lead to rumination, which in turn could result in new appraisals and bring previous ones to mind, similar to the effect of worry in paranoia (Freeman, 2016). Perseverative thinking may also be part of a reciprocal relationship with dissociation via increased anxiety, which some theorise makes dissociative experiences more likely to occur (Hunter et al., 2003). Indeed, a similar process has been proposed by Baker et al. (2007) with respect to symptom monitoring. The mediation effect of anxiety would explain the discrepancy between the result for perseverative thinking in this chapter and the result for worry (a construct with conceptual overlap) in Chapter Five, which was not found to have a direct relationship with dissociation. In that chapter, the relationship between worry and dissociation was mediated by the anxiety variable included in the network, whereas no such variable was included in this chapter's analysis, resulting in a direct pathway. Indeed, only the minority of the moderate causal effect of perseverative thinking on dissociation was found to occur via the direct pathway in the DAGs analysis.

Importantly, the results of this study also extend current understanding beyond the general cognitive model by implicating self-efficacy as also potentially important in dissociation. In particular, the negative edge-weight in the first network model, and negative causal effect in the second indicates that it is specifically *low* self-efficacy that may provide the context for dissociation to thrive. Low self-efficacy was found

to influence dissociation in over half of the sampled DAGs, with nearly all of its small causal effect acting via indirect pathways through cognitive appraisals, perseverative thinking, and variables relating to affect tolerance (affect intolerance, anxiety sensitivity, and negative meta-emotion). This suggests that people who judge themselves to be less able to cope in difficult situations may experience greater dissociation, and that this could be due to an increased likelihood of having negative cognitive appraisals about dissociative experiences, a tendency to ruminate, and difficulties tolerating emotion. Certainly, this is consistent with participants' descriptions of themselves and their experiences in the qualitative interviews in Chapter Two.

Alexithymia was also found to have a strong relationship with dissociation in both networks. Like perseverative thinking and general self-efficacy, this relationship was ambiguous in terms of the direction of causal influence between the two variables, suggesting possible reciprocity. It is a somewhat surprising result that the correlation was found in both networks to be negative, considering many previous findings of moderate positive correlations between alexithymia and dissociation (e.g. Evren, Çınar & Evren, 2012). It could be hypothesised that this result arises from participants' subjective ratings of themselves as very capable in identifying their emotional experiences, and may therefore reflect a particularly heightened attunement or sensitivity to affect. Such an explanation is consistent with Chapter Two, and may constitute hypervigilance to threat in the context of the hypothesised affect intolerance. Alternatively, the contrasting result may be due to this study adopting a different conceptualisation of dissociation (and even alexithymia). It would be of interest for future research to test this result more thoroughly, including using experimental designs, and exploring these constructs at the level of their different factors: the seven factors of the FSA-dissociation scale, and the different facets of alexithymia. The latter suggestion may be particularly important given the association between alexithymia and somatisation (Panayiotou et al., 2015), which

may imply that alexithymia would relate more closely to the FSA domain of 'body', rather than an FSA 'type' such as 'unfamiliarity'.

Psychological processes and factors related to attention appeared to be less likely to act as mechanisms for dissociation than those related to processing of affect.

Although only beliefs about being overwhelmed reached the threshold for inferring probable direction of causality, there were also strong indications that poor attentional control was an indirect effect of dissociation. However, the result for body vigilance could also be explained by its conceptual relationship to anxiety. This more specific – and therefore constrained – concept may appear to relate to dissociation less readily than variables capturing negative affect more broadly.

Future research may therefore benefit from the inclusion of a more general somatic vigilance measure.

Overall, therefore, the results of this study point towards factors relating to the cognitive processing of affect being important in FSA-dissociation as well as the processes indicated by the general cognitive model. The relationships with alexithymia (subjective emotion recognition ability), and general self-efficacy (possibly mediated by anxiety sensitivity, negative meta-emotion, and affect intolerance) in this study suggest that vulnerability to dissociation may be conferred in situations where heightened affect is detected and met with a negative response because the person believes themselves to be unlikely to cope. These remote variables may be reinforced through the effects of the more proximal variables of the general cognitive model: rumination upon upsetting cognitive appraisals causing distress and reinforcing negative expectations regarding heightened affect. Additionally, appraisals and the subjective experience of dissociation themselves may be taken as evidence of an inability to cope, further reinforcing these beliefs. The use of safety behaviours may also be theorised to have a similar reinforcing effect. Reciprocally, as traits, these more remote variables – confidence in one's

coping ability and hypervigilance to affect – are likely to influence the proximal processes taking place in the general cognitive model: influencing catastrophisation, preoccupation, and reliance on safety behaviours to mitigate feared outcomes. The interpretation of these series of events appears to be likely to result in explicit beliefs that heightened stress and affect are overwhelming and cause mental ‘shut down’. Indeed, the description ‘overwhelming’ may be clinically useful in the context of FSA-dissociation, as this concept was a feature of interviews of Chapter Two and is implicated as an ultimate endpoint of the processes implicated in activating FSA-dissociation in this chapter.

There are limitations to the current study. As discussed in Chapter Four, the ‘*Understanding dissociative experiences*’ survey recruited a biased sample, which limits the generalisability of the results. However, whilst not representative of the general population, the large number of respondents who reported a mental health difficulty (Appendix 4.1) may mean that the results are somewhat generalisable to a clinical group. Nevertheless, this suggestion requires further testing.

Additionally, as outlined in Chapter Five, the results of DAGs analyses require tentative interpretation, and rely upon a number of assumptions which are unlikely to be fully upheld in psychological research. In particular, the assumption of causal sufficiency (that all relevant variables are present in the network) is unlikely to have been satisfied in the current study. This study was not exhaustive in terms of the psychological processes included in the analysis, and since it is unclear which factors may be the most relevant to dissociation (much less FSA-dissociation), it is likely that important variables were omitted. Nonetheless, this study has generated testable hypotheses by identifying plausible maintenance mechanisms of dissociation. Future research is required both to identify further factors, and to more robustly assess the factors implicated here using studies that go beyond cross-sectional designs.

Chapter Conclusions

The results of this chapter suggest that cognitive responses both to dissociation and to heightened affect may be important in the maintenance of FSA-dissociation. One interpretation of the analyses presented here is that dissociation arises from interactions between emotional sensitivity, catastrophic appraisals, and repetitive negative thinking. This occurs in the context of self-rated low self-efficacy and is reinforced by behaviours intended to mitigate feared outcomes (safety behaviours).

However, in this chapter, the direction of influence between these factors and dissociation was unclear, and the effect sizes throughout the networks were small to moderate with many indirect effects. Therefore, caution is required when interpreting the findings – these factors should be considered as candidate mechanisms only, and the patterns of effect suggested here as hypotheses to be tested. Before these factors can be integrated into an evidence-based cognitive model of dissociation, robust causal evidence from experimental or interventionist design studies must support their relationship to the construct.

Therefore, more work is required to determine whether the factors identified here can be considered mechanisms of dissociation. In particular, it would be valuable to gain a better understanding of the relationship these variables have with dissociation within a clinical sample. Whilst all of the constructs included in this chapter are considered to exist along a spectrum of severity, such that non-clinical datasets include all of these variables at a sub-clinical level, it is not known whether the interactions and relationships between them are also analogous. Therefore, in Chapter Seven the aim is to test the key findings of this chapter and Chapter Five in a large clinical group.

7 Dissociation in Patients with Non-Affective Psychosis

'Because everything else is going on in my head. And this disconnected feeling.'
(Qualitative Study Participant 4)

Chapter Abstract

Rationale

In this chapter, a first step is made in applying the learning from the previous general population studies to a clinical population. In a large non-affective psychosis patient group, the aims are to estimate the prevalence of FSA-dissociation and to test potential network relationships between dissociation candidate maintenance mechanisms and key mental health symptoms.

Methods

The Černis Felt Sense of Anomaly (ČEFSA) scale was administered to 902 NHS adult patients with non-affective psychosis diagnoses. An undirected Gaussian Graphical and a partially directed Bayesian inference with Directed Acyclic Graphs (DAGs) network model were used to identify potential relationships between dissociation, paranoia, hallucinations, psychological wellbeing, sleep, and six candidate maintenance mechanisms (affect intolerance, perseverative thinking, general self-efficacy, alexithymia, cognitive appraisals, and safety behaviours).

Results

A total of 310 (34.37%) patients reported paranoia at the severity of a persecutory delusion and n=315 (34.92%) patients reported hearing voices daily or almost daily. Taking ratings of 'often' or 'always' for items on the ČEFSA scale as 'endorsement', n=285 patients (31.60%) did not endorse any item, and 617 patients (65.40%) endorsed at least one. In this group, an average of 8.93 experiences from 3.94 different factors of the ČEFSA were endorsed. Dissociation had direct relationships with paranoia, hallucinations, (low) psychological wellbeing, cognitive appraisals, safety behaviours, perseverative thinking, and (low) alexithymia. Dissociation was found to be a probable cause of hallucinations (94.21% of 50,000 sampled DAGs), with a trend towards being a cause of paranoia (86.25%).

Conclusions

FSA-dissociation is common in non-affective psychosis, it is associated with low psychological wellbeing, and likely to have a direct causal influence on psychotic symptoms. This large clinical study indicates that catastrophic cognitive appraisals, safety behaviours, and variables related to affect sensitivity and perseverative thinking are bound together in relation to dissociation.

Introduction

In the previous chapters, large general population datasets have been used to clarify a working definition of dissociation as a felt sense of anomaly (FSA), develop a scale to measure this construct and related cognitive appraisals, understand relationships between FSA-dissociation and key symptoms, and build a provisional mechanistic understanding of dissociation. In the current chapter, the next step is taken – testing the learning in a clinical group. This is part of the process of developing a theoretical model, and later a treatment, for patients with psychosis who are experiencing dissociation. Accordingly, the specific aims of this chapter are to: provisionally estimate the levels of FSA-dissociation present in a non-affective psychosis population, test potential associations between FSA-dissociation and psychotic experiences, and to explore using network analysis methods the relationships between the proposed mechanisms of dissociation and key symptoms.

The symptoms and psychological variables examined in this study are those that have been identified in the previous chapters to potentially have important relationships to FSA-dissociation. Additionally, since the result for the relationship between sleep and dissociation in Chapter Five contradicted existing experimental evidence, sleep is also included in order to test the relationship in a clinical group. Therefore, the variables included in this study are: paranoia, hallucinations, psychological wellbeing, sleep, cognitive appraisals, safety behaviours, perseverative thinking, general self-efficacy, alexithymia, and affect intolerance (Table 1).

Table 1. Summarising the key results of previous chapters and related variables

Chapter	Key result	Variable(s) of interest*
Key symptoms		
Five	Dissociation has probable causal influence on paranoia	Paranoia
Five	Dissociation has a direct relationship with hallucinations, but with unclear direction of influence	Hallucinations
Four	Cognitive appraisals of dissociation explain variance in hallucinations and paranoia	Cognitive appraisals Paranoia Hallucinations
Five	Contrary to hypothesis and existing experimental evidence, dissociation has no direct relationship with poor sleep (insomnia)	Sleep
Two	Dissociation has wide-reaching negative impacts on day-to-day life, including on mental health	Wellbeing
Potential Mechanisms		
Six	Dissociation has direct relationships with cognitive appraisals and safety behaviours (consistent with the general cognitive model)	Cognitive appraisals Safety behaviours
Six	Dissociation has a direct relationship with perseverative thinking	Perseverative thinking
Six; Two	Dissociation may be sustained by low self-rated coping and high affect sensitivity	General self-efficacy Alexithymia Affect intolerance
<i>*Omitting FSA-dissociation</i>		

Key symptoms

Paranoia and hallucinations are included as key psychotic symptoms that are expected to be prevalent in a non-affective psychosis population. Further, analysis estimating the direction of influence between dissociation and hallucinations (which was ambiguous in Chapter Five) may yield clearer results in a participant group where clinical levels of hallucinations are present. Psychological wellbeing is also included in order to explore quantitatively the impact of FSA-dissociation on general

mental health and functioning, which is an association that was highlighted by participants in the qualitative study in Chapter Two.

Potential mechanisms of dissociation

In Chapter Six, cognitive appraisals, safety behaviours, and perseverative thinking were implicated in the maintenance of dissociation in a process hypothesised to be consistent with a general cognitive model, whereby distress is sustained by repeated catastrophic appraisals and counter-productive safety-seeking responses. These variables are therefore included in the current study to test their associations in a clinical group. Similarly, the variables of general self-efficacy, alexithymia, and affect intolerance are also assessed since low self-rated coping ability and affect sensitivity were also found to be potentially important in the maintenance of FSA-dissociation (Chapter Six). Finally, as the result regarding poor sleep and dissociation in Chapter Five contradicted previous literature (Barton, Kyle, Varese, Jones & Haddock, 2018; Lynn et al., 2019), including experimental evidence (e.g. van Heugten-van der Kloet, Giesbrecht & Merckelbach, 2015), poor sleep was included in the current study in order to test the relationship to dissociation in a clinical population. The relationship between sleep disruption and dissociative experiences may arguably be stronger in this population given the causal relationship of insomnia to psychotic symptoms (Waite, Sheaves, Isham, Reeve & Freeman, 2020), which are in turn hypothesised to be associated with dissociation.

It should be noted that there are significant challenges to identifying maintenance mechanisms using network analyses. Gaussian graphical (undirected) models do not indicate direction of effect, and as previously discussed, an assumption of the Directed Acyclic Graphs (DAGs) analysis is that relationships between variables are acyclic. As García-Velázquez, Jokela and Rosenström (2020) observe, this assumption constitutes an ‘oversimplification in the context of mental health’, since most relationships are likely to be reciprocal to some degree. This is particularly true

of maintenance processes, which by definition form feedback loops. Accordingly, it is anticipated that ambiguous directions of effect between the proposed potential maintenance factors and dissociation are more likely to be found in this study than robust directions of effect. This is because the method of DAGs analysis used here incorporates Bayesian inference. The proportions of the 50,000 sampled DAGs that contain each direction of influence (i.e. *causing* or caused *by* dissociation) are expected to be more similar for reciprocally interacting variables, thus resulting in probabilities for each direction of effect that are unlikely to exceed the threshold for inferring probable causality. Therefore, with regards to the potential mechanisms of dissociation, this study will seek to determine whether there are robust relationships between the proposed variables and dissociation, in the understanding that these are likely to show an unclear direction of effect and will require further testing with experimental methods.

Methods

Design

The design was a cross-sectional self-report questionnaire study (the *Exploring Unusual Feelings Study*) as described in Chapter Three (and in Appendices 2.7 & 2.8).

Procedure and Participants

As described in Chapter Three, participants were recruited by CRN research assistants and clinical studies officers embedded in clinical teams and research and development departments across 36 NHS trusts in England. Research workers approached patients meeting the inclusion criteria, gained informed consent, and supported participants to complete the assessment pack. Inclusion criteria were: age 16 years or over, currently under the care of an NHS mental health service, with a diagnosis of non-affective psychosis, and willing and able to give informed consent

to participate. Exclusion criteria were: insufficient English language to complete the questionnaires even with support, or an affective psychosis diagnosis (e.g. psychotic depression, bipolar disorder).

Recruitment took place between 18th October 2019 and 19th March 2020. Datasets from 1038 participants were returned. For this analysis, only cases with low levels of missing data in any measure (less than or equal to 20% missing) were retained for analysis. This resulted in a participant group of 902 patients.

In this group, the majority of participants were White (68.63%), male (69.51%), under the care of mental health services as an outpatient (73.73%), and had a clinical diagnosis of schizophrenia (64.19%). The mean age of the sample was 41.08 (SD=12.24) years. See Table 2 for full demographic details.

Measures

Cronbach's alphas for each scale are shown in Table 3. All scales demonstrated good or excellent internal consistency in this participant group.

Černis Felt Sense of Anomaly scale (ČEFSA; Chapter Three; Appendix 2.5)

As described in Chapter Three, higher scores on the ČEFSA indicate higher levels of dissociative experiences which share a core experience of a felt sense of anomaly (FSA). The scale comprises 35 items and is rated for the past two weeks.

Cognitive Appraisals of Dissociation (CAD-P; Chapter Four, Appendix 3.4)

As described in Chapter Four, the CAD-P measures cognitive appraisals of dissociative experiences using 13 items rated for the past two weeks. Higher scores indicate more frequent occurrence of catastrophic appraisals in response to dissociative experiences.

Table 2. Showing the demographic data for the clinical participant group (n=902)

Demographic and clinical information		n (%)
Gender	<i>Female</i>	269 (29.82%)
	<i>Male</i>	627 (69.51%)
	<i>Other</i>	4 (0.44%)
	<i>Missing</i>	2 (0.22%)
Ethnicity	<i>White (any)</i>	619 (68.63%)
	<i>Black (any)</i>	147 (16.29%)
	<i>Asian (any)</i>	84 (9.31%)
	<i>Mixed / Multiple</i>	33 (3.66%)
	<i>Other</i>	14 (1.55%)
	<i>Missing</i>	5 (0.55%)
Diagnosis	<i>Schizophrenia</i>	579 (64.19%)
	<i>Schizoaffective</i>	135 (14.97%)
	<i>Delusional Disorder</i>	11 (1.22%)
	<i>Psychotic Disorder NOS*</i>	61 (6.76%)
	<i>First Episode Psychosis</i>	94 (10.42%)
	<i>Other psychosis disorder</i>	18 (2.00%)
Co-Morbid Dissociative Disorder	<i>Yes</i>	3 (0.33%)
	<i>No</i>	877 (97.23%)
	<i>Missing</i>	3 (0.33%)
Care team type	<i>Inpatient</i>	237 (26.27%)
	<i>Outpatient</i>	665 (73.73%)
	<i>Early intervention</i>	110 (12.20%)
*including Unspecified Non-Organic Psychosis		

Responses to Dissociation (RTD; Appendix 5.2)

As in Chapter Six, responses to dissociation (safety behaviours) were measured using a two-factor scale comprising six items. Higher scores on the RTD indicate greater use of safety behaviours in response to dissociation. Items are rated from 0 “never” to 4 “always” for how the respondent typically acts when feeling dissociated.

Affect Intolerance Scale (AIS; Stapinski, Abbott & Rapee, 2014)

The Affect Intolerance Scale assesses respondents’ beliefs and responses to negative emotions using 30 items rated on a Likert scale from 1 “strongly disagree” to 6 “strongly agree”. Items form two factors: “threat expectancy” (e.g. “Once I have negative feelings, I worry that they will get worse”) and “avoid/suppress” (e.g. “I should avoid negative feelings”). Higher scores indicate greater intolerance of negative affect.

General Self-Efficacy Scale (GSE; Schwarzer & Jerusalem, 1995)

The General Self-Efficacy scale comprises ten items such as “I can always manage to solve difficult problems if I try hard enough” and “I can usually handle whatever comes my way”. Items are rated on a four-point Likert scale from 1 “not at all true” to 4 “exactly true”. Higher scores indicate greater self-efficacy.

Online Alexithymia Questionnaire (OAQ-G2 adapted; Thompson, 2007; Appendix 5.4)

As in Chapter Six, an adapted version of the Online Alexithymia Questionnaire was used to measure alexithymia. Eleven items form three factors: “difficulty identifying feelings” (e.g. “When asked which emotion I’m feeling, I frequently don’t know the answer”); “difficulty describing feelings” (e.g. “I can describe my emotions with ease”); and “externally-oriented thinking” (e.g. “I prefer doing physical activities with friends rather than discussing each others’ emotional experiences”). Items are rated from 1 “strongly agree” to 5 “strongly disagree” (with one reverse-coded

item). Higher scores indicate greater difficulty identifying, naming, and acknowledging one's emotional state.

Perseverative Thinking Questionnaire (PTQ; Ehring et al., 2011)

The Perseverative Thinking Questionnaire is a 15-item measure of repetitive negative thinking. Items relate to how the respondent 'typically' thinks about negative experiences or problems and are rated from 0 "Never" to 4 "almost always". Higher scores indicate higher levels of ruminative thinking.

Sleep Condition Indicator: Two-item short form (SCI-02; Espie et al., 2014)

The SCI is a clinical screening tool evaluating insomnia. The two-item short-form version asks "thinking about a typical night in the last month: how many nights a week do you have a problem with your sleep?" and "thinking about the past month, to what extent has poor sleep troubled you in general?". Responses are scored from 4 to 0, with lower scores indicating poorer quality sleep.

Revised Green et al. Paranoid Thoughts Scale (R-GPTS Persecution; Freeman et al., 2019)

The R-GPTS assesses paranoia using two subscales: ideas of reference and persecution. The persecution subscale of the R-GPTS was used in this study. This subscale comprises ten items (e.g. "Certain individuals have had it in for me"), rated over the past month on a five-point Likert scale from "0 - not at all" to "4 - totally". Higher scores indicate higher levels of paranoia, with a score above 18 indicating 'severe' levels of perceived persecution.

Specific Psychotic Experiences Questionnaire (SPEQ-H adapted; Ronald et al., 2013)

The SPEQ comprises four scales which each assess a key psychotic experience. The hallucinations scale (SPEQ-H) was used in this study. This asks respondents to rate how frequently they have recently had particular experiences (e.g. "How often do

you: hear noises or sounds when there is nothing about to explain them?") using a six-point Likert scale ("0 - not at all" to "5 – daily"). As described in Chapter Four, this was adapted to include two further items assessing voice hearing. Higher scores indicate higher levels of hallucinatory experiences.

Warwick-Edinburgh Mental Wellbeing Scale (WEMWBS; Tennant et al., 2007)

The WEMWBS measures psychological wellbeing over the past two weeks using 14 items rated from 1 "none of the time" to 5 "all of the time". Items include "I've been feeling optimistic about the future" and "I've been feeling cheerful". Higher scores indicate greater psychological wellbeing.

Statistical analysis

Analyses were conducted in R, version 3.6.1 (R Core Team, 2019). The 'mice' package (version 3.8.0; van Buuren & Groothuis-Oudshoorn, 2020) was used to carry out multiple imputation for missing data. Network estimation followed the exact procedure as described in Chapter Six, including transformation to a normal distribution using 'gaussianize' prior to network estimation.

Undirected partial correlation network

The packages 'bootnet' (v1.3) and 'qgraph' (Epskamp, Cramer, Waldorp, Schmittmann & Borsboom, 2012) were used to estimate and visualise the undirected (Gaussian Graphical model) network using ggmModSelect to obtain optimum model fit. Non-parametric bootstrapping (5000 bootstraps) was used to assess the accuracy and stability of the estimated network.

Bayesian inference with directed acyclic graphs

As in previous chapters, the BiDAG package was used to run the partition Markov Chain Monte Carlo algorithm (Kuipers & Moffa, 2017; Kuipers, Suter & Moffa, 2018) for 10 million iterations, and the final causal graph was calculated by averaging the

results of the 50,000 sample DAGs obtained. Causal effects (z-scores with credible intervals; CIs) were also calculated.

Results

Table 3 shows the mean scores for each scale. Scale scores indicate that the group was experiencing paranoia on average in the moderately severe range. High paranoia scores were common, with a third ($n=310$; 34.37%) of participants scoring above the cut-off for a persecutory delusion, and 162 (17.96%) scoring in the ‘very severe’ range of the R-GPTS Persecution scale. There were also high levels of hallucinatory experiences within the group. For example, a third reported hearing ‘voices saying words or sentences’ daily or several times a week ($n=315$; 34.92%), and a quarter reported ‘hear[ing] two or more unexplained voices talking to each other’ daily or several times a week ($n=234$; 25.94%). The scores also suggest that many of the participants had significantly poor sleep quality (15.74%, $n=142$ scored 0 on the SCI-02), whilst a quarter (24.94%, $n=225$) rated themselves as having good sleep (i.e. the maximum score). The WEMWBS score indicates psychological wellbeing on the boundary between ‘low’ and ‘average’ ranges, with 34.70% ($n=313$) scoring below 40, a level which corresponds to a level suggestive of depression (Warwick Medical School, 2020).

Table 3. Showing the means and standard deviations of the population for each scale

Scale	Sample mean (SD)	Cronbach's alpha for this sample	Scale min – max score
Černis Felt Sense of Anomaly scale	40.56 (30.59)	0.97	0 – 140
Cognitive Appraisals of Dissociation	18.84 (13.19)	0.93	0 – 52
Responses to Dissociation	13.22 (4.80)	0.69	0 - 24
Green et al. Paranoid Thoughts Scale (Revised) <i>*Persecution subscale</i>	13.94 (12.14)	0.94	0 - 40
Specific Psychotic Experiences Scale <i>*Hallucinations subscale (adapted)</i>	16.87 (16.00)	0.93	0 - 55
General Self-Efficacy scale	27.08 (7.36)	0.92	10 - 40
Perseverative Thinking Questionnaire	45.35 (16.31)	0.96	15 - 75
Affect Intolerance Scale	118.50 (34.89)	0.95	30 – 180
Online Alexithymia Questionnaire <i>*(subset of 11 items)</i>	31.96 (8.69)	0.79	11 – 55*
Warwick-Edinburgh Mental Wellbeing Scale	44.93 (12.75)	0.94	14 - 70
Sleep Condition Indicator <i>(2-item short-form)</i>	4.49 (2.93)	0.83	0 - 8

Table 4 shows the correlations between dissociation and each of the other variables in the network extracted from the correlation matrix (which can be found in Appendix 6.1). FSA-dissociation was found to be highly correlated with cognitive appraisals, and moderately correlated with safety behaviours, paranoia, hallucinations, perseverative thinking, and affect intolerance.

Table 4. Showing the correlations between dissociation and each variable

Variable	Pairwise partial correlation
Cognitive appraisals	0.79
Safety behaviours	0.53
Paranoia	0.58
Hallucinations	0.63
General self-efficacy	-0.28
Perseverative thinking	0.67
Affect intolerance	0.56
Alexithymia	-0.40
Wellbeing	-0.43
Sleep quality	-0.40

Levels of FSA-dissociation in the group

As stated in Table 2, only three participants had a recorded dissociative disorder diagnosis. These were: 'dissociative disorder' (n=1), 'non-epileptic attack disorder' (n=1), and a historical diagnosis of 'depersonalisation' (n=1). (ČEFSA total scores for these participants were 77, 28, and 3, respectively).

Inspecting FSA-dissociation levels as measured by the ČEFSA revealed a full range of responses, with the expected skew towards lower scores (Figure 1) (skewness coefficient=0.621, indicating moderate skew). This was consistent with the moderate skewness of the psychotic symptom scores (paranoia=0.544; hallucinations=0.730). Variation in ČEFSA scores was high, as demonstrated by the high standard deviation (30.59). Of the seven ČEFSA factors (each of which consist of five items), *Anomalous Experience of Emotion*, *Altered Sense of Connection*, and *Altered Sense of Agency* had the highest mean scores (Table 5).

Taking a response of 'often' or 'always' as endorsement of an item, 31.60% (n=285) of the group did not endorse a single ČEFSA item. However, 3.22% (n=29) endorsed a minimum of 75% of the items, 10.64% (n=96) endorsed a minimum of 50%, and 26.94% (n=243) endorsed more than 25% of the items. Figure 2 shows the rates of endorsement (endorsement rates by item can be found in Appendix 6.2).

Of those who endorsed at least one item on the scale (n=617), the mean number of items endorsed was 8.93 (SD=8.01). Taking endorsement of any of the five items in a factor as endorsement of that factor, the mean number of factors (i.e. different dissociation symptom types) endorsed by this subgroup was 3.94. *Anomalous Experience of Emotion*, *Altered Sense of Connection*, and *Altered Sense of Agency* were the most likely to have at least one regular symptom being reported (Table 5).

Figure 1. A histogram displaying the distribution of ČEFSA total scores in the participant group.

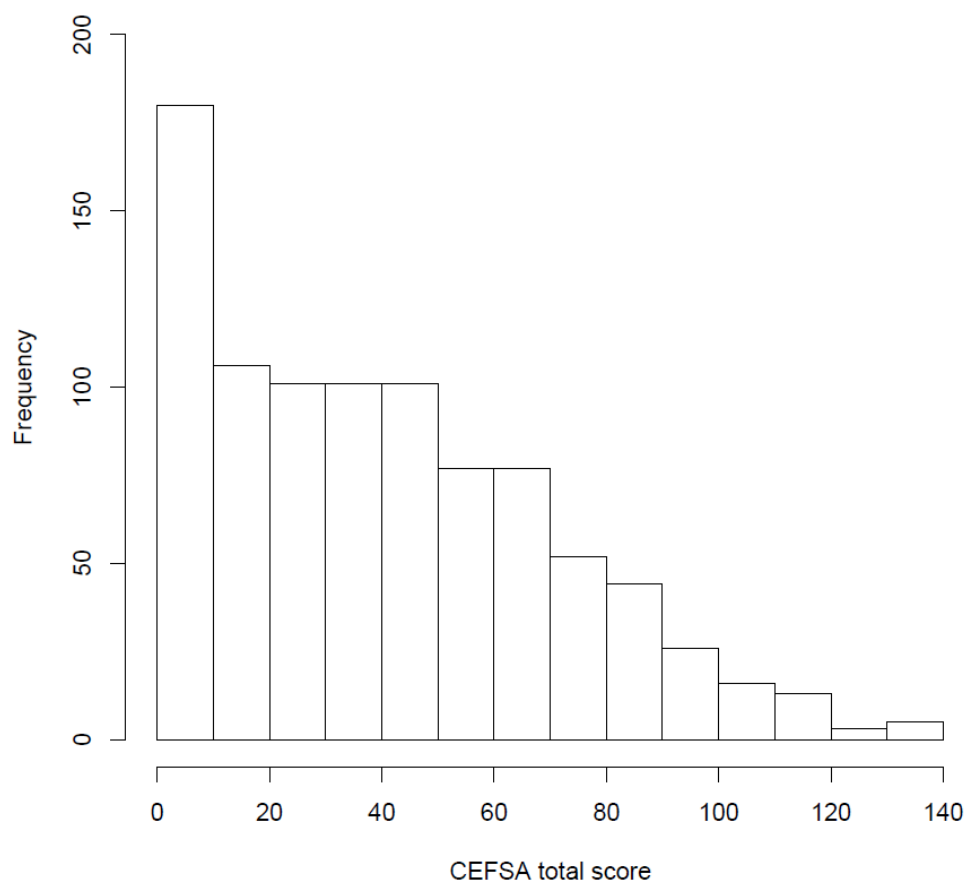
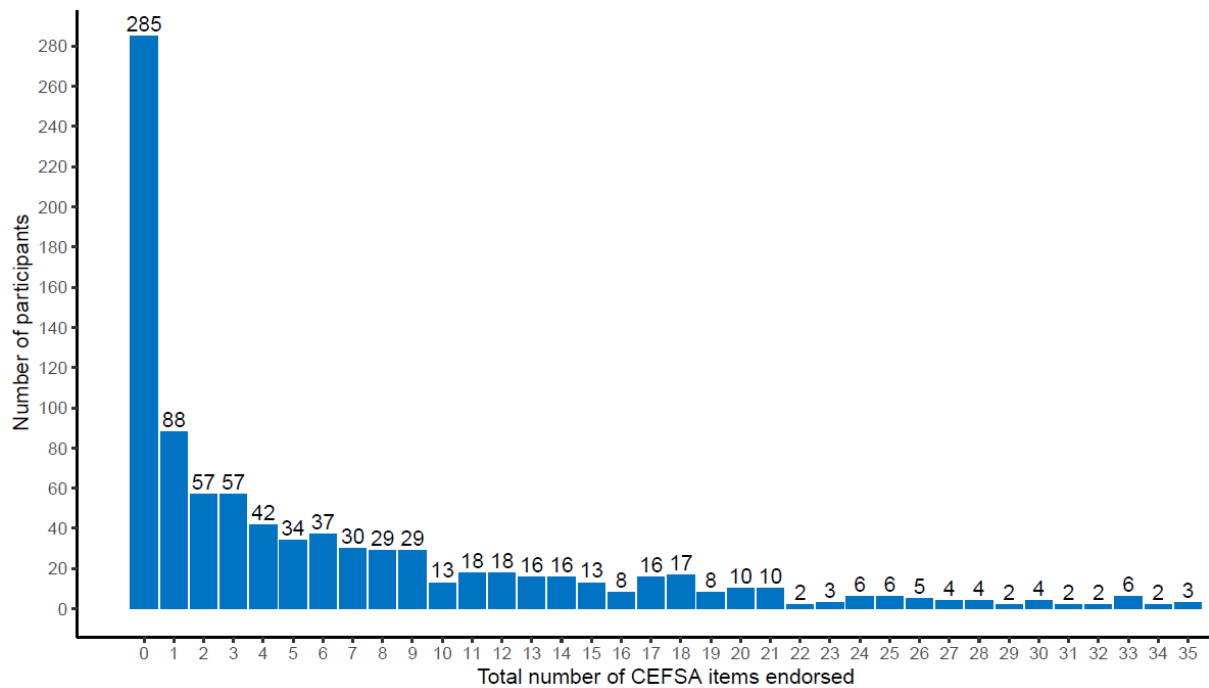


Table 5. Showing the descriptive statistics and rates of endorsement for the ČEFSA total and factors in this group.

	Score <i>Mean (SD)</i>	No. of items endorsed <i>Mean (SD)</i>	No. patients endorsing 0 items <i>N (%)</i>	No. patients endorsing ≥1 item <i>N (%)</i>
ČEFSA total	40.56 (30.59)	6.11 (7.81)	285 (31.60)	617 (68.40)
Anomalous Experience of the Self	5.60 (5.02)	0.85 (1.33)	547 (60.64)	355 (39.36)
Anomalous Experience of the Body	4.73 (4.81)	0.66 (1.21)	620 (68.74)	282 (31.26)
Altered Sense of Familiarity	4.94 (4.65)	0.97 (1.53)	620 (68.74)	282 (31.26)
Anomalous Experience of Emotion	6.34 (5.38)	1.11 (1.53)	558 (61.86)	344 (45.90)
Altered Sense of Connection	7.04 (5.33)	1.12 (1.44)	488 (54.10)	414 (45.90)
Altered Sense of Agency	7.01 (5.03)	0.85 (1.33)	460 (51.00)	442 (49.00)
Altered Sense of Reality	4.91 (4.95)	0.76 (1.28)	593 (65.74)	309 (34.26)

Figure 2. Graph showing the rates of endorsement of ČEFSA items.



Undirected network

Bootstrapped confidence intervals (CIs) for each edge, calculated using non-parametric bootstrapping (5000 bootstraps) using bootnet (v1.3), illustrate the accuracy of the connections in the estimated undirected network (Figure 3). Overall, the network appears to be estimated with good accuracy. The edge between general self-efficacy and wellbeing was very strong, and did not overlap with the CIs for any other edge.

Figure 3. Showing sample edge-weights and bootstrapped confidence intervals of edge-weights obtained via non-parametric bootstrapping (5000 bootstraps) for all edges in the undirected network

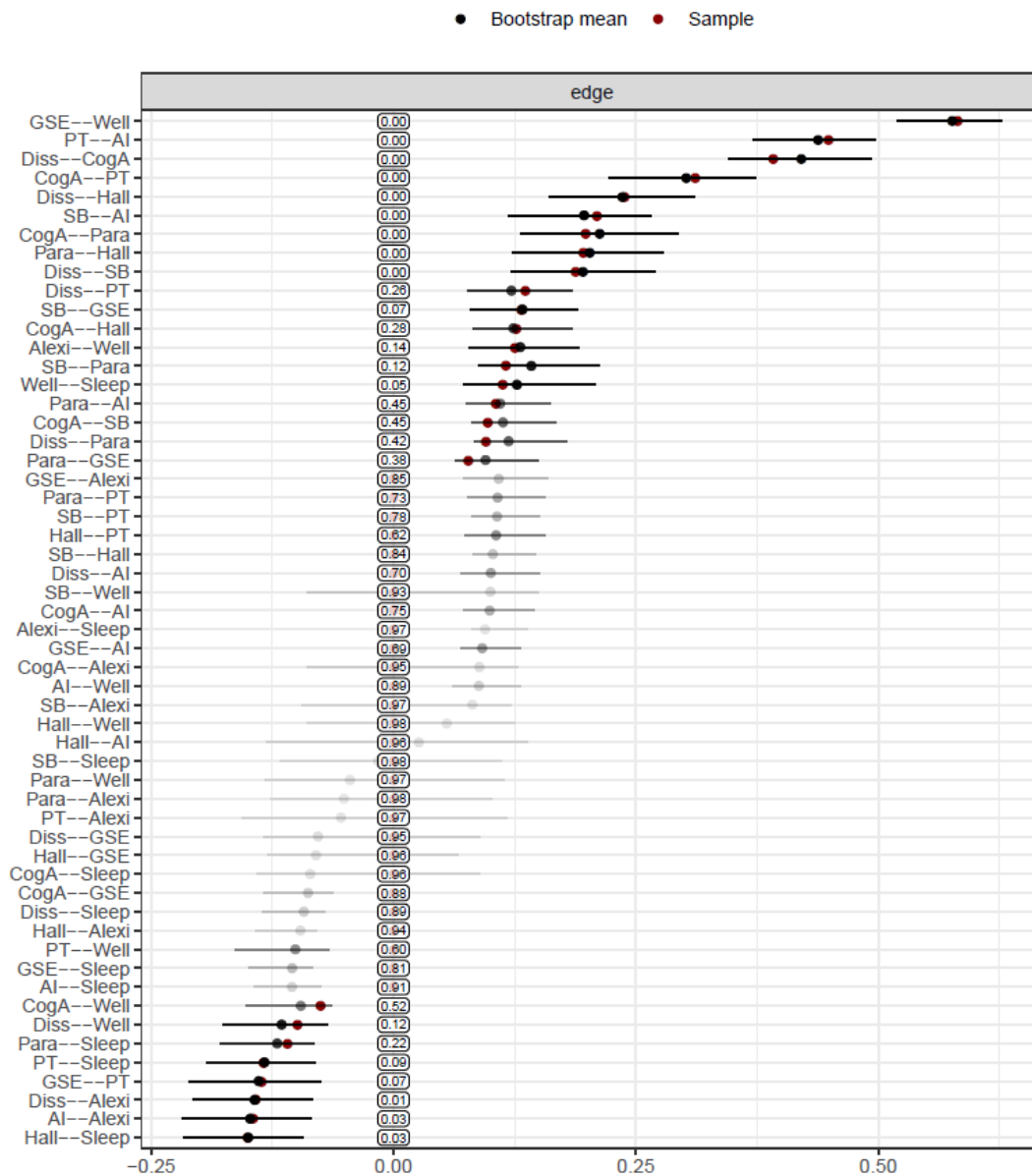


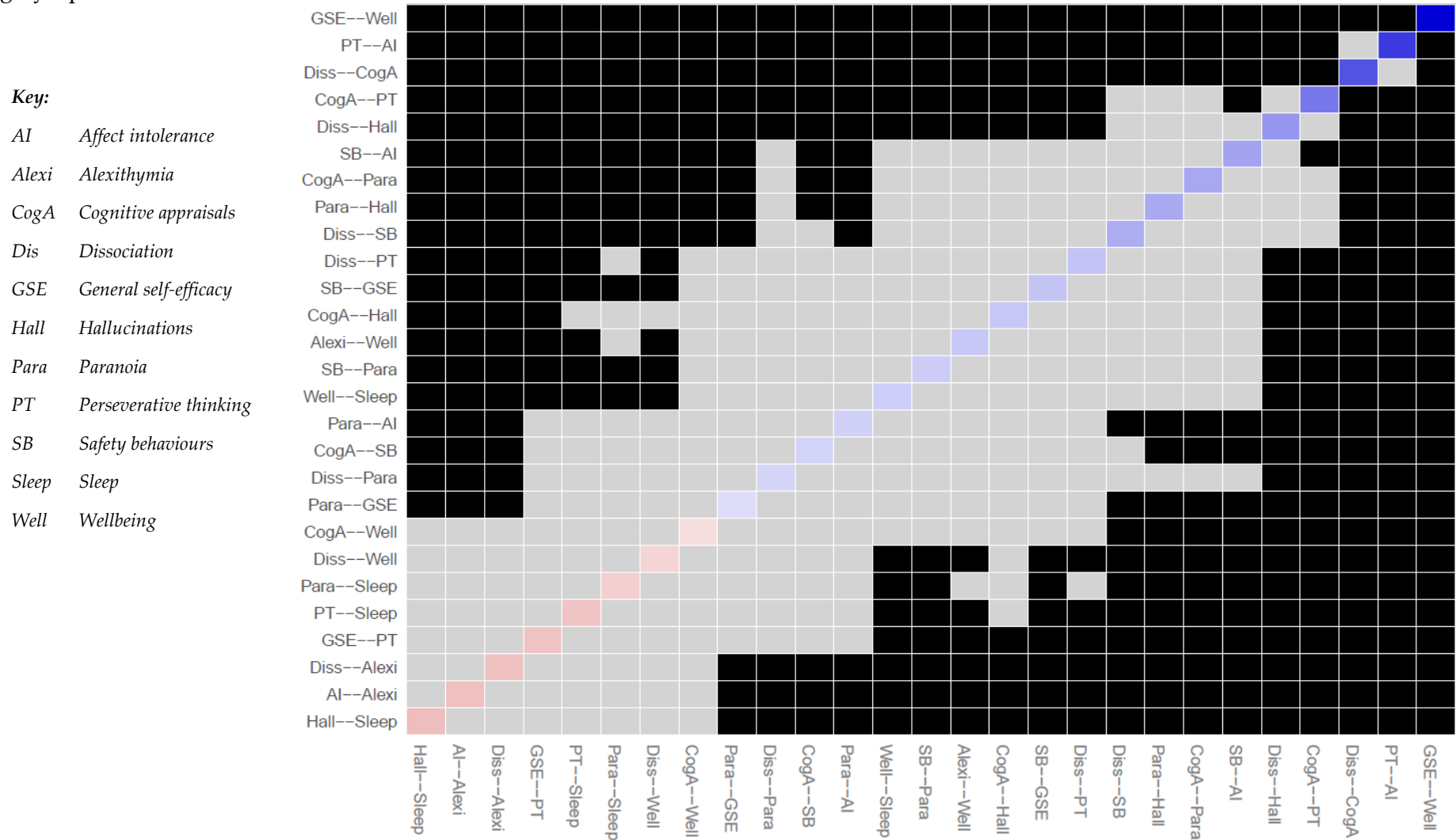
Table 6 shows the edge-weights and their bootstrapped confidence intervals for edges between dissociation and all other variables, and Figure 4 shows the edge-weight difference tests. These show that the strongest edge with dissociation was between cognitive appraisals and dissociation, and that this was significantly stronger than any other edge with dissociation. The second strongest was with hallucinations, which was not significantly stronger than the edge between dissociation and safety behaviours (nor the edge between hallucinations and

paranoia). Consistent with Chapter Six, the edge between dissociation and alexithymia was negative.

Table 6. Edge-weights and their bootstrapped confidence intervals for edges between dissociation and each other variable (3 s.f.)

Variable	Edge-weight	C.I.
Cognitive Appraisals	0.392	0.316 – 0.468
Safety Behaviours	0.188	0.108 – 0.268
Paranoia	0.0955	-0.0283 – 0.219
Hallucinations	0.239	0.163 – 0.315
General Self-Efficacy	(no edge)	-0.0394 – 0.0394
Perseverative Thinking	0.136	0.0192 – 0.253
Affect Intolerance	(no edge)	-0.0946 – 0.0946
Alexithymia	-0.142	-0.211 – -0.0726
Wellbeing	-0.0990	-0.192 – -0.00581
Sleep	(no edge)	-0.0604 – 0.0604

Figure 4. Differences between edge-weights: statistically significant differences indicated by a black square, non-significant differences by a grey square



Centrality estimates (strength, closeness and betweenness) were calculated for all variables. The results are shown in Figure 5 and Table 7. The results of difference tests for all centrality estimates for all variables are shown in Figure 6.

Figure 5. Showing centrality scores for all variables in the network

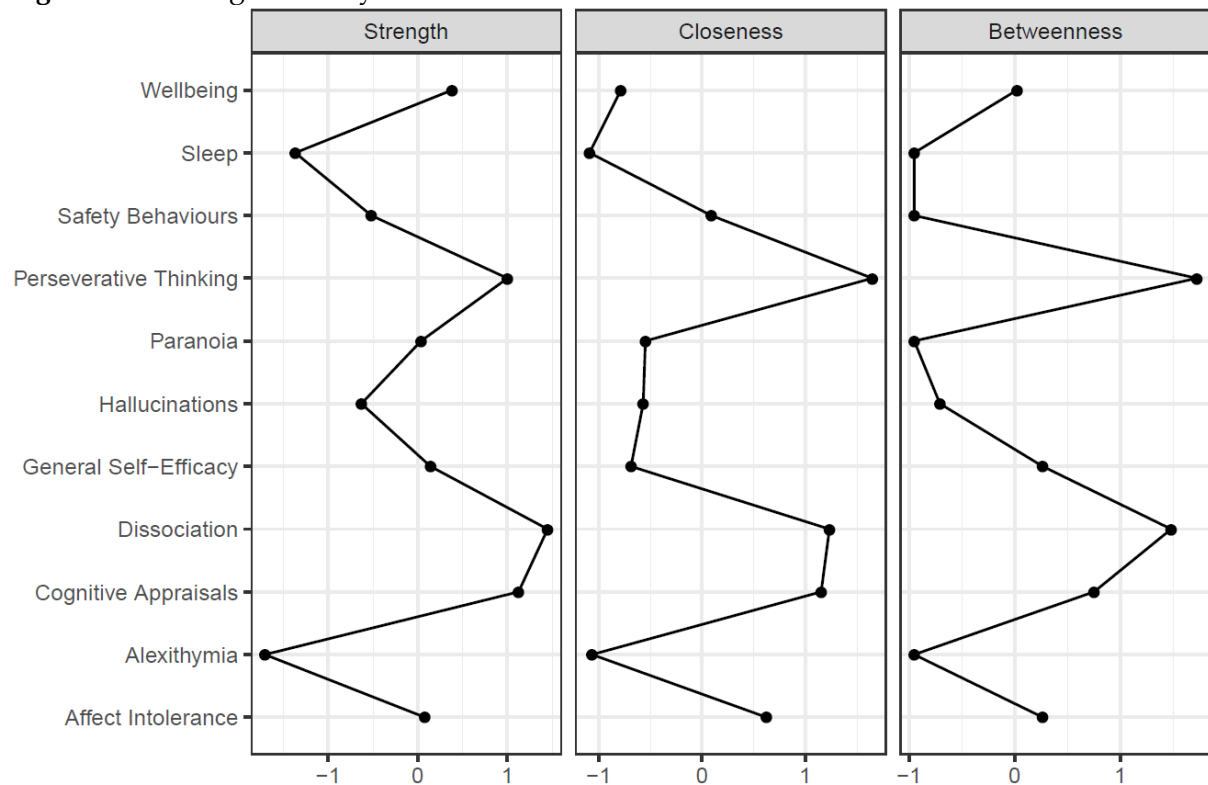
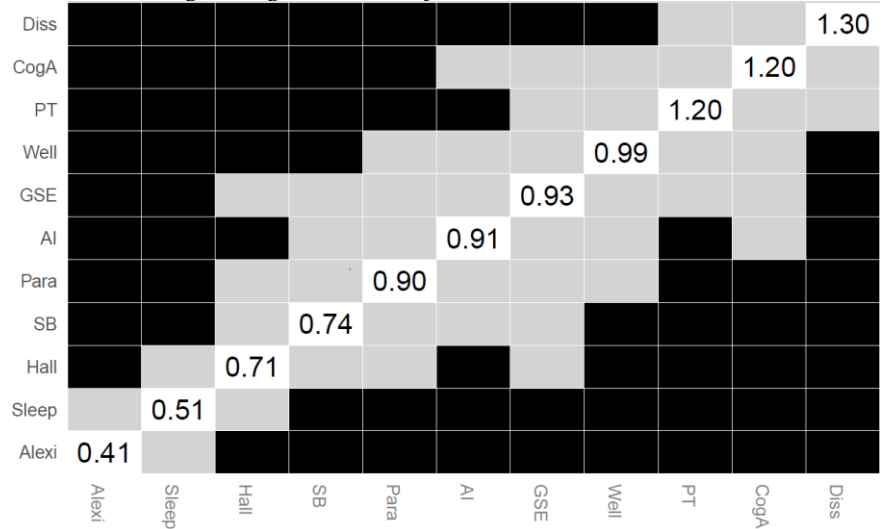


Table 7. Centrality measures for all variables. (Degree centrality and closeness to 3 s.f.)

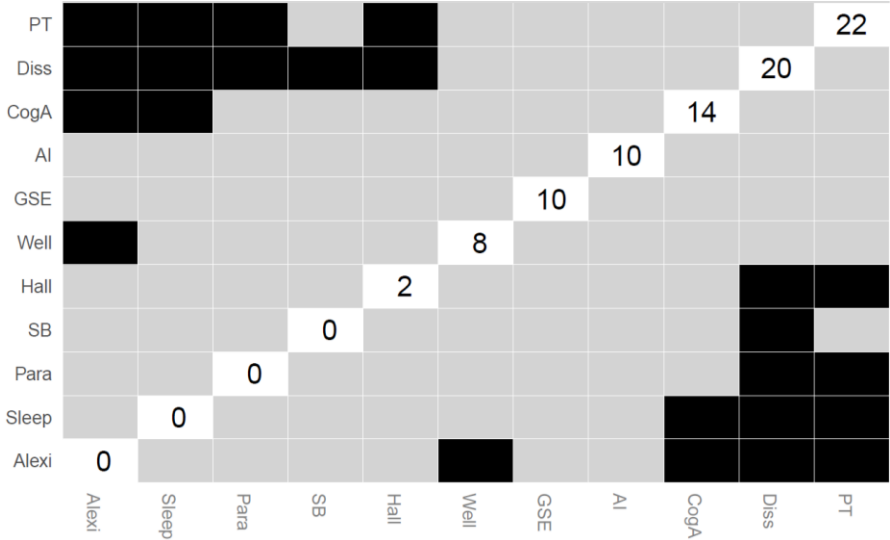
Variable	Strength (Degree)	Closeness	Betweenness
Dissociation	1.29	0.0137	20
Cognitive Appraisals	1.20	0.0135	14
Safety Behaviours	0.743	0.0116	0
Paranoia	0.898	0.0105	0
Hallucinations	0.712	0.0104	2
General Self-Efficacy	0.927	0.0102	10
Perseverative Thinking	1.17	0.0144	22
Affect Intolerance	0.909	0.0126	10
Alexithymia	0.412	0.00955	0
Wellbeing	0.994	0.0100	8
Sleep	0.506	0.00950	0

Figure 6. Differences between centrality estimates (statistically significant differences indicated by a black square, non-significant differences by a grey square)

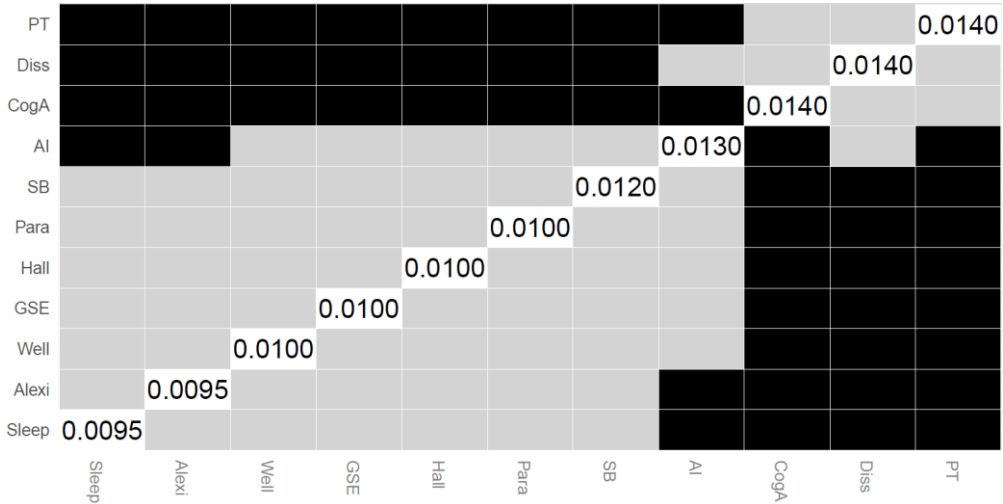
Panel 6a: Strength (degree centrality)



Panel 6c: Betweenness



Panel 6b: Closeness



Key:

- AI Affect intolerance
- Alexi Alexithymia
- CogA Cognitive appraisals
- Dis Dissociation
- GSE General self-efficacy
- Hall Hallucinations
- Para Paranoia
- PT Perseverative thinking
- SB Safety behaviours
- Sleep Sleep quality
- Well Wellbeing

The results of the centrality estimates indicate that dissociation has the highest node strength in the network. Difference tests found that its node strength was not significantly higher than that of cognitive appraisals or perseverative thinking. Perseverative thinking had the highest closeness centrality in the network, but this was not significantly higher than those of dissociation or cognitive appraisals. A similar pattern was found in the betweenness scores: perseverative thinking had the highest betweenness centrality, but this was not significantly greater than those for dissociation, cognitive appraisals, affect intolerance, general self-efficacy, wellbeing, or safety behaviours. Overall, these results suggest that dissociation, cognitive appraisals, and perseverative thinking are particularly highly connected within the network. The high levels of betweenness signify many short pathways between nodes.

Finally, the stability of centrality estimates was calculated using case-dropping subset bootstrapping (Figure 7). This indicated that the stability for all three centrality measures was good. Correlation stability coefficients for betweenness was 0.36, closeness 0.75, and strength 0.75, which meet the recommendation that coefficients should preferably be above 0.50, and not below 0.25.

Figure 7. Showing the results of the case-drop subset bootstrapping

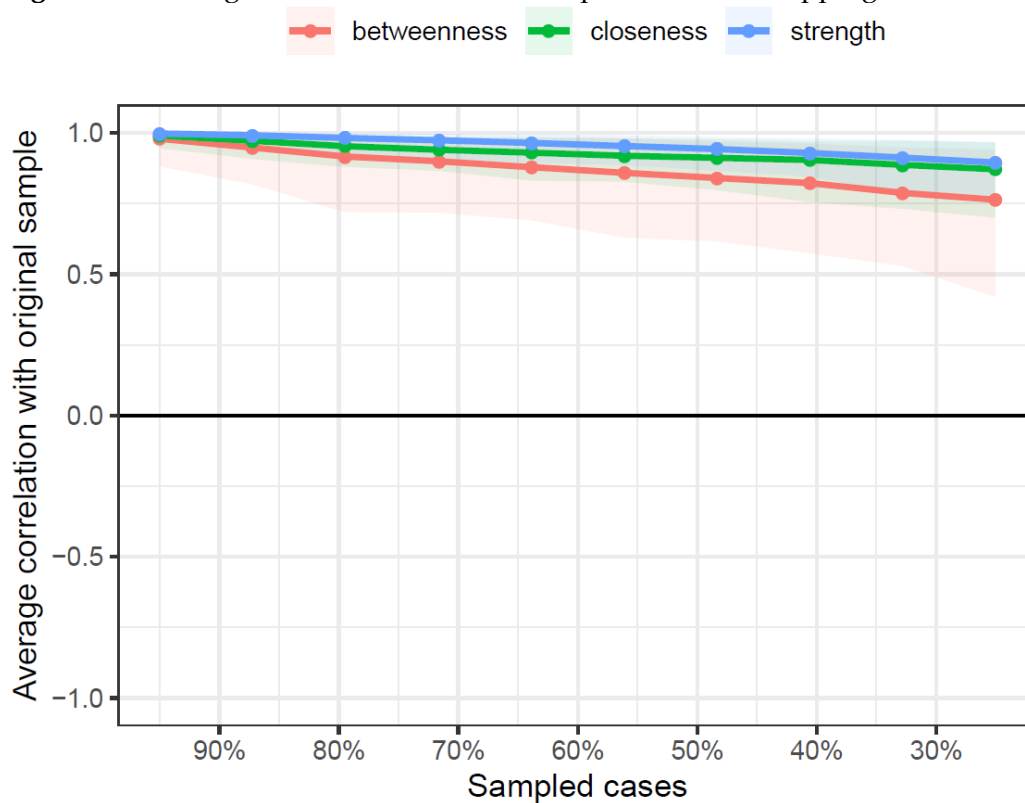


Figure 8 shows the undirected network. In summary, dissociation had direct relationships with most variables, but not with affect intolerance, general self-efficacy, or sleep. Dissociation was most strongly connected to cognitive appraisals about dissociation (CAD). Like dissociation, CAD also did not have a direct edge with affect intolerance, general self-efficacy, or sleep. The network consists of many short paths, affecting the stability of the betweenness centrality estimate. However, this is above minimum recommended levels, and the stability of closeness and strength centrality estimates were good.

Figure 8. Undirected network graph showing relationships between dissociation, symptoms, and candidate maintenance mechanisms. (Red lines show negative relationships. Blue lines show positive relationships. Greater thickness and colour strength of edges indicates greater edge weight).

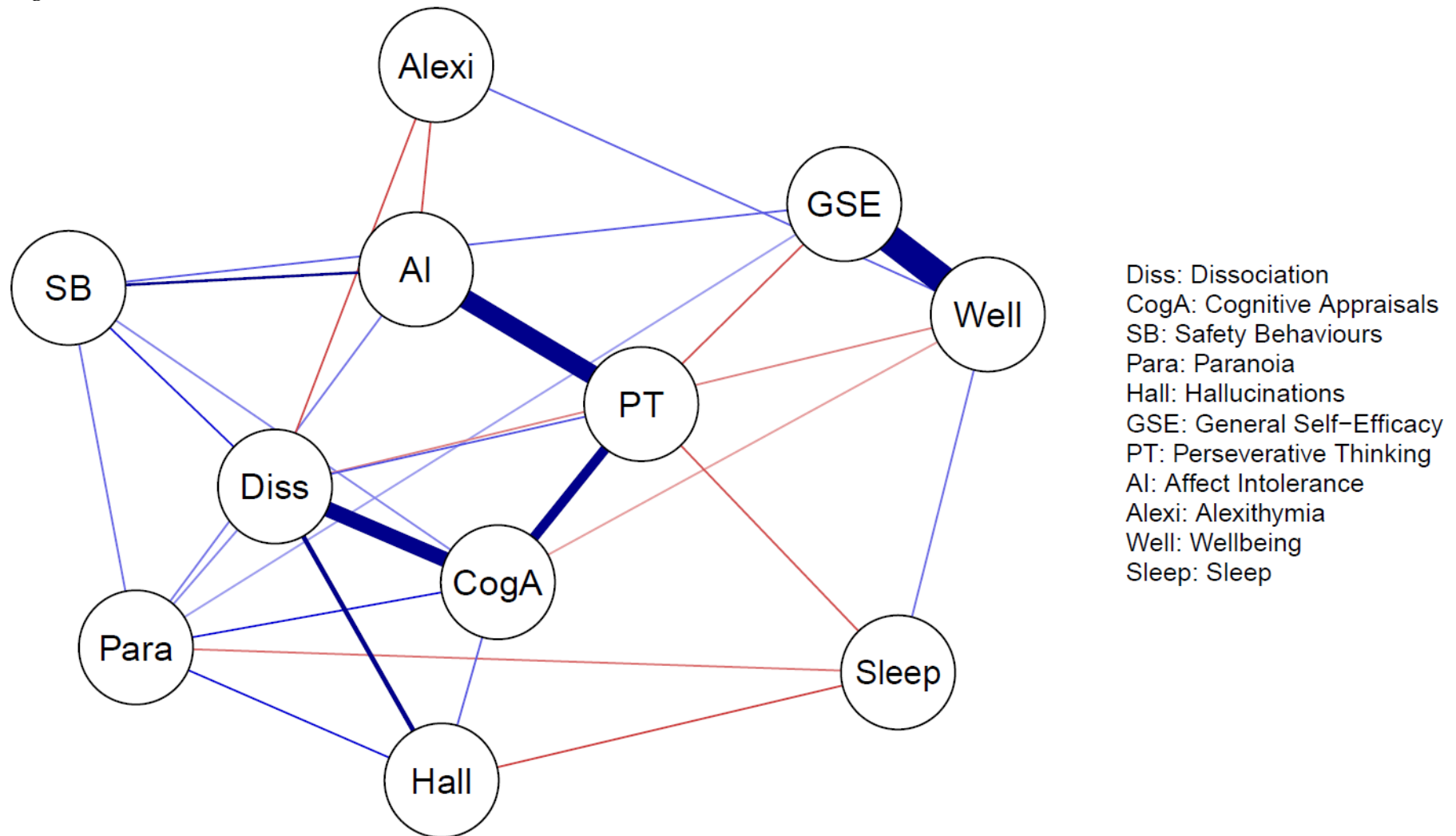


Table 8 summarises the directions of relationships between dissociation and all other variables in the network.

Table 8. Summarising the average causal effects between dissociation and all other variables (Percentages to 2 d.p., causal effects & CIs to 2 s.f.).

Causal effects:	Pathway present (direct or indirect) %	Causal effect	90% CI	Direct edge present %	Direct causal effect	90% CI
Variable to dissociation (i.e. variable causing dissociation)						
Cognitive Appraisals	15.28	0.72	0.55 - 0.81	100	0.64	0.49 - 0.79
Safety Behaviours	17.28	0.43	0.17 - 0.58	100	0.29	0.15 - 0.55
Paranoia	13.75	0.38	0.13 - 0.65	99.42	0.29	0.10 - 0.62
Hallucinations	5.79	0.43	0.19 - 0.67	100	0.33	0.18 - 0.66
General Self-Efficacy	30.19	-0.22	-0.31 - 0.024	28.13	-0.046	-0.26 - 0.00
Perseverative Thinking	18.28	0.52	0.19 - 0.70	99.89	0.37	0.14 - 0.64
Affect Intolerance	22.28	0.41	0.073 - 0.61	94.80	0.34	0.00 - 0.59
Alexithymia	24.06	-0.33	-0.44 - -0.19	100	-0.29	-0.42 - -0.17
Wellbeing	43.06	-0.35	-0.47 - -0.12	100	-0.29	-0.45 - -0.10
Sleep	2.52	-0.20	-0.46 - -0.016	35.71	-0.072	-0.38 - 0.00
Dissociation to variable (i.e. dissociation causing variable)						
Cognitive Appraisals	84.72	0.69	0.47 - 0.79	100	0.51	0.41 - 0.74
Safety Behaviours	82.72	0.49	0.30 - 0.61	100	0.34	0.22 - 0.54
Paranoia	86.25	0.48	0.22 - 0.60	93.40	0.25	0.00 - 0.52
Hallucinations	94.21	0.53	0.35 - 0.63	100	0.35	0.25 - 0.47
General Self-Efficacy	50.75	-0.23	-0.31 - -0.025	9.84	-0.017	-0.18 - 0.00
Perseverative Thinking	81.72	0.53	0.21 - 0.69	98.09	0.29	0.094 - 0.50
Affect Intolerance	77.18	0.46	0.11 - 0.61	90.50	0.32	0.00 - 0.59
Alexithymia	75.94	-0.33	-0.44 - -0.22	100	-0.27	-0.40 - -0.17
Wellbeing	59.90	-0.36	-0.46 - -0.20	99.65	-0.30	-0.44 - -0.15
Sleep	96.86	-0.24	-0.36 - -0.073	8.75	-0.011	-0.097 - 0.00
Key:						
<i>'Pathway present'</i>		The proportion of sampled DAGs which found this pathway.				
<i>'Causal effect'</i>		Average total causal effect when that pathway was present.				
<i>'Direct edge present'</i>		The proportion of DAGs that found direct pathways of those where some pathway was found to be present.				
<i>'Direct causal effect'</i>		Average total causal effect of the direct pathways.				
<i>CI</i>		Credible interval.				

Psychotic symptoms

The table can be interpreted as with the following example: a pathway (direct or indirect) *from* paranoia *to* dissociation was present in 13.75% of the 50,000 DAGs

sampled. The average strength of the effect of paranoia on dissociation within these graphs was 0.38 (with a 90% credible interval 0.13–0.65). In 99.42% of the 13.75% of sampled DAGs a direct edge from paranoia to dissociation was present, and this had an average strength of 0.29 (90% CI= 0.10-0.62). In the opposite direction, from dissociation to paranoia, there was a pathway present in 86.25% of the 50,000 sampled graphs, with an average strength of 0.48 (CI= 0.22–0.60). Of these, 93.40% contained a direct pathway (edge) from dissociation to paranoia. The average strength of this direct pathway was 0.25 (CI= 0.00-0.52). Therefore, for the relationship between paranoia and dissociation, there is a non-significant indication (i.e. found in more than 50% but less than 90% of sampled DAGs) that dissociation has a moderate influence on paranoia. The direction of influence whereby paranoia affects dissociation was found in fewer than 50% of sampled DAGs, indicating a low probability of this direction of effect.

The relationship with hallucinations was the only edge between dissociation and another variable that reached the 90% threshold for inferring probable direction of effect. In this case, it was found to be probable that dissociation is a causal factor for hallucinations, with a moderate effect size (0.53, CI=0.21-0.69).

Other mental health presentations

Sleep and psychological wellbeing both had a negative correlation with dissociation, indicating that as one increases, the other decreases. For sleep, the direction of influence reached the 90% threshold for inferring that dissociation was a probable cause of poor sleep. However, this effect was largely indirect, with fewer than 10% of the sampled DAGs containing a pathway between dissociation and sleep containing the direct pathway. Inspection of the indirect pathways revealed that pathways between dissociation and sleep commonly (i.e. in >50% of the 96.86% of DAGs) included perseverative thinking, hallucinations, paranoia, cognitive appraisals, and affect intolerance.

In contrast, the result for wellbeing was ambiguous in terms of direction of influence, but indicated that the vast majority of effect was via the direct pathway. The direction of wellbeing to dissociation was found in just under 50% of the sampled DAGs, indicating that this is a less probable direction of effect.

Potential maintenance mechanisms

As in the undirected network model, dissociation had direct relationships (i.e. over the 50% threshold) with all potential maintenance mechanisms except general self-efficacy and sleep. It is a point of difference between the two networks that the DAGs analysis found a direct relationship between dissociation and affect intolerance, where none was found in the undirected network, although it should be noted that this was only marginally above the 50% threshold (50.75% of 50,000 DAGs found a direct relationship from dissociation to general self-efficacy).

In terms of likely direction of influence, no relationship between dissociation and a candidate maintenance factor reached the 90% threshold. There were trends towards dissociation being a causal influence for nearly all mechanism factors except general self-efficacy, and particularly in the cases of cognitive appraisals, safety behaviours, and preservative thinking which were found to be influenced by dissociation in over 80% of sampled DAGs. As in Chapter Six, the correlations between dissociation and general self-efficacy and alexithymia were found to be negative.

Discussion

The study presented in this chapter with 902 patients is the largest exploration of dissociation in psychosis with a clinical participant group. The group had high levels of paranoia and hallucinations, with a third scoring above the cut-off for a

persecutory delusion and a third hearing voices daily or several times a week. In this context FSA-dissociation was also common, with two-thirds of the group experiencing at least one dissociative experience frequently over the past fortnight. The results indicate not only that FSA-dissociation is prevalent in non-affective psychosis, but that it is also a construct with direct relationships to key symptoms, including hallucinations and paranoia. In both network models, dissociation and psychotic symptoms were directly connected by positive edges of moderate strength. The relationship to hallucinations reached the threshold in the DAGs for inferring probable causation, indicating that FSA-dissociation may have a causal effect on the occurrence of hallucinatory experiences. Dissociation also had direct relationships with cognitive appraisals, safety behaviours, perseverative thinking, low alexithymia, and low psychological wellbeing, but not to poor sleep. As expected, whilst these relationships were robust, they were ambiguous in terms of likely direction of effect, and require further testing with experimental methods to elucidate. Therefore, the results of the current study appear to be supportive of the hypothesis developed in Chapter Six that dissociation may be maintained by a process related to affect sensitivity and an interacting process reinforcing dissociation via cognitive and behavioural responses to the experience.

Dissociation in non-affective psychosis

The results of the *Exploring Unusual Feelings* study presented in this chapter indicate that FSA-dissociation is prevalent in a non-affective psychosis population. Approximately one third of the group did not endorse any FSA-dissociative experiences, but the majority of participants reported multiple dissociative experiences happening ‘often’ or ‘always’ over the past fortnight. Of those who did report dissociation, an average of nine dissociative experiences were reported, comprising an average of almost four different types (scale factors). The most common of these was altered sensations of control: half of the group reported at least one experience of this kind at least ‘often’ over the past week.

These findings are in stark contrast to the number of co-morbid dissociative disorder diagnoses recorded in clinical notes (less than half a percent), which itself is far lower than estimates of prevalence from previous literature (e.g. Renard et al., 2017) and illustrates the extent to which dissociative phenomena may be overlooked in routine clinical practice.

Dissociation and psychotic symptoms

In this group of 902 people, of whom the majority have current clinically significant symptoms of psychosis, dissociative experiences were found to be directly related to paranoia and hallucinations, consistent with the results of Chapter Five. However, in this analysis, the likelihood statistic for the effect of dissociation on paranoia fell short of the 90% criterion (86.25%). This may reflect a more complex relationship between severe paranoia and dissociation, for example via the effect on anxiety. The results of this chapter also extend the findings of Chapter Five by clarifying the direction of influence between dissociation and hallucinations in a participant group with clinical hallucinations. Here, dissociation is found to be a likely cause of hallucinations. Therefore, both network models in both chapters support the thesis hypothesis that dissociation is directly related to psychotic symptoms with moderate strength of effect, and tentatively support the hypothesis that dissociation plays a causal role in this association. Indeed, these results are consistent with those of a recent meta-analysis of the relationship between dissociation and symptoms of psychosis (Longden et al., 2020).

Dissociation and potential maintenance processes

In Chapter Six, two (interacting) processes were proposed to maintain dissociation. First, a process involving traits related to sensitivity to affect, which confers vulnerability to dissociation due to the generation of a threat-based cognitive response to emotion. Second, and in line with the general cognitive model applied in

cognitive behavioural therapy (CBT), a process reinforcing dissociation via catastrophic cognitive appraisals of the dissociative experience and counter-productive safety-seeking behaviours. These two hypothesised processes are proposed to be mutually reinforcing, and ultimately result in beliefs about being overwhelmed.

Regarding the first process, the direct relationships between dissociation and affect intolerance and alexithymia (i.e. self-rated detection of emotion) were replicated in this clinical group. With respect to the second hypothesised process, this study also replicated direct relationships between dissociation, cognitive appraisals, safety behaviours, and perseverative thinking. This is consistent with the proposed 'general cognitive model' process, as the implicated factors were again found to be closely inter-connected. Potentially linking the two hypothesised processes, perseverative thinking (a key factor of the more proximal process) was found to have a direct relationship with affect intolerance.

Thus, the current study and the results of Chapter Six together give a strong indication that variables relating to affect intolerance, affect sensitivity, and general self-efficacy are bound together in relation to dissociation. This interconnectivity is robust enough that it is detectable in both general population and non-affective psychosis groups. However, the exact configuration of these relationships may differ slightly between groups, and therefore remains to be tested by experimental methods that can determine causality. For example, in contrast to Chapter Six, there were no relationships in the current study between low general self-efficacy and affect sensitivity (i.e. affect intolerance and alexithymia). However, general self-efficacy was still found to be directly linked to perseverative thinking and safety behaviours, suggesting that the selection of response(s) to dissociative experiences might relate to this factor.

It is important to note that, as anticipated, the results of the DAGs analysis do not unambiguously find that these potential maintenance factors causally influence dissociation. In all cases, the relationship between these variables and dissociation did not reach the 90% threshold for drawing conclusions about direction of influence and thus ‘robust findings on directional dependence’ (García-Velázquez, Jokela & Rosenström, 2020) were not found. Indeed, the majority of these relationships (with the exception of general self-efficacy) showed strong trends towards dissociation having causal influence (from 75.94% (alexithymia) to 84.72% (cognitive appraisals)). These proportions are of a similar magnitude to the relationship for dissociation and paranoia (86.25%), which – in conjunction with the results of Chapter Five – was interpreted as supporting the prior hypothesis that dissociation is a causal influence on paranoia. In this case, existing theoretical models of psychotic symptoms may inform the interpretation of ambiguous results. However, unlike the relationships between dissociation and psychotic symptoms, the question of how best to interpret ambiguous directions of influence between potential maintenance factors and dissociation in this study is not as clearly indicated by the existing literature. One possible explanation may be that there are sufficient individual differences in the response to dissociation (or which mechanisms are more or less influential in its maintenance) that this heterogeneity presents as a weaker overall causal effect from each mechanism to dissociation at a group level.

As previously discussed, whilst the interpretation of these results illustrates the limitations of network analysis methods for causal discovery, the purpose of using DAGs analysis to explore possible maintenance factors of dissociation was to generate novel hypotheses that take into account the complexity and high levels of intercorrelation between these variables. In this study, network analysis has achieved the aim of refining the hypotheses generated in Chapter Six. Here, a picture forms of a closely related set of variables where some patterns of edges are retained between comparisons of general population and clinical groups, but where the

direction of effect will remain unclear until further tested with direct manipulation studies.

Finally, as in Chapter Five, no direct relationship between dissociation and poor sleep was found in either network model. This again contrasts with previous literature hypothesising that disrupted sleep is a maintenance process for dissociation (e.g. Lynn et al., 2019). The absence of a direct relationship may indicate mediation by another affective variable (Reeve, Emsley, Sheaves & Freeman, 2018), such as low psychological wellbeing. Alternatively, a more specific element of poor sleep may relate to dissociation than broader sleep quality, as was measured here. For example, Aksen, Polizzi and Lynn (2020) found a strong relationship between dissociation and unusual sleep experiences, which included sleep-talking, sleepwalking, and vivid dreaming.

Dissociation and wellbeing

For the first time in this thesis, the current study also quantitatively explored the relationship of dissociation to general psychological wellbeing. A direct negative relationship of moderate strength was found in both network models, indicating that high levels of FSA-dissociation are associated with poorer wellbeing. However, further exploration is required to determine whether dissociation contributes to low wellbeing, whether low wellbeing confers risk for experiencing dissociation, or whether the relationship may be bidirectional.

The relationship between wellbeing and general self-efficacy was found to be notably strong. Indeed, the edge between these two variables was significantly stronger than any other edge in the undirected network. This may suggest a mechanism for the effect of wellbeing: low wellbeing may lead to beliefs that one is unable to cope or seeing oneself as having low self-efficacy may contribute to poorer general psychological wellbeing. However, this result may also be due to a

significant conceptual overlap between the two constructs (in a manner similar to that for worry and anxiety in Chapter Five). In this case, subjective judgement of coping ability is common to both self-report measures. For example, 'I've been dealing with problems well' on the wellbeing scale, and 'I can always manage to solve difficult problems if I try hard enough' on the self-efficacy scale. The implication of this overlap is that some of the effect of general self-efficacy in the wider network models may have been masked by the variable of wellbeing. If true, this may account for the differences between the current study and Chapter Six with regards to general self-efficacy and its direct links with dissociation, alexithymia, and affect intolerance.

As outlined in the previous two chapters, network analysis methods rely upon several assumptions which are unlikely to be upheld in psychological research, particularly regarding acyclic relationships (in the DAGs analysis), and causal sufficiency (in both analyses). As a result, network estimations require careful interpretation in this context, and must be considered as exploratory and hypothesis-generating. For example, the result that paranoia is likely to cause poor sleep contradicts interventionist experimental findings (e.g. Freeman et al., 2017), demonstrating that causal tests of network results are required where reciprocal relationships are present. The current study is therefore limited by this analysis method, as well as by the nature of the data collected, which were cross-sectional and self-report. A further limitation of the data is that participants were invited into the study on the basis of their recorded diagnosis, rather than their current clinical presentation. Nevertheless, the results presented in this study are likely to be generalisable across the range of psychosis presentations, as participants were recruited from a broad range of care teams, including early intervention teams, community outpatients, and inpatient services.

It is also a limitation of the current study that only two (positive) psychotic symptoms were measured. As psychosis research and intervention strategies increasingly take a symptom-specific approach (e.g. Freeman, 2016), it would be valuable to explore the relationship between dissociation and a broader range of symptoms, including negative psychotic symptoms. It could also be helpful to explore such associations at the level of individual FSA-dissociation factors, as different domains or types of FSA may have differential patterns of association with psychotic symptoms. For example, Humpston, Harrow and Rosen (2020) report differential associations between first rank symptoms of schizophrenia and depersonalisation or derealisation in a twenty-year longitudinal study of 555 people with schizophrenia spectrum, other psychosis, or non-psychosis diagnoses. This included finding that at a fifteen-year follow-up, passivity phenomena were significantly associated with depersonalisation, but not derealisation, whereas overall hallucinations showed the opposite pattern of association.

This study was also not comprehensive in terms of the possible maintenance mechanisms of dissociation measured. The narrower focus of this study arose from the aim of testing the results of the two earlier studies (Chapter Five and Six) in a clinical group, which determined the selection of variables. Future network analysis studies in this area may wish to address a broader range of psychotic symptoms, FSA-dissociation variables, and possible maintenance mechanisms. Experimental and interventionist designs will be required to test the hypotheses generated in this chapter and build upon the results of the current study.

Chapter Conclusions

Although only three of the 902 participants in this study had received a co-morbid diagnosis of a dissociative disorder, dissociative experiences involving a felt sense of anomaly were common. In a group where patients were frequently hearing voices and many had paranoia at the severity of a persecutory delusion, two thirds reported experiencing at least one dissociative symptom regularly in the past fortnight. The robust direct relationships between such experiences and positive psychotic symptoms found in Chapter Five were replicated in this study. Notably, in this group reporting clinical levels of hallucinations, the relationship between dissociation and hallucinations was no longer found to be ambiguous: dissociation was found to be a likely influence on hallucinations with a moderate strength of effect.

Importantly for the thesis aims pertaining to the future development of a cognitive model of dissociation, the findings of this chapter show consistencies with the hypotheses developed in Chapter Six. Direct associations between dissociation and factors relating to affect sensitivity were replicated, and dissociation was again highly connected with variables forming a general cognitive model maintenance process. Whilst further refinement of these hypotheses may yet be required, and there are many other possible maintenance factors of FSA-dissociation to be explored, the findings presented in this thesis nevertheless begin to suggest that dissociation forms part of a replicable cluster of psychological factors involving affect sensitivity and cognitive threat responses. A logical next step in this line of research, therefore, is an experimental study testing the most clinically effective way to intervene in the interconnected network, thereby potentially disrupting the maintenance of dissociation.

8 Conclusions

'I think the right questions are so key [...] You have to break it down and then piece it together.'
(Qualitative Study Participant 8)

At the beginning of this thesis, it was highlighted that dissociation causes significant distress but is currently greatly under-recognised in patients in clinical services in part due to its poor conceptualisation. Crucially, it was also identified that dissociative experiences may be particularly important in non-affective psychosis, where they are hypothesised to be common and to play a casual role in the development and maintenance of key psychotic symptoms. The aims of this thesis, therefore, were to: develop a precise working definition of dissociative experiences as they arise in non-affective psychosis, establish the associations between these and psychosis, and to identify potential maintenance factors of dissociation in this context. In this chapter, each of the thesis aims are considered in turn, before the limitations of the work and its clinical and research implications are discussed.

Thesis aim: The conceptualisation of dissociation

As outlined in Chapter One, existing definitions variously conceptualise dissociation as either a normative, pathological, or post-traumatic process or symptom, incorporating a wide range of different experiences, often in the absence of a unifying concept. As a result, there is growing support for the argument that 'dissociation' may be made up of several subgroups or types of experience (Holmes et al., 2005). Accordingly, the conceptualisation developed in this thesis does not seek to explain the entire range of experiences that have been previously been described as 'dissociative', but identifies a circumscribed subset that share a common phenomenological core experience: a felt sense of anomaly (FSA).

FSA is conceptualised as a highly subjective ‘felt sense’ of strangeness or peculiarity. Whilst this may be verbally expressed as an appraisal, the qualitative participants’ descriptions in Chapter Two suggest that FSA is a ‘feeling’ or sensation that may often be physically or emotionally experienced, rather than entirely cognitive. Such feelings are evidently difficult to translate into verbal descriptions, illustrating their subtlety at the lower end of the severity spectrum, and perhaps the inherent difficulty in describing experiences for which one has no cognitive or linguistic framework (referred to as ‘hypocognition’ by Wu & Dunning, 2018). The theoretical framework described in Chapter Three proposes that FSA can be felt in relation to various domains of experience, and take a range of forms, including detachment.

There are benefits to defining a subset of dissociative symptoms in this way. First, by using the common denominator of FSA as a heuristic, it is clear which experiences are considered (those with the core phenomenology), and which are not (those without). As discussed, this clarity is absent in many existing definitions of the construct, which has led to attempts to identify subgroups of experiences (e.g. Holmes et al., 2005). The construct of FSA may therefore also describe a subtype of dissociation. Whilst it remains to be seen whether this subset of symptoms that share the same core phenomenology also share the same aetiology and maintenance factors, the structure of the framework described in this thesis facilitates the development of research questions required to test this. This is because the categorisation of FSA and its domains and types in the FSA matrix allow a level of distinction amenable to precise measurement and testing. In effect, an approach analogous to the single symptom approach taken in psychosis research could be applied to the FSA matrix (and other well-defined proposed subtypes of dissociation).

Second, conceptualising dissociation in terms of FSA is advantageous in clinical settings (particularly in the context of psychosis) because it describes the person's lived experience regardless of the specific or idiosyncratic content or context. This simplifies and defines the core clinical problem to be addressed. That is, the goal of therapy or treatment should be to reduce the FSA, which is at the root of patient statements that they wish to feel 'normal again'. The distillation of a wide range of symptoms into a core clinical problem may also reduce the complexity for assessing clinicians and thereby facilitate detection of dissociation in services. This is important in light of the clear message from participants in Chapter Two that they wished for their dissociative symptoms to be better recognised and understood by mental health services.

It is also a benefit that the 'signature' of this subtype of dissociation relates to a core cognitive appraisal of 'oddness' or anomaly, as this implies that the construct may be amenable to a cognitive approach. Since a fundamental technique in cognitive behavioural therapy (CBT) is to explore and test the truth of cognitive appraisals, this approach could be applied to recurrent or problematic appraisals of anomaly, as well as to any secondary appraisals, such as those identified in Chapter Four (e.g. 'it's not me in control right now' or 'this might last forever'). Further testing is required to determine whether this constitutes a good treatment target for FSA-dissociation.

However, there are also limitations to the conceptualisation of dissociation proposed in this thesis. The most striking of these is that the construct of FSA-dissociation and the accompanying matrix (and measure) do not explain or capture all experiences that have previously been described as dissociative. This includes dissociative symptoms that are considered 'cardinal', such as dissociative amnesia, which comprises a diagnostic entity in its own right (American Psychiatric Association, 2013) and forms a factor in many established measures of dissociation (Chapter

Three). Whilst detachment or unfamiliarity of memory fall within the framework of FSA-type dissociation, the relationship of FSA to frank dissociative amnesia (such that another 'part' of the personality retains a memory that is entirely inaccessible by another 'part') is unclear. Further exploration is required to determine whether such experiences may be described by the conjunction of 'absent' and 'mind' in the FSA-matrix, or whether a 'felt sense of anomaly' simply does not occur with dissociative amnesia in the same way as for other experiences within the subset. Indeed, an inherent feature of FSA is the subjective experience of (and subsequent appraisal of) anomaly – however, many compartmentalisation symptoms are defined by a subjective absence or inaccessibility of experience until *after* the event has passed (Holmes et al., 2005). The conceptualisation developed here therefore does not capture processes where the person loses awareness of their current surroundings completely or responds to content in memory as if it represented the present (as in post-traumatic flashbacks), and further research is required to determine the compatibility of the concept of FSA with these processes.

Although the core phenomenology of FSA is not experienced as cognitive, the fact that it may typically be expressed this way means that it could be argued that another potential confound is that the cognitive appraisals of these symptoms, as explored in Chapter Four, become *de facto* secondary appraisals. Again, further research is required to determine the role of the cognitive appraisals outlined in Chapter Four. However, if they are found to play the same role as catastrophic cognitive appraisals in the general cognitive-behavioural model (Beck, 1971), then the distinction of these as 'secondary' becomes a point of semantic argument, since they may be considered, elicited, and targeted as usual.

Chapters Three and Four introduce new scales, developed with data from the general population and validated in a psychosis group, with which to measure the new construct of FSA-dissociation and the most relevant related cognitive

appraisals. Operationalising the new conceptualisation and its appraisals in this way is potentially valuable for clinical practice as it affords practical ways to identify, assess, and measure them. Crucially, they will also enable future research to further test the construct, including exploring how the FSA matrix integrates with existing proposals of dissociative subtypes, establishing prevalence across other diagnostic categories, and continuing the work started here of identifying potential causal and maintenance mechanisms of FSA-dissociation.

In summary, the first aim of the thesis – to define clearly the phenomenon of dissociation is considered to have been achieved. Despite its limitations, the conceptualisation presented in this thesis presents an opportunity to explore a discrete subset of phenomenologically related symptoms of dissociation from a new perspective. It remains to be seen how this construct relates to other proposed subtypes of dissociative experience, such as detachment and compartmentalisation (Holmes et al., 2005) and further testing is also required to determine whether phenomenologically similar symptoms have shared maintenance processes, and therefore whether grouping experiences in this manner is truly pragmatic. It should also be noted that conceptualising dissociation in this way assumes that dissociation is a multidimensional construct, something that is not universally accepted within the field (e.g. Bernstein, Ellason, Ross & Vanderlinden, 2001). Further, whilst FSA-dissociation was considered within this thesis to exist along a spectrum of severity, this assumption also requires testing against the alternative taxonomic approach.

Thesis aim: Dissociation in relation to non-affective psychosis

The second aim of the thesis was to demonstrate the importance of dissociation in the context of non-affective psychosis. As outlined in Chapter One, this emphasis follows from observational findings that the prevalence of dissociation is elevated in

psychotic disorders (Renard et al., 2017), and from theoretical models (Freeman, 2016) and clinical interventions (Varese et al., 2020) that highlight its potential as a novel treatment target for psychotic symptoms. The studies in Chapters Two, Four, Five, and Seven support this aim. Specifically, Chapters Two and Seven demonstrate qualitatively and quantitatively that dissociation is an important and common problem in psychosis. Chapters Four, Five and Seven indicate that it may play a causal role.

In the *Exploring Unusual Feelings* study surveying over nine hundred patients with psychosis, two thirds of the group reported that at least one dissociative experience had happened frequently over the previous fortnight. The average participant reporting dissociation experienced symptoms from four different areas of the FSA-matrix. This suggests not only that FSA-dissociation is common in psychosis, but that multiple proposed subtypes of dissociation may occur at the same time. Similarly, in Chapter Two, participants described two key FSA-matrix ‘types’ (detachment and unreality) and spoke about the effect of feeling ‘strange’ on various ‘domains’ such as emotion, cognition, selfhood, and connection to others. These findings are consistent with previous explorations of dissociative phenomena in psychosis, such the systematic review by Renard et al. (2017), which suggests that depersonalisation may be present at a rate of 48% and derealisation at a rate of 22% in schizophrenia spectrum disorder populations.

The relationship between dissociative and psychotic difficulties was also borne out by quantitative data: network and regression analyses of general population and clinical data (Chapters Four, Five and Seven) found strong associations between these symptoms. Further, these analyses, and the qualitative interviews in Chapter Two are consistent with Maher and Ross (1984), Garety, Kuipers, Fowler, Freeman and Bebbington (2001), and Freeman’s (2016) proposals that dissociation influences the phenomenology of psychosis. In the interviews, participants described trying to

make sense of their subjective experiences of anomaly and searching for ways to understand the experiences that they could not easily put into words. Chapter Four indicated that FSA-dissociation and cognitive appraisals explained approximately a third of the variance in paranoia and hallucinations, Chapter Five suggested that FSA-dissociation was likely to be causal for cognitive disorganisation, grandiosity, and paranoia, and Chapter Seven found dissociation to be a likely cause of hallucinations.

This pattern of results supports the hypothesis that dissociation is a causal factor in psychosis. These findings could also be interpreted to either support or contradict suggestions by theorists such as Moskowitz, Read, Farrelly, Rudegeair and Williams (2009) that key psychotic symptoms are in fact 'dissociative in nature'. Following the network approach to psychopathology, the robust connectivity between dissociation and psychotic symptoms modelled in each network analysis may be taken as evidence that contradicts artificially imposed diagnostic boundaries recommending they be considered separately as discrete entities. On the other hand, the results from the partially directed analyses indicate that these variables are distinct enough for reliable patterns of likely causal influence to be detected.

The results of this thesis also indicate a robust link between dissociation and other mental health problems that frequently occur in patients with psychosis, such as anxiety and depression. These are more likely to be bidirectional (Chapter Five), and may be particularly important with respect to the relationship between dissociation and sleep (Reeve, Emsley, Sheaves & Freeman, 2018). Less can be concluded from this thesis regarding the relationship of negative symptoms of psychosis to dissociation, although the descriptions of social withdrawal and emotional disconnection in Chapter Two indicate a clinically important overlap between the two, and thus warrants further exploration.

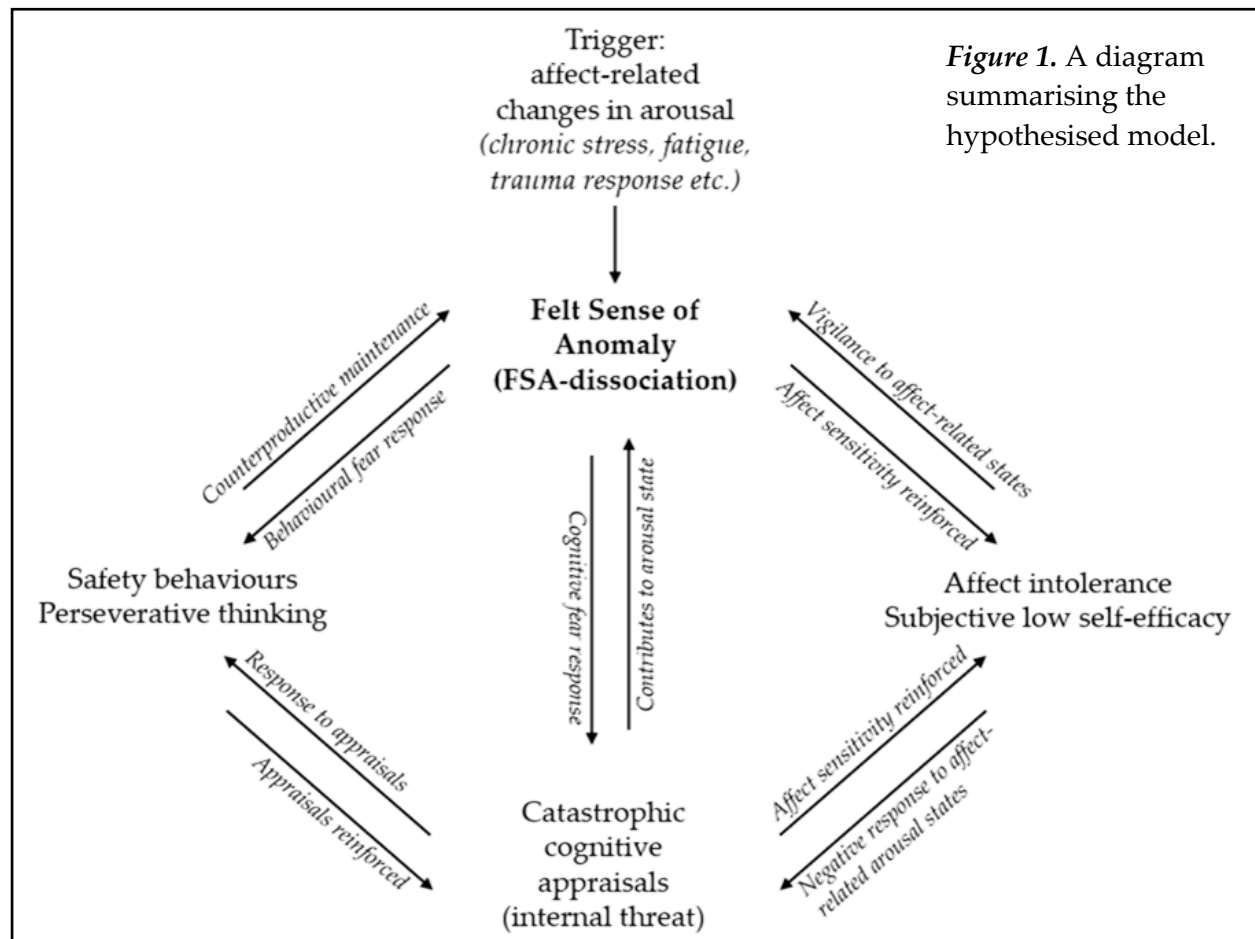
In summary, the second aim of the thesis has also been achieved as far as is possible using cross-sectional research designs. The results of these studies indicate that dissociation is common in psychosis, can cause significant distress and impairment, and may be a feasible novel target for intervention in the treatment of positive psychotic symptoms. As discussed below, these conclusions would be significantly strengthened by evidence from intervention studies, and further improved by consideration of a broader range of psychotic symptoms.

Thesis aim: The theoretical understanding of dissociation

According to the Oxford Approach described in Chapter One, before effective psychological interventions for reducing dissociation can be developed, its maintenance mechanisms must be well-defined and their causal influence well-evidenced. In this thesis, progress has been made towards identifying potential maintenance factors of FSA-dissociation (the third thesis aim). Specifically, variables relating to affect sensitivity, rumination upon catastrophic cognitive appraisals, and counterproductive behavioural responses have emerged in network models using both clinical and general population data as being closely bound with dissociation.

Tentatively, a provisional model is described proposing a pattern of interaction between these variables in which affect sensitivity (largely driven by remote, trait factors) results in a negative cognitive response when affect is detected. This is reinforced by a second, interacting process more proximal to the experience of dissociation – a feedback loop fitting the pattern of the general cognitive-behavioural model whereby experiences of dissociation are appraised as threatening, and the behavioural responses taken to mitigate anticipated negative outcomes (e.g. withdrawing from social interaction) reinforce the dissociative experience. The resulting hypothesised model (Figure 1) is therefore fear-based in nature: the

experience of affect is aversive and met with cognitive and behavioural attempts to manage the increased arousal. Ultimately, these responses reinforce the subjective felt sense of anomaly.



Trauma-focused models of psychosis that address dissociation (e.g. Hardy, 2017; Larkin & Morrison, 2005) propose a process comparable to the affect sensitivity or ‘remote’ process described above. In these models, trauma-related dissociation is misinterpreted and maintains the sense of threat which is at the core of PTSD and psychosis presentations. In the remote process proposed in this thesis, threat-focused misinterpretation of dissociation is also the core component. The results regarding low self-rated alexithymia indicate a level of heightened introspection and sensitivity to signs that emotion is being experienced. This could feasibly relate to increases or decreases in arousal. The findings regarding low general-self efficacy

suggest that sensitivity to affect may stem from beliefs that the individual would struggle to cope with (positive or negative) emotions that are too overwhelming, uncontrollable, or threatening. Therefore, it is hypothesised that dissociative experiences related to fatigue, chronic stress, and emotion dysregulation (whether or not traumatic in origin, and as described in Chapter Two) are misinterpreted as signs of heightened affect, appraised as more threatening than the person can tolerate, and thus result in negative cognitive and behavioural coping responses. (These ultimately reinforce dissociation via the proposed proximal process).

This hypothesis suggests that dissociation may therefore be particularly likely in individuals who have reasons to fear heightened affect or changes in arousal, which may include those with problematic emotion dysregulation. Difficulties tolerating and regulating emotion would feasibly elicit and reinforce vigilance to signs of affect, regardless of the original cause of the dysregulation. This hypothesis is consistent with the well-documented links between dissociation and emotion dysregulation (Briere & Runtz, 2015). It is also consistent with the results of neurocognitive studies of dissociative PTSD such as that of Haricharan et al. (2019), who report significantly increased activity in the insular cortex in this group of patients – an area of the brain involved in the processing of visceral sensations and interoception (Uddin, Nomi, Hebert-Seropian, Ghaziri & Boucher, 2017). One may also predict that individuals who have difficulties accurately identifying the cause of affect-related changes in arousal (and believe themselves to have low coping ability) may also appraise internal sensations as confusing, threatening or aversive – even in the absence of specific beliefs about emotion. This hypothesis also remains to be tested, but is supported by studies such as those by Venta, Hart and Sharp (2012), who found that, in comparison to patients without alexithymia, adolescent inpatients who had alexithymia also showed heightened avoidance of aversive internal experiences.

As stated, the proposed affect sensitivity process is hypothesised to reinforce a process more proximal to dissociation. This process fits with the general cognitive model of catastrophic appraisals being reinforced by safety-seeking behavioural responses (Salkovskis, 1991) and bears resemblance to the Hunter, Phillips, Chalder, Sierra and David (2003) model of depersonalisation disorder. Indeed, many of the catastrophic attributions, 'avoidances', safety behaviours, and cognitive biases included in Hunter et al.'s model were reported by participants in Chapter Two. This suggests that FSA-dissociation and depersonalisation may at least partially overlap, and provoke similar cognitive and behavioural responses at the proximal level. Perseverative thinking is a key part of this hypothesised process, and may serve as an internal form of the 'symptom monitoring' behaviour proposed by Hunter et al. (2003). Rumination may direct attention towards dissociative experiences and their appraisals, keeping them in mind, therefore maintaining the sense of internal threat that causes FSA to persist. Additionally, if 'obsessive focus' directly produces sensations of unreality, as proposed by Jaspers (1963; cited in Hunter et al., 2003), then it is possible that perseverative thinking, as an example of this, may itself directly produce and reinforce FSA. Experimental studies (particularly of the kind described in Chapter Six) may be helpful in elucidating how much of the effect of perseverative thinking upon FSA-dissociation is direct in this way, versus indirect, via the (re)activation of threat appraisals.

The two processes proposed (remote affect sensitivity and proximal cognitive-behavioural) are hypothesised to be mutually reinforcing (Figure 1). In the context of self-rated low ability to cope and high sensitivity to internal experiences (remote process), the symptoms and subsequent catastrophic appraisals of dissociation (proximal process) provide aversive new experiences that reinforce affect intolerance and further promote sensitivity to internal states (remote process). The safety-seeking behaviours used to mitigate this aversive experience (proximal process) ultimately maintain the dissociation, thus providing new experiences of having low

self-efficacy in the face of such internal states (remote process). Finally, just as cognitive appraisals and safety behaviours are mutually reinforcing, so too might be the remote process. Feeling increasingly powerless (low self-efficacy) is likely to influence the perception of the severity of threat posed by the internal state – and thereby increase affect sensitivity in the longer term. In short, chronic stress, fatigue, or trauma produce experiences that are appraised as anomalous: in the context of affect intolerance, these are regarded as an internal threat and met with negative cognitive and behavioural responses. These responses only serve to make the individual feel increasingly vulnerable to internal threats, and thus dissociation is maintained via heightened sensitivity and response to future internal threat experiences.

The central concept of ‘internal threat’ in this hypothesised model is compatible with trauma-focused models of psychosis, as discussed above, and trauma-based explanations of dissociation such as Schauer and Elbert’s (2010) conceptualisation of dissociation as a fear response. However, it is important to note that the hypothesised model is not reliant upon trauma being the original cause of the internal threat. This is a benefit of the proposed model, as some theorists hold that trauma is neither necessary nor sufficient to produce dissociation, and therefore that more fine-grained explanatory mechanisms must be sought (Briere & Runtz, 2015). The emphasis on fear-based processes in the model reflects the choice of variables in the thesis, and it may be considered a limitation of the work presented here that other variables were not included.

In terms of how this model relates to psychosis, three particular aspects might account for the aforementioned proposed causal relationship from FSA-dissociation to psychotic symptoms. First, as outlined in Chapter One, the experience of dissociation is implicated in models of positive psychotic symptoms, such as that of Garety et al. (2001), because it results in misinterpretations and a ‘search for

meaning'. The hypothesised model describes the reinforcement and reoccurrence of these anomalous experiences, which may explain why they come to be considered as significant sensations requiring explanation. Certainly, this is a series of events described by many participants in Chapter Two. Second, as reported in Chapters Two and Four, in the context of psychosis, the appraisals arising from dissociative experiences provide opportunity for paranoid or magical thinking to ensue (*'someone has done something to me', 'I'm not in the same world as everyone else'*). Therefore, if a person has a predisposition to these thinking styles, the occurrence of dissociation presents an opportunity to engage further in this, potentially reinforcing psychotic experiences. As noted previously, cognitive appraisals of dissociation that contain the theme of control represent an example of the 'fuzzy boundary' (Renard et al., 2017) between psychotic and dissociative symptoms. It is therefore also feasible that sensations and appraisals of being controlled or out of control represent a particular 'tipping point' between dissociation and psychosis. Third, and finally, avoidance and withdrawal safety behaviours may present as negative symptoms of psychosis (as discussed in Chapter Two), and checking and rumination behaviours may reinforce positive symptoms. Isolation, rumination, and avoidance are cited as important maintenance factors for paranoia and hallucinations (Badcock, Adery & Park, 2020; Freeman et al., 2016), and were all described in Chapter Two as methods for coping with dissociation.

In summary, the third aim of the thesis is considered to have been achieved. A subset of variables relating to cognitive, affective, and behavioural responses to dissociation and to broader changes in arousal have been found to be robustly associated across a spectrum of clinical severity. The proposed model for how these variables may interact is consistent with existing literature, but requires testing with experimental methodology before it can be applied to clinical practice. Furthermore, the variables tested in this thesis were not exhaustive; alternative or additional candidate mechanisms should also be considered in future research.

Dissociation: Theory and practice

Clinical practice may be one of the most valid and effective methods for generating insights into which psychological factors might be acting as maintenance mechanisms for dissociation. The concept of a mutually-beneficial interaction between research and clinical practice (so-called ‘theory-practice links’) is a fundamental principle in the profession of clinical psychology. Stemming from this, the ‘scientist-practitioner’ model of clinical psychology states both that clinicians should deliver evidence-based practice, and that they should consider practice-based evidence when generating new research questions (Jones & Mehr, 2007). Theory-practice links are therefore important to consider in the context of this thesis, both to explore the applicability of the ideas presented here to real-life clinical practice and to generate new hypotheses and questions for future research.

Theory from practice

As discussed with respect to the possible overlap between dissociation and negative psychotic symptoms, there are findings within the data of the qualitative study described in Chapter Two that merit further research. One such example is the finding that many interviewees stated negative beliefs about emotion and stress. It is unclear whether these are part of a more general negative world schema, or specific to affect and arousal. Understanding the formation of these beliefs may be key to the prevention of dissociation, and to understanding the affect sensitivity (remote) process hypothesised here.

Attitudes towards emotion are also relevant to observations made in the course of the clinical work undertaken as part of the clinical fellowship held during this thesis. In this work with four people experiencing dissociative symptoms in the context of

first episode psychosis (FEP), all patients described some level of confusion or lack of awareness about the way in which emotions affect physiology and influence cognitions. For example, one client was very attuned to changes in their cognitions, but without support could not relate these to external events or recognise when an emotion was their cause. All clients described difficulties linking cognitions to affect. This has implications for the affect sensitivity process in the hypothesised model, as it supports the aforementioned prediction that low awareness of emotion may also produce negative cognitive-behavioural responses to arousal. Of clinical relevance, three of the four clients had also either been formally tested for, or suggested to have traits of, an autistic spectrum disorder (ASD) (although no official diagnosis of ASD was recorded for any patient). One interpretation is that, alongside the detachment experiences inherent in dissociation, difficulties recognising and responding to emotion may produce a clinical presentation with elements that appear consistent with social communication difficulties. A future research endeavour identifying points of similarity and difference between dissociation presentations and milder forms of ASD may therefore be valuable.

Adding further complexity, all four clients also reported social anxiety or paranoia. In one case, social anxiety was directly influenced by the context of FEP and dissociative experiences. The client reported feeling anxious because they were unable to trust their behaviour around others due to their experiences of disinhibition during their initial presentation of psychosis. Dissociative symptoms were interpreted as signs that they were no longer in control of their actions and were at risk of acting embarrassingly in public. The interpretation of dissociation as a marker of control was common to all clients, and also commonly reported in Chapter Two. In these accounts, dissociation was reported as a feeling of being 'out of control' (acting unpredictably), 'not in control' (running on automatic pilot), or 'being controlled' (being influenced by a separate entity). The theme of control therefore arose as being central to client concerns and merits greater attention when

considering theory-practice links in dissociation. This concept is included in the hypothesised model under cognitive appraisals and related safety behaviours, but it remains to be determined whether a more distinct role better fits the clinical picture.

In addition to these observations – which could be argued to extend ideas already presented in this thesis – there are also indications of processes and variables related to dissociation which have not been addressed in previous chapters but that may also be important. For example, clients reported difficulties with their self-concept to varying degrees. This was either related directly to dissociative experiences (i.e. feelings of not existing, or other experiences captured in the FSA-matrix), or to the effects of emotional ‘set-shifting’. The latter term is intended to describe the observation that the impact of mood-dependent memory may be significant in this group and raise challenges for the client and therapist. For example, one client described feeling as though they acted so differently across contexts that they became concerned they could not tell which was the ‘real’ version of themselves. In terms of the process of therapy, the mood-state of the client greatly affected from one session to the next how severe they reported their dissociative experiences to be, how well they considered themselves to be coping, and the subjective distress caused by any other incidents that had occurred during the previous week. Cohesiveness of identity, and the extent to which this is vulnerable to affect and state-dependent memory, is therefore an important area to consider in delivery of psychological interventions for dissociation and to explore further in research. This is likely to be a complex picture, with implications for other dissociation-related concepts, such as dissociative amnesia, (negative) self-schemas (which may relate to low self-efficacy), and the more marked difficulties of this kind characteristic of dissociative identity disorder (DID) presentations.

Theory into practice

Due to the methods used in this thesis there may be many differing interpretations of the results – there is much to understand before the findings can be directly applied to clinical practice. Nevertheless, it is encouraging that many of the key concepts outlined in this thesis, and both hypothesised processes, were also observed in the course of clinical practice. For example, affect sensitivity and perseverative thinking manifested clinically as hypervigilance to internal changes and rumination upon the meanings and causes of these. In the context of psychosis, this may be particularly important given that at least one client engaged in monitoring of their thoughts and memories with the appraisal that any changes in these indicated imminent relapse into psychosis. Clients were aware of this process, and often described this positively in terms of being exceptionally sensitive or attuned to themselves.

Low self-efficacy was also expressed explicitly in clients' appraisals of themselves. In this regard, clients reported being easily overwhelmed, or described themselves as passive spectators of their thoughts and emotions, as described in Chapter Two. For all clients, low self-efficacy formed just one aspect of a negative self schema that conferred low self-esteem. Importantly, low self-efficacy was also expressed implicitly through the process of therapy: many clients found it difficult to engage or persist with behaviour-change strategies due to perceptions of these being beyond their ability or ultimately futile endeavours given their passive status in their emotional lives. When techniques were found to be effective, clients often seemed to attribute the process of change to the therapist, and often relied upon the therapist to continue to scaffold the new behaviours and techniques beyond the point at which the client could initiate these effectively independently.

Implications for clinical practice

As stated, further treatment development and evaluation is required before the findings of this thesis can be widely disseminated for use in clinical practice.

However, the theory-practice links discussed above indicate that some particular clinical approaches and core cognitive-behavioural techniques are likely to be relevant to dissociation and should be considered further.

Firstly, the potential of effective psychoeducation is evident. Clients presenting with dissociative symptoms are likely to benefit from an explanation of dissociation that normalises the 'strange' sensations, addresses fearful appraisals, and offers a language for talking about difficult-to-describe experiences. Explaining the links between dissociation and arousal states – particularly anxiety – may be helpful, but should also be supported with adequate assessment of the client's level of emotional literacy and subsequent further psychoeducation about emotion as required. It may be beneficial for this latter psychoeducation to include information about the physiological and cognitive effects of arousal states, normalising and de-catastrophising the appraisals of these changes, and scaffolding the client's own identification of high and low arousal states (whether or not these are then labelled as specific emotions).

Generic CBT techniques directly addressing unhelpful cognitive appraisals and safety behaviours are also likely to be helpful in alleviating dissociation. These may include testing appraisals regarding loss of control, and behaviours intended to retain control or appear 'normal', as discussed by Hunter et al. (2003).

Strategies targeting rumination and facilitating change of attentional focus may also be relevant. This may include behavioural strategies, as suggested by Kennerley (1996), and defusion techniques, such as those incorporated into third wave CBT approaches. Since rumination and biased attention are processes known to be important in paranoia and hallucinations (Freeman, 2016; Valmaggia, Bouman & Schuurman, 2007), the development of these strategies may be a particularly important goal of therapy in the context of psychosis.

Finally, interventions targeting perceived low self-efficacy (and potentially broader negative beliefs about the self) may be important. For clients with marked difficulties in this regard, the incorporation of motivational interviewing techniques might be considered to support engagement with behaviour change techniques.

Thesis limitations

The above suggestions should be followed with appropriate caution, since there are several limitations to the work presented in this thesis that impact on its conclusions and the confidence with which they may be drawn. In particular, as discussed, there are limitations inherent in the conceptualisation of FSA-dissociation developed here. This novel definition makes assumptions about the broader category of dissociation that those who view dissociation from a unidimensional or taxonomic perspective are likely to question. Further, since all subsequent studies employ this conceptualisation, its limitations impact the conclusions drawn throughout the thesis. Specifically, the hypotheses generated here may be based on an incomplete picture of dissociation, and may therefore not generalise to other dissociative experiences – such as dissociative amnesia, for example.

A further limitation, also related to conceptualisation of constructs, is the problem of overlap between variables included within the same analyses. In some instances, conceptual or measurement overlap between variables may explain results indicating that they are closely associated. For example, the Affect Intolerance Scale contains items describing ideas that may arise in catastrophic cognitive appraisals (e.g. *'negative feelings could make me go mad'*), and may therefore conceptually overlap with the Cognitive Appraisals of Dissociation scale (e.g. *'I'm losing my mind'*). Similarly, it could be argued that there is overlap between worry and anxiety

(Chapter Five), general self-efficacy and psychological wellbeing (Chapter Seven), and distress intolerance (Chapter Five) and affect intolerance (Chapters Six and Seven). Regarding general self-efficacy, it may also be a limitation of the thesis that a more precise construct – coping self-efficacy – was not explored, as this is recognised as a mediator of distress in PTSD (Benight, Swift, Sanger, Smith & Zeppelin, 2006), and has recently been shown to mediate dissociation over a timeframe of two months in undergraduate students (Mahoney & Benight, 2019).

The main method of exploring the data and generating the hypotheses presented here was network analysis. As outlined in Chapters Five, Six, and Seven, there are significant limitations to drawing conclusions from such methods when using cross-sectional data (Dawid, 2010), and particularly when exploring psychological variables, which are almost always expected to relate reciprocally. The latter challenge has led some researchers to take the stance that it is not feasible to use network analyses for causal discovery, and indeed that it may be inappropriate to use them at all in mental health research (T. Rodebaugh, personal communication, 10 December 2019). Whilst this is understandable given the significant limitations applying the findings of these models, network approaches are nevertheless gaining popularity in the field (Robinaugh, Hoekstra, Toner & Borsboom, 2019), with the caveat that they should be ‘employed with extreme caution and interpreted guardedly’ (Steinley, Hoffman, Brusco & Sher, 2017). Recently drafted guidelines for the proper and appropriate interpretation and reporting of their results (Burger et al., 2020) written by researchers with expertise in estimated network psychometrics, and observed in this thesis, will undoubtedly support this recommendation. As stated throughout the work presented here, the limitations of the network approach for drawing definitive conclusions in cross-sectional data emphasise the importance and value of carrying out experimental studies to test the generated hypotheses.

Indeed, whilst a cross-sectional survey design was used in Chapter Seven, this was not the only way in which the key findings of the thesis could have been tested in a clinical group. It is a limitation of this thesis that experimental or longitudinal observational studies were not carried out – particularly within the clinical group. Further, as discussed, other candidate mechanisms of dissociation remain to be identified, and may be facilitated by employing a broader range of study designs.

Future research directions

In Chapter One, a research framework was described for the systematic exploration of psychological constructs and subsequent development of a translational evidence-based intervention. The earliest stages of this ‘Oxford Approach’ have been the focus of this thesis. Whilst a number of recommendations for the direction of future research have already been proposed throughout the chapter, this discussion will now focus on outlining some possibilities for the continuation of this framework.

The Oxford Approach indicates that following the identification of possible maintenance mechanisms, the next stage of development is to test their causal influence. This may be achieved in a series of experimental tests demonstrating that manipulating the proposed maintenance mechanism affects the phenomenon of interest. With the model hypothesised here, one such investigation may include allocating participants to experimental conditions with task demands designed to increase or decrease perseverative thinking in order to demonstrate that this results in significant differences in reported FSA-dissociation. Indeed, a similar study has been carried out in patients with persecutory delusions, where it was found that a worry induction or reduction procedure resulted in corresponding changes in anomalous perceptions (Freeman et al., 2013).

Increasingly, the causal interventionist approach (Kendler & Campbell, 2009) is used as a form of mechanistic manipulation in psychological research. In this paradigm, a candidate psychological mechanism is directly manipulated via delivery of a highly targeted intervention. Improvement in this mechanism acts as a manipulation check, and improvement in the target psychological construct is interpreted as evidence for causal effect. A number of possible interventionist causal tests follow from the results of this thesis. First, it may be possible to disrupt the network cluster outlined in Chapters Six and Seven (and the provisional model above) by intervening on one of the variables. The hypothesis that the targeted variable has a causal relationship to dissociation would be tested by assessing any subsequent changes in FSA-dissociation as a result of the intervention. For example, targeting fearful appraisals of dissociation using CBT techniques, or promoting tolerance of affect with third-wave CBT techniques may be feasible tests of hypotheses that cognitive appraisals and affect intolerance play a causal role in the maintenance of dissociative experiences. Second, the ambiguous directions of effect between FSA-dissociation, anxiety, and depression found in Chapter Five may be clarified in a similar manner. Finally, a study with an interventionist causal design may also be well-suited to testing the hypothesis that dissociation is a feasible treatment target for ameliorating psychotic symptoms. For example, following Waite et al. (2020), it would be of interest to assess the effect of an intervention for dissociation on psychotic symptoms in a group at ultra-high risk for psychosis. Certainly, there is a high rate of dissociative symptoms in first episode psychosis in particular (36.4%; Logan, 2019), as well as similarities between the concept of ‘made thoughts, feelings, impulses’ rated in the Comprehensive Assessment of At Risk Mental States (CAARMS; Yung et al., 2005) and the altered sense of control described in relation to dissociation in this thesis.

A potential challenge to the research proposed above may be the low clinical recognition of dissociative symptoms. Feasibly, the low awareness of dissociation

amongst clinicians may present a barrier to the recruitment of patients with psychosis and co-occurring dissociative experiences to intervention studies. However, it is also possible that many clinicians are aware of dissociative difficulties, but – given the aforementioned lack of specific training and the complexity of the field (Chapter One) – may not feel confident addressing these symptoms with their clients. Another valuable line of investigation may therefore be gauging clinical understanding of the problem of dissociation, and identifying and implementing clinician training and service-level processes aimed to improve the detection and understanding of this where required.

In conclusion, it is hoped that the work presented in this thesis will contribute to the fields of both dissociation and psychosis by providing a language with which to talk about dissociative experiences, demonstrating the significance of dissociation in psychosis, and identifying routes for the development of an evidence-based cognitive model of dissociation. It is possible that psychological interventions based on such a model would not only improve dissociation, but also reduce other mental health problems, such as psychotic experiences.

9 References

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Dissociation in Non-Affective Psychosis: A Felt Sense of Anomaly

Appendices

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Appendix 1.1:
Qualitative study Participant Information Sheet

[Begins next page]



PARTICIPANT INFORMATION SHEET

Title of Study: Understanding strange feelings and experiences.

Chief Investigator: Dr Emma Cernis
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01865 618283

Thank you for taking time to read this. This information sheet explains why this research is being done and what it would involve for you if you decide to take part. Please take time to read it and discuss with others if you wish. If anything is unclear, or you would like more information, please ask the study team.

What is the purpose of the study?

Sometimes, people have strange feelings and experiences – like feeling that they are ‘spaced out’, numb, unreal, disconnected, or ‘trapped in a bubble’. These experiences are sometimes called ‘dissociation’ or ‘depersonalisation’.

Here are some examples of people’s experiences of dissociation:

“I feel like I am in a parallel world”	“I do not seem to feel anything at all”
“My mind just goes empty”	“I have big gaps in my memory for recent things in my life”
“I can get so involved in fantasies or daydreaming that it seems to be really happening, and I lose touch with what is happening in the real world at that moment”	“I can remember something that happened before so vividly that it’s like a video playing in my head”
“I feel as if I don’t exist and am not real”	“I ‘zone out’ and don’t see or hear what’s going on around me”

We are interested in talking to people who have had these and other strange feelings and experiences to find out what people think about them.
For example: what did you think was happening? What negative or positive things did you think about the experience?

We are also interested to know what people think starts these experiences, what makes them end, and why they often return.

This information will help researchers and clinicians better understand what it is like to experience dissociation, and what other factors might be keeping it going.

Why have I been invited?

Your clinical team have heard about this study and suggested to us that it might be relevant to you.

We would like to speak to 12 people who have experience of dissociation (the kinds of strange feelings described on page 1) as well as experience of psychosis or schizophrenia.

What should I consider?

Together with a researcher, you will discuss whether the study is relevant to you.

You can participate if you:

- Are aged 16 years or older
- Have experience of psychosis or schizophrenia (e.g. your clinical team may have given you a diagnosis)
- Have had strange feelings and experiences (like the ones on page 1). (We will discuss this and ask you to fill in a questionnaire about this).

You will *not* be able to take part in this study if:

- You have only had strange feelings and experiences when taking alcohol or non-prescribed drugs.
- Your level of English would prevent you from talking easily about your experiences.
- Your diagnosis is not psychosis or schizophrenia (or something very similar).

How do I decide whether to take part?

If you are interested in taking part, we will invite you to talk to a researcher (this is a “screening visit”). The researcher will ask you some questions to check whether the study is relevant to you. You will *not* have to make your final decision about taking part in the study at this meeting.

The questions asked at the screening meeting will be about the kinds of strange feelings and experiences you have had, when you had them, and whether they are still occurring. You will also be asked to fill in a questionnaire about strange feelings and experiences. (This questionnaire is destroyed if you choose not to take part after the visit).

The screening visit will take approximately 45 minutes, but can be longer or shorter if you wish. It will take place somewhere convenient for you, such as at your home or local mental health building. You are welcome to invite a friend, family member, or member of staff to come with you, if you prefer.

At this meeting, you can ask us any questions you want to help you decide whether or not to take part, and the researcher will explain the study in detail.

What will happen to me if I decide to take part?

If the study is relevant to you, and you do want to take part, you will meet again with a researcher and you will be asked to sign a written consent form which the researcher will go through with you. This is to show that you are happy with the study details.

You will be asked to confirm some basic details about yourself, such as your age, gender, and other details. These will be written down by the researcher.

You will then talk about your experiences of strange feelings with the researcher (we are calling this conversation ‘the interview’).

The researcher will ask questions about your experiences: like ‘*what do you think started it?*’ and ‘*what goes through your mind when you notice it is happening again?*’. You do not have to answer any questions or talk about any experiences that you are uncomfortable sharing.

This study visit will last about an hour but can be longer or shorter if you prefer. The interview will last for one appointment, but we can split this into two if you would find that more helpful.

The interview can be at your house or at your local mental health team base, and on a day and time that you choose. You can let us know if you would prefer for a friend, family member, or member of staff to be at the interview with you.

We will audio-record the interview and then type it up so that we can accurately recall what has been said. We will ask you for your written permission to record the interview on the consent form before the interview.

Do I have to take part?

No. Participation is entirely voluntary. Whatever you decide, this will not affect your clinical care or legal rights.

What will happen if I don’t want to carry on with the study?

You can stop participating at any point within the two weeks after the interview if you wish, without giving a reason. If you choose to stop, data collected up to that time point will continue to be used in the study unless you ask us not to do this.

If you take part and then change your mind within two weeks after the interview, you can let us know, and we will remove your interview transcript from the study. However, we will not remove the information about your age, gender etc. from the study as this helps us to see whether the study was fair to everyone, or whether people with particular characteristics chose not to continue. You will not be identifiable from this information.

However, if you change your mind more than two weeks after the interview, it will not be possible to remove your interview transcript from the study. This is because we will have begun to split up the transcript and mix it together with other people's transcripts to look for similarities, and it will not be possible to take it back out.

Whatever you decide, this will not affect your clinical care or legal rights.

Please note that if you do not respond to our attempts to contact you to arrange an appointment, or you regularly do not attend arranged appointments, we will leave a maximum of 3 messages before assuming that you are no longer interested. We will not contact you again after this unless you ask us to.

Will I be reimbursed for taking part?

If you choose to participate, you will receive a total of £10, and we will also pay reasonable travel costs. This is so it doesn't cost you anything to take part and to thank you for your time and your interview.

What are the possible benefits of taking part?

This study may not be of direct benefit to you but it will give you the opportunity to share your views and experiences, which some people find helpful and even enjoyable. This study may help us to develop our research into strange feelings and experiences by helping researchers and clinicians to understand peoples' experiences of dissociation.

What are the potential risks of taking part?

Sometimes talking about experiences can be upsetting or uncomfortable. However, you do not have to talk about anything that you do not want to and can decide not to answer questions. You can also stop the interview at any time. If you do feel upset please let the researcher know so that we can support you and help you access appropriate support (e.g. talking to your care team).

Will my taking part in the study be kept confidential? What will happen to my data?

Your clinical team will be told you are taking part in the study and your consent form and brief note stating that you have attended the interview will be sent to them to be added to your medical record. All other information from the interview – including what you have said - will be kept confidential unless you would like your clinical team to know.

The only exception to this is where there are significant concerns about a risk to you or others. In this case good clinical practice guidelines will be followed which involves appropriate communication with your clinical team. We will let you know if we have to communicate risk to your team.

Your name will not appear on any of your information – instead we use a participant ID code. This is to keep your information anonymous and confidential. Only the research team will know which person has been given the different ID codes.

Your interview will be recorded on a password-protected recorder. It will be moved onto a secure computer within 24 hours of the interview and deleted from the recorder.

The audio recording of your interview will be transferred onto a computer and saved on a secure server, then immediately deleted from the audio recording device. Once the interview is typed up, it is called a “transcript”. Your interview transcript will be kept securely and anonymised - all identifying information will be removed e.g. your name, names of others you mention, or places that can be easily identified.

All data will be kept in a locked cabinet in a locked room at the University of Oxford Department of Psychiatry at the Warneford Hospital or, for electronic versions, on password protected secure servers. All data will be collected and stored in accordance with the Data Protection Act 1998 and secured against unauthorised access. All data will be kept in this way and then destroyed five years after the research has taken place. All contact details (e.g. your telephone number so that we can arrange appointments with you) will be deleted immediately after the study has finished, or immediately after we send you a summary of the results if you choose to receive it (see below).

Responsible members of the University of Oxford and Oxford Health NHS Foundation Trust may be given access to data for monitoring and/or audit of the study to ensure that the research is complying with applicable regulations.

What will happen to the results of this study?

This study is part of a DPhil degree (a postgraduate academic qualification) and as such will be written up and published in a DPhil thesis. Data will also be used to write up a scientific research report which will be published, and presentations of the main findings will be given at conferences. We may wish to keep quotations for future use in research and research presentations.

In all cases, data will be anonymised so that no individual can be identified. Anonymised quotes describing experiences may be used within these reports and presentations. If you do not want some of your words to be written in the study then please let the researcher know at the interview.

If you would like, we can send you a copy of the final report or a summary of the main findings. However, this is likely to be at least 12 months after you’ve done the interview. Please note that choosing to receive a summary of the findings will mean that we will have to store your contact details beyond the end of the study. They will be deleted once the summary has been sent out.

What if there is a problem?

The University of Oxford, as Sponsor, has appropriate insurance in place in the unlikely event that you suffer any harm as a direct consequence of your participation in this study.

If you wish to complain about any aspect of the way in which you have been approached or treated during the course of this study, you should contact Professor Daniel Freeman who is supervising this research (contact details below) or you may contact the University of Oxford Clinical Trials and Research Governance (CTRG) office on 01865 572224, or the head of CTRG, email: ctrig@admin.ox.ac.uk

The Patient Advisory Liaison Service (PALS) is a confidential NHS service that can provide you with support for any complaints or queries you may have regarding the care you receive as an NHS patient. PALS is unable to provide information about this research study. If you wish to contact the PALS team please call 0800 328 7971 or email PALS@oxfordhealth.nhs.uk

Who is organising and funding the study?

This study is funded by the Wellcome Trust which is a charity that funds scientific research. The study is sponsored by the University of Oxford.

Who has reviewed the study?

All studies that take part in the NHS are reviewed by an independent group of people, called a Research Ethics Committee, to protect participants' safety, rights, wellbeing and dignity. This study has been reviewed and given favourable opinion by South Central – Hampshire B Research Ethics Committee (REC Reference 18/SC/0048).

Further information and contact details:

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Thank you for considering taking part.

Appendix 1.2:

Qualitative study Informed Consent Form



Oxford Health **NHS**
NHS Foundation Trust

Study Code:

Site ID Code:

Participant identification number:

PARTICIPANT CONSENT FORM

Title of Study: Understanding strange feelings and experiences.

Chief Investigator: Dr Emma Cernis

University of Oxford Department of Psychiatry, Warneford Hospital, OX3 7JX

emma.cernis@oxford.ac.uk

01865 618283

Please initial
boxes

- 1 I confirm that I have read and understood the Participant Information Sheet dated 07.02.2018 (version 2) I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily. ☐
- 2 I understand that my participation is voluntary and that I am free to withdraw from the study at any time without giving a reason, and without my medical care or legal rights being affected. I understand that if I withdraw two weeks or more after the interview date, it will not be possible to erase my interview data. ☐
- 3 I agree to the use of audio recording during the interview, and the use of anonymised quotes in research reports and publications. I understand that it will not be possible for me to be identified by these quotes. ☐
- 4 I give permission for my clinical team to be informed that I have participated in this research, and be sent this consent form for inclusion in my medical notes. I understand that my team will not be told what I have said in the interview, as this will be kept confidential unless the researcher has significant concerns about risk to myself or others, in which case they will make appropriate contact with my clinical team ☐
- 7 All clinical research may occasionally be audited to ensure that they are carried out to the best standards. I understand this means that sections of my data collected during the study may be looked at by individuals from the University of Oxford, or from regulatory authorities and from the NHS Trust where it is relevant to my taking part in this research. I give permission for these individuals to have access to my records related to the study. ☐
- 8 I agree to take part in this study. ☐

OPTION: I would like a written summary of the main results of the study once the research is completed. I understand that this will require my name and address to be stored securely by the research team in order to send me the summary. My details will be deleted once the summary has been sent to me.

Circle: Yes / No

Name of participant: _____ Date: _____

Signature: _____

Name of researcher taking consent: _____ Date: _____

Signature: _____

One copy for patient, one copy for research site, and original to be sent to team for medical notes.

Informed Consent Form

Understanding Strange Feelings and Experiences: A qualitative study

Dr Emma Cernis

Version: 1 13.12.2017

IRAS Project number: 236517

REC Reference number: 18/SC/0048

Page: 1 of 1

Appendix 1.3: **Qualitative study Topic Guide**

Topic Guide: Understanding Strange Feelings and Experiences

Wherever <dissociation> is written, the interviewer will insert the participant's language for describing dissociation. For example, if an individual talks about 'spacing out', the interviewer would ask "tell me about your experiences of spacing out".

Please note that in accordance with good qualitative interview practice, the topic guide will be tailored to particular individuals. This will include mirroring the participant's language, and encouraging story-telling via supportive prompts. As is common within interview studies, the interview process will be reviewed after an initial period.

The first few interviews (approx. 4) will be reviewed to discover early themes emerging from the data and used to adjust this topic guide to increase the accuracy and acceptability of the questions, as well as the breadth of data gained.

Topic 1: Experiences of Dissociation

Thank you for coming today – I really appreciate you taking the time to meet with me. I am interested in your experiences of <dissociation>.

For the first part of the interview, could you tell me more about this? In the second part, I will have some questions to help me get some more detail about what you've told me. You don't have to answer any questions that you don't want to. What's important to me is to really understand your experiences – so nothing is irrelevant. I will try and listen as much as possible and not interrupt you, but do ask me any questions you might have as we go along.

Please tell me about your experience(s) of <dissociation>.

Topic 2: Impact of the Dissociative Experiences

What was it like to experience <dissociation>?

What impact did it have on you?

Has this changed at all?

Topic 3: Relevant Factors

What do you think started the <dissociation>? / What brought on the <dissociation>?

What things kept it going?

Was there anything that helped bring it to a close?

Do you have any guesses about why it happened more than once?

Topic 4: Cognitive Appraisals*

What do you remember thinking about <dissociation> while it was happening? / What goes through your mind when <dissociation> happens?

What goes through your mind when you first realise that <dissociation> is happening again?

What do you think about your <dissociation>?

Do you have any beliefs or opinions about <dissociation> that you can share with me?

Topic 5: Ending the Session

Is there anything I haven't asked / we haven't discussed about <dissociation> that you think is important for psychologists and researchers to know?

Is there something you'd like to talk about that we haven't talked about?

* Note that the interviewer should determine which thoughts / opinions / cognitive appraisals link with which specific symptoms of dissociation, since there is a large variation in dissociative experience, and these may elicit differing appraisals.

Appendix 2.1:

Systematic review (Table 2) references

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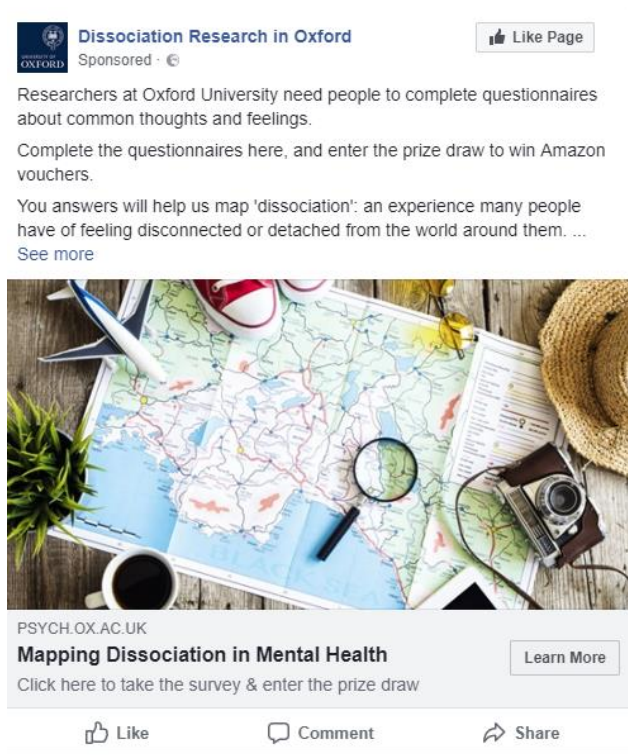
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Appendix 2.2:

Facebook Ads for *Mapping Dissociation in Mental Health*



Text:

Researchers at Oxford University need people to complete questionnaires about common thoughts and feelings.

Complete the questionnaires here, and enter the prize draw to win Amazon vouchers.

Your answers will help us map 'dissociation': an experience many people have of feeling disconnected or detached from the world around them.

Mapping Dissociation in Mental Health has received approval from the University of Oxford Central Ethics Committee (REF: R57488/RE001)

Appendix 2.3

***Mapping Dissociation in Mental Health* Participant Information Sheet & consent statements**



Oxford University Department of Psychiatry
Warneford Hospital
Oxford
OX3 7JX

Online Survey Consent Form

You are being invited to participate in a research study titled **Mapping Dissociation in Mental Health**.

This study is being carried out by Dr Emma Cernis at the University of Oxford, UK, who is a Research Clinical Psychologist and doctoral research student. The research is funded by a Wellcome Trust Clinical Research Fellowship.

The research will be written up as part of a thesis, and therefore deposited in print and online in the University archives and possibly published as original research, to facilitate its use in future research. It will also be submitted for publication in a peer-reviewed scientific journal. No personally identifiable information will be included in the research.

Study Purpose

The purpose of this research study is to find out more about strange feelings and experiences such as 'spacing out', feeling 'unreal', or feeling detached from the world around you. Experiences like these are often called "dissociation", "depersonalisation" or "derealisation".

The study aims to find out more about how dissociative experiences relate to other common experiences (e.g. low mood, anxiety, and poor sleep). It will also help us develop a new questionnaire to measure experiences of feeling strange or dissociated.

If you agree to take part in this study, you will be asked to complete an online survey. This survey will ask about a range of different experiences and will take approximately 35 minutes to complete. It is important to complete as many of the questions as possible, although you may skip questions if necessary.

Risks & Benefits

You may not directly personally benefit from this research; however, we hope that your participation in the study will help improve our current ways of measuring dissociative experiences, which will help people experiencing these feelings in therapy, and help improve research in this area.

We believe there are no known risks associated with this research study; however, as with any online related activity the risk of a breach of confidentiality is always possible. To the best of our ability your answers in this study will remain confidential. We will minimize any risks by anonymising the data you provide and storing it securely under encryption.

This study has been reviewed by, and received ethics clearance through, the University of Oxford Central University Research Ethics Committee (R57488/RE001).

Your participation in this study is completely voluntary and you can withdraw at any time, without penalty, and without needing to supply a reason.

Prize Draw

As a thank you for your time completing this survey, you will be offered the chance to enter a prize draw to win one of 21 Amazon vouchers. One person will win £100, five will win £50, and 15 people will win £20 in Amazon vouchers.

To enter the draw, please supply your email at the end of the survey. Please note that this email will be stored separately from your answers and therefore your responses will remain anonymous. Email addresses supplied for the purpose of the prize draw will be deleted once the winner is chosen and the survey closed.

Aftercare

Unfortunately, we will not be able to follow up with you after this study. If you feel upset after completing the study, or find that some questions or aspects of the study triggered distress, talking with a trained support worker (see below), or qualified clinician (e.g. your GP) may help.

If you feel you would like assistance please contact your GP, The Samaritans on 116 123 (UK or ROI) (www.samaritans.org), Mind Infoline on 0300 123 3393 (www.mind.org.uk), or a mental health support organisation local to you.

You can also self-refer to your local IAPT (Improving Access to Psychological Therapies) service. Find your local service at: [www.nhs.uk/Service-Search/Psychological-therapies-\(IAPT\)/LocationSearch/10008](http://www.nhs.uk/Service-Search/Psychological-therapies-(IAPT)/LocationSearch/10008)

In the case of an emergency please call 999 or your local emergency number.

These details will be shown again at the end of the survey.

Future Research

You will be asked whether you would like to be emailed about similar research we run in the future. This is entirely voluntary. If supplied, your email address will be stored securely and deleted at your request, or at the end of the researcher's contract (likely to be three years from March 2018).

What happens to the research data provided?

All answers provided via the online survey will be anonymised. Data provided is held confidentially and will be stored in an anonymous format on an encrypted, password-protected storage system. Only the researcher (Dr Emma Cernis) and supervisors (Professors Daniel Freeman and Anke Ehlers) will have access to this data. IP addresses will not be stored.

Email addresses provided for the prize draw or future contact will be stored separately from the survey responses and will never be passed on to third parties. Email addresses for the prize draw will be deleted as soon as the study is complete and the draw has been conducted. Email addresses for future contact will be deleted in 2020, unless you email emma.cernis@psych.ox.ac.uk to request your details to be deleted.

At the end of the project, this data will be kept for ten years after publication before being deleted.

Data Protection

The University of Oxford is the data controller with respect to your personal data, and as such will determine how your personal data is used in the study. The University will process your personal data for the purpose of the research outlined above. Research is a task that we perform in the public interest.

Further information about your rights with respect to your personal data is available from <http://www.admin.ox.ac.uk/councilsec/compliance/gdpr/individualrights/>.

What if there is a problem?

If you have a concern about any aspect of this project, please speak to the relevant researcher (Dr Emma Cernis, emma.cernis@psych.ox.ac.uk), who will do their best to answer your query. The researcher should acknowledge your concern within 10 working days and give you an indication of how they intend to deal with it.

If you remain unhappy or wish to make a formal complaint, please contact the chair of the Research Ethics Committee at the University of Oxford (Chair, Medical Sciences Inter-Divisional Research Ethics Committee;
Email: ethics@medsci.ox.ac.uk; Address: Research Services, University of Oxford, Wellington Square, Oxford OX1 2JD). The chair will seek to resolve the matter in a reasonably expeditious manner.

Consent

Before you can proceed to the survey, please confirm the following by checking the boxes. If you have decided not to take part, clicking “I do not give consent” will exit the survey.

- ☐ I confirm that I have read the participant information above
- ☐ I confirm that I have had the opportunity to contact the researcher to ask questions, and have received satisfactory answers to the questions
- ☐ I confirm that I understand that I may withdraw from the study without penalty at any time by advising the researchers of this decision
- ☐ I confirm that I understand how to raise a concern and/or make a complaint about this research
- ☐ I confirm that I understand who will have access to the data I provide for this research, how the data will be stored and what will happen to the data at the end of the project.
- ☐ I consent to take part in this study.

- ☐ [I do not give consent] *(This will exit the survey)*

Appendix 2.4:

Full list of 104 items generated for measure development

No	Item	FSA Type	Domain
1	I feel separated from the world around me.	Disconnection	World
2	It feels like my body has a mind of its own.	Automaticity	Physiology
3	The things happening around me seem unreal to me - like a dream or a movie.	Unreality	Perception
4	I feel disconnected from my thoughts or memories.	Disconnection	Mind
5	I don't recognise some of the emotions I feel.	Unfamiliarity	Affect
6	One or more of my senses seem strange, distorted or odd to me.	Unfamiliarity	Perception
7	I feel disconnected from the sensations in my body.	Disconnection	Physiology
8	When I do something (e.g. walking, speaking), it feels unreal.	Unreality	Behaviour
9	My mind goes completely empty.	Absence	Mind
10	I don't recognise myself.	Unfamiliarity	Identity
11	My actions (e.g. walking, speaking) feel like they are out of my control.	Automaticity	Behaviour
12	I feel like I'm watching things from outside my body.	Disconnection	Perception
13	I don't fully experience emotion.	Disconnection	Affect
14	My thoughts don't seem real.	Unreality	Mind
15	I can't control my senses.	Automaticity	Perception
16	I have emotions that don't feel like they are mine.	Unfamiliarity	Affect
17	My body (or part(s) of it), appears strange, distorted or odd to me.	Unreality	Physiology
18	Other people seem unreal.	Unreality	Others
19	My own reflection seems unfamiliar to me.	Unfamiliarity	Identity
20	People I know seem unfamiliar.	Unfamiliarity	Others
21	My emotions don't seem real.	Unreality	Affect
22	Places that I know seem unfamiliar.	Unfamiliarity	World
23	Part(s) of my personality feels unfamiliar.	Unfamiliarity	Identity
24	I am not fully connected to my body (or part(s) of it).	Disconnection	Physiology
25	My sense of time is odd or distorted.	Unfamiliarity	Perception
26	My body feels like it's not under my control.	Automaticity	Physiology
27	I feel like someone else.	Unfamiliarity	Identity
28	My body (or part(s) of it) doesn't feel real.	Unreality	Physiology
29	I feel disconnected from other people.	Disconnection	Others
30	My memory doesn't work in the right way.	Automaticity	Mind
31	I feel detached from my emotions.	Disconnection	Affect
32	Things around me seem to behave in a strange way.	Unreality	Perception
33	I don't recognise my surroundings.	Unfamiliarity	World
34	When I speak, my voice sounds unfamiliar or odd to me.	Unfamiliarity	Perception
35	Some of the things in my head don't seem to be mine.	Unfamiliarity	Mind
36	My actions (e.g. walking, speaking) feel like they are happening automatically.	Automaticity	Behaviour
37	My body (or part(s) of it) feels unreal or strange.	Unreality	Physiology
38	People around me seem different or altered.	Unfamiliarity	Others
39	I feel disconnected from who I really am.	Disconnection	Identity

40	My thoughts or memories pop into my mind when I don't want them to.	Automaticity	Mind
41	Emotions suddenly take over me.	Automaticity	Affect
42	The world around me seems odd or altered.	Unfamiliarity	World
43	I feel as if I'm experiencing life from very far away.	Disconnection	Perception
44	I feel disconnected from the world around me.	Disconnection	World
45	My personality doesn't feel real.	Unreality	Identity
46	Things I've done many times before seem new or unfamiliar.	Unfamiliarity	Behaviour
47	I feel detached from my physical body (or part(s) of it).	Disconnection	Physiology
48	My body (or part(s) of it) feels like it doesn't belong to me.	Unfamiliarity	Physiology
49	Things seem strange.	None	FSA
50	I feel odd.	None	FSA
51	Things seem weird.	None	FSA
52	I feel surreal.	None	FSA
53	My experiences seem strange.	None	FSA
54	I experience things (myself / the world) unusually, compared to other people.	None	FSA
55	I feel detached from what I'm doing.	Disconnection	Behaviour
56	My surroundings seem unreal.	Unreality	World
57	My body (or part(s) of it) feels unfamiliar.	Unfamiliarity	Physiology
58	My thoughts behave strangely.	Automaticity	Mind
59	I feel detached from the people I'm close to.	Disconnection	Others
60	I feel like I don't exist.	Unreality	Identity
61	I feel detached from my own mind.	Disconnection	Mind
62	I don't feel my sense of self is under my control.	Automaticity	Identity
63	I experience thoughts or memories that are unfamiliar to me.	Unfamiliarity	Mind
64	I feel like a stranger to myself.	Automaticity	Identity
65	My memories don't seem real.	Unreality	Mind
66	My body feels numb.	Absence	Physiology
67	I act like someone else without meaning to.	Automaticity	Identity
68	I feel like I don't have a personality.	Absence	Identity
69	Familiar sights, smells (etc.) feel unfamiliar to me.	Unfamiliarity	Perception
70	When something very bad or good happens, I find myself so stunned that I'm unable (or slow) to respond	Absence	Behaviour
71	I'm absorbed in my own world and don't notice what is happening around me.	Absence	World
72	I feel as though other people stop existing when I can't see them.	Absence	Others
73	Memories of important events in my life seem unfamiliar, or like they belong to someone else.	Unfamiliarity	Mind
74	My emotions don't make sense.	Unreality	Affect
75	Parts of my body don't respond when I need them to.	Automaticity	Physiology
76	My personality changes seemingly at random.	Automaticity	Identity
77	I feel like I don't have an identity.	Absence	Identity
78	I feel like I'm on automatic pilot.	Automaticity	Behaviour
79	I freeze, unable to do anything.	Absence	Behaviour
80	Things around me appear faint or far away.	Absence	Perception
81	I don't notice how much time passes.	Absence	Perception

82	I find myself in a place and don't know how I got there.	Absence	World
83	I find myself drifting off into my own world when I'm with others.	Absence	Others
84	I can't access my thoughts or memories at will.	Automaticity	Mind
85	I feel like an alien or a ghost.	Unreality	Identity
86	My actions feel fake or unreal.	Unreality	Behaviour
87	The world around me seems unreal.	Unreality	World
88	I feel that I'm not part of the world around me.	Disconnection	World
89	I feel that other people live in a separate world.	Disconnection	Others
90	I lose track of my surroundings.	Absence	World
91	My emotional reactions don't fit with the situation I'm in.	Automaticity	Affect
92	I feel like I'm more than one person.	Unfamiliarity	Identity
93	I feel like I don't exist.	Absence	Identity
94	I feel disconnected from my own actions.	Disconnection	Behaviour
95	Sounds appear to come from far away.	Absence	Perception
96	The world seems like it is fake.	Unreality	World
97	I feel like other people aren't real.	Unreality	Others
98	I feel disconnected from my emotions.	Disconnection	Affect
99	I don't feel pain or other bodily sensations.	Absence	Physiology
100	I feel like I'm not a real person.	Unreality	Identity
101	I feel detached from my personality.	Disconnection	Identity
102	My sense of sight, touch, hearing (etc.) don't respond to me.	Automaticity	Perception
103	I feel like the world isn't real outside of what I'm doing at the moment.	Unfamiliarity	World
104	I can't feel emotions.	Absence	Affect

Appendix 2.5: **The Černis Felt Sense of Anomaly (ČEFSA) Scale**

Please read the following items and rate how often you have experienced these over the past **TWO WEEKS** using the following rating:

0	1	2	3	4
Never	Rarely	Sometimes	Often	Always

Please note that this should NOT be whilst under the influence of drugs, alcohol or legal highs.

		Never	Rarely	Sometimes	Often	Always
1.	I feel like a stranger to myself.	0	1	2	3	4
2.	I feel detached from my physical body (or parts of it).	0	1	2	3	4
3.	Places that I know seem unfamiliar.	0	1	2	3	4
4.	I don't fully experience emotions.	0	1	2	3	4
5.	I feel disconnected from the world around me.	0	1	2	3	4
6.	I'm absorbed in my own world and don't notice what is happening around me.	0	1	2	3	4
7.	I feel like other people aren't real.	0	1	2	3	4
8.	My personality changes seemingly at random.	0	1	2	3	4
9.	My body (or parts of it) feels like it doesn't belong to me.	0	1	2	3	4
10.	Familiar sights, smells (etc.) feel unfamiliar to me.	0	1	2	3	4
11.	I can't feel emotions	0	1	2	3	4
12.	I feel disconnected from other people.	0	1	2	3	4
13.	I find myself drifting off into my own world when I'm with others.	0	1	2	3	4
14.	The world seems like it is fake.	0	1	2	3	4
15.	I feel like I don't have a personality	0	1	2	3	4
16.	My body (or parts of it) feels unreal or strange.	0	1	2	3	4
17.	People around me seem different or altered.	0	1	2	3	4
18.	I feel detached from my emotions.	0	1	2	3	4
19.	I feel as if I'm experiencing life from very far away.	0	1	2	3	4

		Never	Rarely	Sometimes	Often	Always
20.	I don't notice how much time passes.	0	1	2	3	4
21.	The world around me seems unreal.	0	1	2	3	4
22.	I act like someone else without meaning to.	0	1	2	3	4
23.	My body feels like it's not under my control.	0	1	2	3	4
24.	People I know seem unfamiliar.	0	1	2	3	4
25.	I feel disconnected from my emotions	0	1	2	3	4
26.	The things happening around me seem unreal to me – like a dream or a movie.	0	1	2	3	4
27.	I lose track of my surroundings.	0	1	2	3	4
28.	I feel as though other people stop existing when I can't see them.	0	1	2	3	4
29.	I feel like I'm more than one person.	0	1	2	3	4
30.	My body feels numb.	0	1	2	3	4
31.	Things I've done many times before seem new or unfamiliar.	0	1	2	3	4
32.	My emotions don't seem real.	0	1	2	3	4
33.	I feel detached from what I'm doing.	0	1	2	3	4
34.	I feel like an alien or a ghost.	0	1	2	3	4
35.	I freeze, unable to do anything.	0	1	2	3	4

Scoring: total score. There are no reverse items.

Factor	Item numbers	Total
Anomalous Experience of the Self	1 + 8 + 15 + 22 + 29	/20
Anomalous Experience of the Body	2 + 9 + 16 + 23 + 30	/20
Altered Sense of Familiarity	3 + 10 + 17 + 24 + 31	/20
Anomalous Experience of Emotion	4 + 11 + 18 + 25 + 32	/20
Altered Sense of Connection	5 + 12 + 19 + 26 + 33	/20
Altered Sense of Agency	6 + 13 + 20 + 27 + 35	/20
Altered Sense of Reality	7 + 14 + 21 + 28 + 34	/20
Grand total		/140

Appendix 2.6:

Global Felt Sense of Anomaly Scale

Please read the following items and rate how often you have experienced these over the past **TWO WEEKS** using the following rating:

0	1	2	3	4
Never	Rarely	Sometimes	Often	Always

Please note that this should NOT be whilst under the influence of drugs, alcohol or legal highs.

		Never	Rarely	Sometimes	Often	Always
i	Things seem strange.	0	1	2	3	4
ii	I feel odd.	0	1	2	3	4
iii	Things seem weird.	0	1	2	3	4
iv	I feel surreal.	0	1	2	3	4
v	My experiences seem peculiar.	0	1	2	3	4

Scoring: total score. There are no reverse items.

Total: /20

Appendix 2.7:

***Exploring Unusual Feelings* Participant Information Sheet**

[Begins next page]



<Title> <Full Name> (Principal Investigator in <location>)

Tel: <XXXXXXXX>

Email: <XXXXXXXX>

Dr Emma Černis (Chief Investigator in Oxford)

Tel: 01865 618283

Email: emma.cernis@psych.ox.ac.uk

PARTICIPANT INFORMATION SHEET

Exploring Unusual Feelings

You are being invited to take part in a research study. This information sheet explains why the research is being done and what it would involve for you. Please ask us if anything is unclear or you would like further information. It may also be helpful to talk to someone else about whether you would like to take part.

What is the purpose of the study?

The aim of the study is to learn more about experiences that are sometimes called 'depersonalisation' or 'dissociation'. These are strange feelings and experiences, which can make people feel numb, unreal, detached, or 'spaced out'.

We are interested in knowing if experiences like these are related to other experiences, like having worries about others trying to harm you, or hearing or seeing things that other people cannot see or hear. We are also interested to find out whether these experiences are related to the way people experience emotions, the way people think, and how capable and confident people feel.

Who can take part in the study?

You have been invited because your clinical team have been informed about this study and think that it might be relevant to you. We hope that a thousand patients across NHS England will take part in this study. Adults attending Early Intervention services, or community mental health teams, or on psychiatric wards are being approached to participate in this study. Patients taking part will have had a range of experiences, such as feeling others are against them, thinking that they have been watched or followed, heard voices, thought they had very unusual abilities, or had very muddled thinking.

Do I have to take part?

No: it is up to you to decide whether you would like to take part or not.

You are free not to take part or to withdraw at any time, without giving a reason. This will not affect your clinical care.

Consent Form
Exploring Unusual Feelings: A Questionnaire Study
Dr Emma Černis

Version/Date: 1: 12.06.19
IRAS Project ID: 266177
Ethics Ref. 19/LO/1394
Page: 1 of 1

What will happen if I decide to take part?

Firstly, we will describe the study, answer any queries you may have and go through this information sheet with you, which is then given to you. If you wish to participate, we will then

also give you a consent form to sign. You will be asked to complete 10 questionnaires, which will take about 30 minutes in total. You can complete the questionnaires during this research meeting or you may take them home and return them in the next fortnight via a stamped addressed envelope that we will provide. Please note that the researcher(s) may wish to contact you to remind you to return the questionnaires if you choose to take them home.

The questionnaires ask about: strange feelings and experiences (the experience of them, possible thoughts about them, and reactions to them); fears about other people; hearing or seeing things that other people do not; how capable you generally feel; how you typically think about problems; what you think about negative emotions; how easy you find it to describe emotions; and your levels of happiness. You do not need to have any of the problems listed above to complete the questionnaires, as we want a wide range of people to take part.

Are there any possible disadvantages or risks from taking part?

We do not anticipate that there are any risks involved in participating in the study. However, if you were to feel upset about your participation in this research study then you would be welcome to speak to <Principal Investigator> (please see contact details below). If the questionnaires cause distress, please stop and you can discuss any issues with your clinical team. It may be that these questionnaires highlight problems that you have not spoken to your clinical team about before. You are welcome to speak to your clinical team about these, or request for the research assistant to do this on your behalf, if you would prefer.

What are the possible benefits of taking part?

We do not anticipate that there will be any direct benefits from taking part. However, some people find the questionnaires interesting and help them to see that other people have had similar experiences to you. We hope that the information learned through this study will help researchers and mental health staff to develop new talking therapies in future.

Will my taking part in the study be kept confidential?

Your clinical team will be told that you have taken part in the study. All other information will be kept confidential unless you would like your clinical team to know or would like to discuss the questionnaires with them yourself. Responsible members of The University of Oxford and the relevant NHS Trust involved in the research may be given access to data for monitoring and/or audit of the study to ensure that the research is complying with applicable regulations.

What will happen to my data?

Data protection regulation requires that we state the legal basis for processing information about you. In the case of research, this is 'a task in the public interest.' The University of Oxford is the data controller and is responsible for looking after your information and using it properly.

The University of Oxford will be using information from you to undertake this study but will not receive any identifying information about you from <NHS Trust site>. <NHS Trust site> will collect information from you and your medical records for this research study in accordance with our instructions and will use the minimum personally-identifiable information possible.

<NHS Trust site> will keep your name and contact details confidential and will not pass this information to the University of Oxford. <NHS Trust site> will use this information as needed, to contact you about the research study, and make sure that relevant information about the study is recorded for your care, and to oversee the quality of the study. The University of Oxford will only receive research information without any identifying information. Your name will not appear on any of the questionnaires that you complete. The anonymous questionnaires will be scanned and sent to the University of Oxford by secure email. At the end of the study, the original anonymous paper copies of the questionnaires will be kept for approximately 5 years in the relevant Trust in a locked cabinet in a locked room. The people who analyse the information will not be able to identify you and will not be able to find out your name or contact details.

<NHS Trust site> will keep identifiable information about you for this research study for 3 months after the study has finished. This excludes research documents with personal information, such as consent forms, which will be held securely at <NHS Trust site> for 5 years after the publication of the study results and in your medical notes in accordance with local policy.

Data protection regulation provides you with control over your personal data and how it is used. When you agree to your information being used in research, however, some of those rights may be limited in order for the research to be reliable and accurate. Further information about your rights with respect to your personal data is available at <http://www.admin.ox.ac.uk/councilsec/compliance/gdpr/individualrights/>

You can find out more about how we use your information by contacting Dr Emma Černis (see contact details below).

Will I be reimbursed for taking part?

You will be reimbursed £5 for filling in the questionnaires.

What will happen if I don't want to carry on with the study?

Participation is voluntary, and you may change your mind as you complete the questionnaires (or before). Withdrawal will not affect the care you receive from the NHS. Once the questionnaires have been completed, you will have a fortnight to tell us that they cannot be used in the research (since the anonymised data enters the main dataset at this point and can no longer be identified).

What will happen to the results of this study?

The data collected during the study will be written up looking at the total information across all patients, and no individual is identified. The results will be presented in a scientific paper and in conferences. Results from this study will also be included in the CI's doctoral thesis. We will make a summary of the results available for participants at the conclusion of the study. If you wish to receive them, you may request them from your local team.

What if there is a problem?

The University of Oxford, as Sponsor, has appropriate insurance in place in the unlikely event that you suffer any harm as a direct consequence of your participation in this study.

If you wish to complain about any aspect of the way in which you have been approached or

treated, or how your information is handled during the course of this study, you should contact Dr Emma Černis (contact details below) or you may contact the University of Oxford Clinical Trials and Research Governance (CTRG) office on 01865 616480, or the head of CTRG, email ctrig@admin.ox.ac.uk.

The Patient Advisory Liaison Service (PALS) is a confidential NHS service that can provide you with support for any complaints or queries you may have regarding the care you receive as an NHS patient. PALS is unable to provide information about this research study. If you wish to contact the PALS team please contact <insert relevant NHS site phone number and email from the PALS website <http://www.ouh.nhs.uk/patient-guide/pals.aspx>>.

How have patients and the public been involved in this study?

In designing this study, we have taken into account patient and service user opinions on previous similar studies.

Who is organising and funding the study?

The study is organised by Dr Emma Černis at the University of Oxford. This study is funded by the Wellcome Trust which is a charity that funds scientific research. The study is sponsored by the University of Oxford.

Who has reviewed the study?

All research in the NHS is looked at by an independent group of people, called a Research Ethics Committee, to protect participants' interests. This study has been reviewed and given favourable opinion by London (City & East) Research Ethics Committee.

Study team contact details:

<Title Full Name> – Local Principal Investigator

<Job Title>

<Office address>

Tel: <XXXX XXXXXX>

Email: <xxxxxxxxx@xxxxxxxxx>

Dr Emma Černis – Study Lead

Wellcome Trust Clinical Doctoral Fellow and Clinical Psychologist

Department of Psychiatry, Oxford University, Warneford Hospital, Oxford, OX3 7JX.

Tel: 01865 618283

Email: emma.cernis@psych.ox.ac.uk

Professor Daniel Freeman

NIHR Research Professor and Consultant Clinical Psychologist

Department of Psychiatry, Oxford University, Warneford Hospital, Oxford, OX3 7JX.

Tel: 01865 226490

Email: daniel.freeman@psych.ox.ac.uk

Professor Anke Ehlers

Professor of Experimental Psychopathology and Wellcome Trust Principal Research Fellow

Oxford Centre for Anxiety Disorders and Trauma, Oxford University, The Old Rectory,
Paradise Square, Oxford, OX1 1TW.

Email: anke.ehlers@psy.ox.ac.uk

Thank you for considering taking part.

Consent Form

Exploring Unusual Feelings: A Questionnaire Study
Dr Emma Cernis

Version/Date: 1: 12.06.19

IRAS Project ID: 266177

Ethics Ref: 19/LO/1394

Page: 4 of 4

Appendix 2.8:

Exploring Unusual Feelings Informed Consent Form



< local NHS Trust logo >

Site ID Code:

Participant number:

PARTICIPANT CONSENT FORM

Title of Study: Exploring Unusual Feelings.

Chief Investigator: Dr Emma Cernis

University of Oxford Department of Psychiatry, Warneford Hospital, OX3 7JX
emma.cernis@psych.ox.ac.uk
01865 618283

Please initial
boxes

- 1 I confirm that I have read and understood the Participant Information Sheet dated 12.08.19 (Version 1) I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.
- 2 I understand that my participation is voluntary and that I am free to withdraw from the study at any time without giving a reason, and without my medical care or legal rights being affected.
- 3 I am aware of the procedure for raising a concern or making a complaint.
- 4 All clinical research may occasionally be audited to ensure that they are carried out to the best standards. I understand this means that sections of my medical notes and data collected during the study may be looked at by individuals from the University of Oxford, or from regulatory authorities and from the NHS Trust where it is relevant to my taking part in this research. I give permission for these individuals to have access to my records related to the study.
- 5 I agree to take part in this study.

Name of participant: _____

Date: _____

Signature: _____

Name of researcher taking consent: _____

Date: _____

Signature: _____

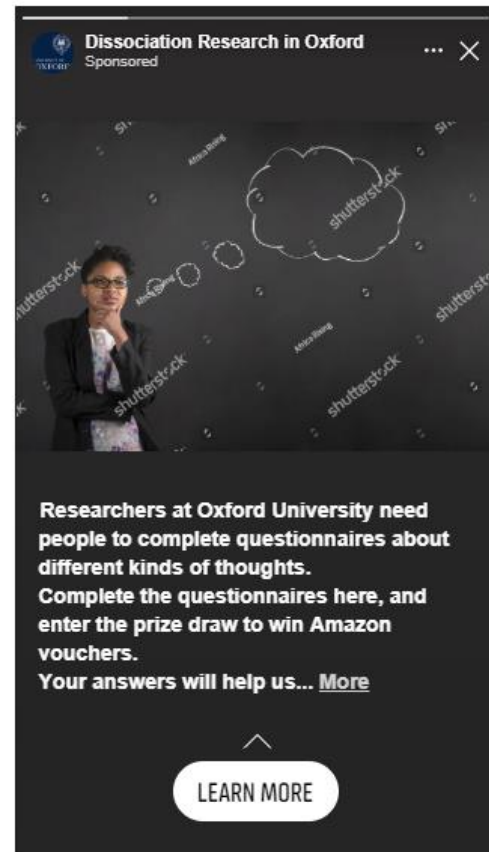
*1 copy for participant; 1 copy for researcher site file; 1 copy for medical notes.

Informed Consent Form
Exploring Unusual Feelings: A Questionnaire Study
Dr Emma Cernis

Version: 1 10.05.2019
IRAS Project number: 288177
REC Reference number: 19/LO/1394
Page: 1 of 1

Appendix 3.1: Facebook Ads for *Understanding Dissociative Experiences*

Part 1 – Measure development (Chapter Four)



Text:

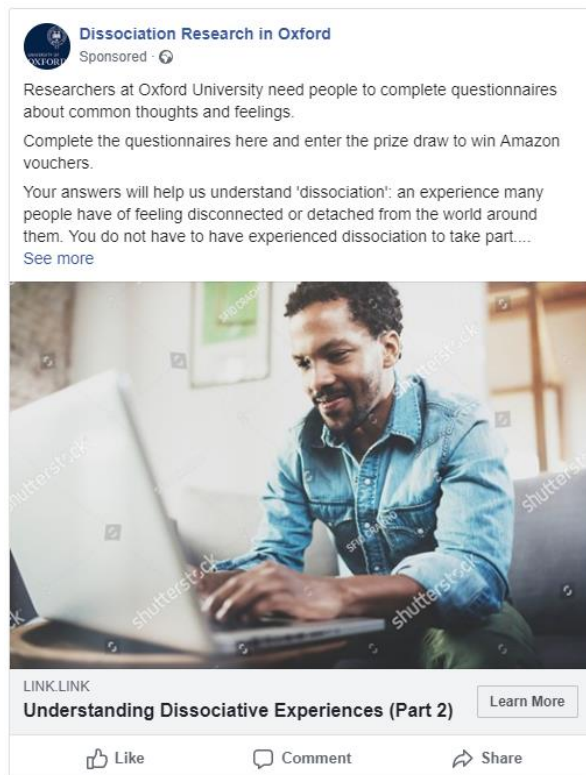
Researchers at Oxford University Department of Psychiatry need people to complete questionnaires about different kinds of thoughts.

Complete the questionnaires here, and enter the prize draw to win Amazon vouchers.

Your answers will help us understand 'dissociation': an experience many people have of feeling disconnected or detached from the world around them. You do not have to have experienced dissociation to take part.

Understanding Dissociative Experiences has received approval from the University of Oxford Central University Research Ethics Committee (CUREC) (REF: R61315/RE001)

Part 2 – Network analyses (Chapter Six)



Text:

Researchers at Oxford University Department of Psychiatry need people to complete questionnaires about common thoughts and feelings.

Complete the questionnaires here and enter the prize draw to win Amazon vouchers.

Your answers will help us understand 'dissociation': an experience many people have of feeling disconnected or detached from the world around them. You do not have to have experienced dissociation to take part.

Understanding Dissociative Experiences has received approval from the University of Oxford Central University Research Ethics Committee (CUREC) (REF: R61315/RE002)

Appendix 3.2

Understanding Dissociative Experiences Participant Information Sheets & consent statements



**Oxford University Department of Psychiatry
Warneford Hospital
Oxford
OX3 7JX**

Understanding Dissociative Experiences – Phase 1

This study is being carried out by Dr Emma Cernis at the University of Oxford, UK, who is a Research Clinical Psychologist and DPhil student. The research is funded by a Wellcome Trust Clinical Research Fellowship awarded to Dr Emma Cernis.

This study has been reviewed by, and received ethics clearance through, the University of Oxford Central University Research Ethics Committee (REF: R61315/RE001).

Study Purpose

The purpose of this research study is to find out more about experiences that are often called “dissociation”, “depersonalisation” or “derealisation”. This is where people describe feeling ‘strange’ or ‘disconnected’ – they might feel like they are ‘spacing out’, feel ‘unreal’, or feel emotionally detached from the world. These experiences can become severe and upsetting, but they are currently not well understood by researchers or clinicians.

You do not have to have had any experience of dissociation to participate in the study. We would really like as many people as possible to participate, as all experiences are equally helpful to our research.

This study aims to find out more about how people think when they notice that they feel strange, detached or different to usual. Data from this study will help us develop a new questionnaire to measure these kinds of thoughts, which will be helpful in future research studies about dissociation.

If you agree to take part in the research, you will be asked to complete an online survey. This survey will contain questions about thoughts people might have when feeling strange, low, or anxious. The whole survey will take approximately 20 minutes to complete. It is important to complete as many of the questions as possible, although you may skip questions if necessary.

Do I have to take part?

Please note that participation is voluntary. You may withdraw at any point during the questionnaire for any reason just by closing the browser. If you have any questions about the study after reading this information, please contact Dr Emma Cernis by emailing dissociation@psych.ox.ac.uk.

Prize Draw

As a thank you for your time completing this survey, you will be offered the chance to enter a prize draw to win one of two £50 Amazon vouchers.

To enter the draw, please supply your email at the end of the survey. Please note that this email will be stored separately from your answers and therefore your responses will remain anonymous. Email addresses supplied for the purpose of the prize draw will be deleted once the winner is chosen and the survey closed.

Future Research

At the end of the survey, you will be asked whether you would like to be emailed about similar research we run in the future. This is entirely voluntary. If supplied, your email address will be stored securely, separately from your answers, and deleted at your request (see below), or at the end of the researcher's contract (likely to be end of year 2020).

Aftercare

Unfortunately, we will not be able to follow up with you after this study. In the event that you feel upset after completing the study, or find that some questions or aspects of the study triggered distress, talking with a trained support worker (see below), or qualified clinician (e.g. your GP) may help.

If you feel you would like assistance please contact your GP, The Samaritans on 116 123 (UK or ROI) (www.samaritans.org), Mind Infoline on 0300 123 3393 (www.mind.org.uk), or a mental health support organisation local to you.

You can also self-refer to your local IAPT (Improving Access to Psychological Therapies) service. Find your local service at: [www.nhs.uk/Service-Search/Psychological-therapies-\(IAPT\)/LocationSearch/10008](http://www.nhs.uk/Service-Search/Psychological-therapies-(IAPT)/LocationSearch/10008)

In the case of an emergency please call 999 or your local emergency number.

These details will be shown again at the end of the survey.

How will my data be used?

Your answers will be completely anonymous, and we will use all reasonable endeavours to keep them confidential. Your data will be stored in a password-

protected file on an encrypted computer on the University of Oxford network. Your IP address will not be stored.

The research will be written up as part of a thesis, and therefore deposited in print and online in the University archives. It will also be published as original research in a peer-reviewed scientific journal, to facilitate future research and clinical care. No personally identifiable information will be included in any of these publications.

Although we encourage participants to answer as many of the questions as they can, all questions are optional or include a 'prefer not to say' option.

At the end of the project, this data will be kept for ten years after publication before being deleted.

Email addresses provided for the prize draw or future contact will be stored separately from the survey responses and will never be passed on to third parties. Email addresses for the prize draw will be deleted as soon as the study is complete and the draw has been conducted. Email addresses for future contact will be deleted in 2020, unless you email dissociation@psych.ox.ac.uk to request your details to be deleted.

Who will have access to my data?

The University of Oxford is the data controller with respect to your personal data, and as such will determine how your personal data is used in the study. The University will process your personal data for the purpose of the research outlined above. Research is a task that we perform in the public interest. Further information about your rights with respect to your personal data is available from <http://www.admin.ox.ac.uk/councilsec/compliance/gdpr/individualrights/>. For the duration of the study, Qualtrics will also be a data controller with respect to your personal data. Qualtrics is an online survey platform, which meets the standards of the University of Oxford's policy on the use of commercial internet survey tools. Qualtrics is GDPR-compliant and adheres to the EU-US Privacy Shield Framework. It encrypts data as it is transferred into storage, and does not continue to store data on its servers after it is deleted at the end of the project.

Your information will not be shared outside of the University of Oxford. Only the researcher (Dr Emma Cernis), supervisors (Professors Daniel Freeman and Anke Ehlers), and consulting statistician will have access to the data. Responsible members of the University of Oxford and funders may be given access to data for monitoring and/or audit of the study to ensure we are complying with guidelines, or as otherwise required by law.

This survey is for a DPhil project. The principal researcher is Dr Emma Cernis, who is attached to the Department of Psychiatry at the University of Oxford. This project is being completed under the supervision of Professors Daniel Freeman and Anke Ehlers.

What if there is a problem?

If you have a concern about any aspect of this project, please speak to the relevant researcher (Dr Emma Cernis, emma.cernis@psych.ox.ac.uk), who will do their best to answer your query. The researcher should acknowledge your concern within 10 working days and give you an indication of how they intend to deal with it.

If you remain unhappy or wish to make a formal complaint, please contact the chair of the Research Ethics Committee at the University of Oxford (Chair, Medical Sciences Inter-Divisional Research Ethics Committee;
Email: ethics@medsci.ox.ac.uk; Address: Research Services, University of Oxford, Wellington Square, Oxford OX1 2JD). The chair will seek to resolve the matter in a reasonably expeditious manner.

Consent

Before you can proceed to the survey, please confirm the following by checking the boxes. If you have decided not to take part, clicking “I do not give consent” will exit the survey, or you may close the browser window.

Please note that you may only participate in this survey if you are 18 years of age or over:

☐ I certify that I am 18 years of age or over.

Please note that you may only participate in this survey if you are usually resident in the UK:

☐ I certify that my usual place of residence is the United Kingdom.

If you have read the information above, and agree to participate with the understanding that the data (including any personal data) you submit will be processed accordingly, please check the relevant box below to indicate that you volunteer to participate:

☐ I consent to take part in this study.

OR:

☐ I do not give consent *(This will exit the survey)*



**Oxford University Department of Psychiatry
Warneford Hospital
Oxford
OX3 7JX**

Understanding Dissociative Experiences – Phase 2

This study is being carried out by Dr Emma Cernis at the University of Oxford, UK, who is a Research Clinical Psychologist and DPhil student. The research is funded by a Wellcome Trust Clinical Research Fellowship awarded to Dr Emma Cernis.

This study has been reviewed by, and received ethics clearance through, the University of Oxford Central University Research Ethics Committee (REF: R61315/RE002).

Study Purpose

The purpose of this research study is to find out more about experiences that are often called “dissociation”, “depersonalisation” or “derealisation”. This is where people describe feeling ‘strange’ or ‘disconnected’ – they might feel like they are ‘spacing out’, feel ‘unreal’, or feel emotionally detached from the world. These experiences can become severe and upsetting, but they are currently not well understood by researchers or clinicians.

You do not have to have had any experience of dissociation to participate in the study. We would really like as many people as possible to participate, as all experiences are equally helpful to our research.

This study aims to find out more about how dissociative experiences happen. We will be looking for connections between dissociation and other common psychological processes: like worrying, or managing strong emotions.

If you agree to take part in the research, you will be asked to complete an online survey. This survey will contain questions about dissociation and about a range of different common psychological experiences. The whole survey will take approximately 35 minutes to complete. It is important to complete as many of the questions as possible, although you may skip questions if necessary.

Do I have to take part?

Please note that participation is voluntary. You may withdraw at any point during the questionnaire for any reason just by closing the browser. If you have any questions about the study after reading this information, please contact Dr Emma Cernis by emailing dissociation@psych.ox.ac.uk.

Prize Draw

As a thank you for your time completing this survey, you will be offered the chance to enter a prize draw to win one of 21 Amazon vouchers. One person will win £100, five will win £50, and 15 people will win £20 in Amazon vouchers.

To enter the draw, please supply your email at the end of the survey. Please note that this email will be stored separately from your answers and therefore your responses will remain anonymous. Email addresses supplied for the purpose of the prize draw will be deleted once the winner is chosen and the survey closed.

Future Research

At the end of the survey, you will be asked whether you would like to be emailed about similar research we run in the future. This is entirely voluntary. If supplied, your email address will be stored securely, separately from your answers, and deleted at your request (see below), or at the end of the researcher's contract (likely to be end of year 2020).

Aftercare

Unfortunately, we will not be able to follow up with you after this study. In the event that you feel upset after completing the study, or find that some questions or aspects of the study triggered distress, talking with a trained support worker (see below), or qualified clinician (e.g. your GP) may help.

If you feel you would like assistance please contact your GP, The Samaritans on 116 123 (UK or ROI) (www.samaritans.org), Mind Infoline on 0300 123 3393 (www.mind.org.uk), or a mental health support organisation local to you.

You can also self-refer to your local IAPT (Improving Access to Psychological Therapies) service. Find your local service at: [www.nhs.uk/Service-Search/Psychological-therapies-\(IAPT\)/LocationSearch/10008](http://www.nhs.uk/Service-Search/Psychological-therapies-(IAPT)/LocationSearch/10008)

In the case of an emergency please call 999 or your local emergency number.

These details will be shown again at the end of the survey.

How will my data be used?

Your answers will be completely anonymous, and we will use all reasonable endeavours to keep them confidential. Your data will be stored in a password-protected file on an encrypted computer on the University of Oxford network. Your IP address will not be stored.

The research will be written up as part of a thesis, and therefore deposited in print and online in the University archives. It will also be published as original research in a peer-reviewed scientific journal, to facilitate future research and clinical care. No personally identifiable information will be included in any of these publications.

Although we encourage participants to answer as many of the questions as they can, all questions are optional or include a 'prefer not to say' option.

At the end of the project, this data will be kept for ten years after publication before being deleted.

Email addresses provided for the prize draw or future contact will be stored separately from the survey responses and will never be passed on to third parties. Email addresses for the prize draw will be deleted as soon as the study is complete and the draw has been conducted. Email addresses for future contact will be deleted in 2020, unless you email dissociation@psych.ox.ac.uk to request your details to be deleted.

Who will have access to my data?

The University of Oxford is the data controller with respect to your personal data, and as such will determine how your personal data is used in the study. The University will process your personal data for the purpose of the research outlined above. Research is a task that we perform in the public interest. Further information about your rights with respect to your personal data is available from <http://www.admin.ox.ac.uk/councilsec/compliance/gdpr/individualrights/>. For the duration of the study, Qualtrics will also be a data controller with respect to your personal data. Qualtrics is an online survey platform, which meets the standards of the University of Oxford's policy on the use of commercial internet survey tools. Qualtrics is GDPR-compliant and adheres to the EU-US Privacy Shield Framework. It encrypts data as it is transferred into storage, and does not continue to store data on its servers after it is deleted at the end of the project.

Your information will not be shared outside of the University of Oxford. Only the researcher (Dr Emma Cernis), supervisors (Professors Daniel Freeman and Anke Ehlers), and consulting statistician will have access to the data. Responsible members of the University of Oxford and funders may be given access to data for monitoring and/or audit of the study to ensure we are complying with guidelines, or as otherwise required by law.

This survey is for a DPhil project. The principal researcher is Dr Emma Cernis, who is attached to the Department of Psychiatry at the University of Oxford. This project is being completed under the supervision of Professors Daniel Freeman and Anke Ehlers.

What if there is a problem?

If you have a concern about any aspect of this project, please speak to the relevant researcher (Dr Emma Cernis, emma.cernis@psych.ox.ac.uk), who will do their best to answer your query. The researcher should acknowledge your concern within 10 working days and give you an indication of how they intend to deal with it.

If you remain unhappy or wish to make a formal complaint, please contact the chair of the Research Ethics Committee at the University of Oxford (Chair, Medical Sciences Inter-Divisional Research Ethics Committee;
Email: ethics@medsci.ox.ac.uk; Address: Research Services, University of Oxford, Wellington Square, Oxford OX1 2JD). The chair will seek to resolve the matter in a reasonably expeditious manner.

Consent

Before you can proceed to the survey, please confirm the following by checking the boxes. If you have decided not to take part, clicking “I do not give consent” will exit the survey, or you may close the browser window.

Please note that you may only participate in this survey if you are 18 years of age or over:

☐ I certify that I am 18 years of age or over.

Please note that you may only participate in this survey if you are usually resident in the UK:

☐ I certify that my usual place of residence is the United Kingdom.

If you have read the information above, and agree to participate with the understanding that the data (including any personal data) you submit will be processed accordingly, please check the relevant box below to indicate that you volunteer to participate:

☐ I consent to take part in this study.

OR:

☐ I do not give consent *(This will exit the survey)*

Appendix 3.3:

Full list of 50 items generated for measure development

Changes subsequently made to two items (no. 32 & 48) are shown after the arrow (→).

1	The world is trying to bring me down	26	I'm losing my mind
2	This might last forever	27	I'm not really "me"
3	This might be a dream	28	Here we go again
4	Everyone's going to notice this	29	I don't want this
5	I can't trust my own mind	30	I can't cope with this
6	Too much is happening right now	31	People are going to think I'm mad
7	Someone has done something to me	32	I'm so lonely → I am all alone
8	I don't care any more	33	I'm just tired
9	I'm pathetic	34	Reality has changed
10	I'm in a computer simulation	35	There's no point fighting this
11	I could get stuck like this	36	I am worthless
12	I just need to wait for it to pass	37	I don't look right to other people right now
13	People are going to judge me for this	38	I must be sick
14	This feeling is dangerous	39	I'm not in the same world as everyone else
15	This is too difficult	40	I can't do this any more
16	There's a hidden meaning in this feeling	41	This is because I am evil
17	This proves I am unloveable	42	I'm just getting confused
18	Something is terribly wrong	43	I must be special
19	This is because there is something wrong with me	44	Now I won't be able to do the things I wanted
20	I must be exhausted	45	It's not me in control right now
21	My life is in danger	46	People are going to think I'm being rude
22	This proves I am abnormal	47	This could spiral out of control
23	I want this to stop now	48	This must mean I'm not human → This must mean I'm an alien, ghost, or not human
24	I'm being stupid	49	It's ok - it's just one of those things
25	This shows I am weak	50	This is too much

Appendix 3.4:

The Cognitive Appraisals of Dissociation in Psychosis (CAD-P) Measure

Please rate how often you think the following when you are feeling strange, disconnected, unreal or "dissociated".

Please note that this should NOT be whilst under the influence of drugs, alcohol or legal highs.

		Never	Rarely	Sometimes	Often	Always
1	I can't trust my own mind.	0	1	2	3	4
2	Someone has done something to me.	0	1	2	3	4
3	Something is terribly wrong.	0	1	2	3	4
4	I'm losing my mind.	0	1	2	3	4
5	I'm not really "me".	0	1	2	3	4
6	I am all alone.	0	1	2	3	4
7	I don't look right to other people right now.	0	1	2	3	4
8	I must be sick.	0	1	2	3	4
9	I'm not in the same world as everyone else.	0	1	2	3	4
10	This is because I am evil.	0	1	2	3	4
11	Now I won't be able to do the things I wanted.	0	1	2	3	4
12	It's not me in control right now.	0	1	2	3	4
13	This might last forever.	0	1	2	3	4

Scoring: sum score of all items.

Note that: raw scores cannot distinguish between many appraisals occurring infrequently, and a small number of appraisals experienced very frequently. In clinical contexts, therefore, further interpretation of responses may be required.

Appendix 4.1:

Details of differences in Černis Felt Sense of Anomaly (ČEFSA) scores between participant subgroups

Descriptive statistics for the ČEFSA scale in the different mental health status subgroups across the three network analysis studies (in Chapters Five, Six and Seven)

	<i>Mapping Dissociation in Mental Health</i> (n=6943)			<i>Understanding Dissociative Experiences</i> (n=6161)			<i>Exploring Unusual Feelings</i> (n = 902)	
	N (%)	Mean (SD)	Min-Max	N (%)	Mean (SD)	Min-Max	Mean (SD)	Min-Max
NN	878 (12.65)	20.58 (19.99)	0 - 124	944 (15.32)	26.83 (21.35)	0 - 109	-	-
YN	1232 (17.74)	22.77 (19.65)	0 - 130	950 (15.42)	27.33 (18.83)	0 - 89	-	-
YY or clinical	4572 (65.85)	51.00 (26.97)	0 - 140	3252 (52.78)	51.70 (25.22)	0 - 130	40.56 (30.59)	0 - 140
<i>Key:</i>								
NN	Answered 'no' to the question 'have you ever experienced mental health difficulties?'							
YN	Answered 'yes' to 'ever' experiencing mental health difficulties, but 'no' to these being 'ongoing'							
YY	Answered that they had current ongoing mental health difficulties							

- Only cases with less than or equal to 20% missing in all measures were included in these analyses, and only those who answered the mental health status question are included for the non-clinical studies in the table above.
- In the clinical group (*Exploring Unusual Feelings*), it is not known how many participants may be better described by the YN criteria, i.e. they may be asymptomatic but under mental health team for administration of medication.
- In the non-clinical studies, the large YY subgroups may reflect self-selection bias for people with high dissociation given the names of studies. For this reason, it may be understandable that the non-clinical YY subgroups' dissociation scores are higher than those for the clinical group.

Tests for significant difference between groups (non-clinical studies)

	NN vs YN	NN vs YY	YN vs YY
<i>Mapping Dissociation in Mental Health</i>	NN < YN (t = -2.48, p = 0.0133)	NN < YN (t = -38.64, p < 0.001)	YN < YY (t = -40.83, p < 0.001)
<i>Understanding Dissociative Experiences</i>	NN = YN (t = -0.54, p = 0.589)	NN < YY (t = 30.18, p < 0.001)	YN < YY (t = 32.29, p < 0.001)

Appendix 4.2:

Correlation matrix: *Mapping Dissociation in Mental Health*

	<i>Anx</i>	<i>Dep</i>	<i>Par</i>	<i>Hal</i>	<i>Gra</i>	<i>CogD</i>	<i>Wor</i>	<i>Ins</i>	<i>DTol</i>	<i>PTSS</i>	<i>Dis</i>
<i>Anx</i>	-	0.62	0.59	0.42	0.07	0.60	0.72	0.50	-0.56	0.70	0.61
<i>Dep</i>	0.62	-	0.50	0.38	-0.01	0.55	0.46	0.53	-0.46	0.66	0.61
<i>Par</i>	0.59	0.50	-	0.55	0.19	0.55	0.51	0.42	-0.50	0.64	0.64
<i>Hal</i>	0.42	0.38	0.55	-	0.22	0.43	0.29	0.38	-0.34	0.51	0.60
<i>Gra</i>	0.07	-0.01	0.19	0.22	-	0.09	0.02	0.03	-0.08	0.12	0.18
<i>CogD</i>	0.60	0.55	0.55	0.43	0.09	-	0.59	0.43	-0.58	0.60	0.62
<i>Wor</i>	0.72	0.46	0.51	0.29	0.02	0.59	-	0.42	-0.58	0.54	0.44
<i>Ins</i>	0.50	0.53	0.42	0.38	0.03	0.43	0.42	-	-0.37	0.57	0.44
<i>DTol</i>	-0.56	-0.46	-0.50	-0.34	-0.08	-0.58	-0.58	-0.37	-	-0.59	-0.50
<i>PTSS</i>	0.70	0.66	0.64	0.51	0.12	0.60	0.54	0.57	-0.59	-	0.71
<i>Dis</i>	0.61	0.61	0.64	0.60	0.18	0.62	0.44	0.44	-0.50	0.71	-

Key:

<i>Anx</i>	Anxiety
<i>Dep</i>	Depression
<i>Par</i>	Paranoia
<i>Hal</i>	Hallucinations
<i>Gra</i>	Grandiosity
<i>CogD</i>	Cognitive disorganisation
<i>Wor</i>	Worry
<i>Ins</i>	Insomnia
<i>DTol</i>	Distress tolerance
<i>PTSS</i>	Post-traumatic stress symptoms
<i>Dis</i>	(FSA) Dissociation

Appendix 5.1:**Full list of 20 items generated for developing the Responses to Dissociation scale**

1	I try and figure out what is going on
2	I stay away from stressful situations until the feeling's over
3	I try not to think about it
4	I watch or think about something upsetting to try and change how I feel
5	I try to keep busy
6	I check that I'm actually doing things the way I meant to
7	I try to focus on something else
8	I take a nap or go to bed early
9	I keep my mind busy
10	I go into stressful situations to try and change how I feel
11	I think about something positive instead
12	I focus on that feeling
13	I isolate myself from others
14	I concentrate on the thing that seems unusual
15	I stay away from other people
16	I sit around not doing anything much
17	I make decisions on purpose to prove I'm still in control
18	I 'keep an eye' on what's happening
19	I try and fight it
20	I try and make myself feel connected again

Appendix 5.2:

The Responses to Dissociation scale

Please rate how often you do the following when you are feeling strange, disconnected, unreal or "dissociated".

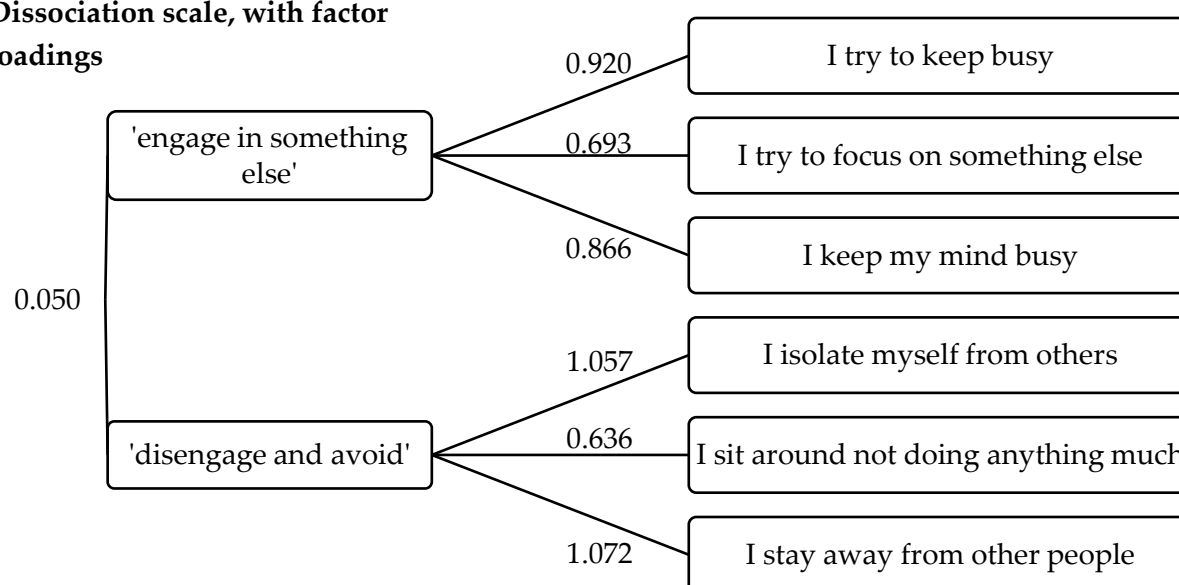
Please note that this should NOT be whilst under the influence of drugs, alcohol or legal highs.

		Never	Rarely	Sometimes	Often	Always
1	I try to keep busy	0	1	2	3	4
2	I isolate myself from others	0	1	2	3	4
3	I try to focus on something else	0	1	2	3	4
4	I sit around not doing anything much	0	1	2	3	4
5	I keep my mind busy	0	1	2	3	4
6	I stay away from other people	0	1	2	3	4

Factor 1 ('engage in something else'): items 1, 3, 5.

Factor 2 ('disengage and avoid'): items 2, 4, 6.

Final CFA model for the Responses to Dissociation scale, with factor loadings



Appendix 5.3:

Adapted version of the Meta-Emotion Scale (MES; Mitmansgruber, Beck, Höfer & Schüßler, 2009)

Here you will find a number of statements about how people treat themselves in times of stress. Please indicate the response that best describes you. Please respond according to the way you actually feel instead of the way you think you should feel.

	Is not at all true for me					Is completely true for me
I repeatedly get angry about my emotional reactions	1	2	3	4	5	6
I downright cajole myself when I experience major emotional burden	1	2	3	4	5	6
Sometimes I could get really mad at myself about the way I react emotionally	1	2	3	4	5	6
I repeatedly force myself to pull myself together	1	2	3	4	5	6
When I see my emotions as inappropriate, I get very strict with myself	1	2	3	4	5	6
I fight strongly against my emotions	1	2	3	4	5	6
Repeatedly, there are situations when I excoriate (criticise) myself	1	2	3	4	5	6
When I feel guilty because I have made a mistake, I am quite unforgiving with myself	1	2	3	4	5	6
When talking to myself in my thoughts, I am often harsh with myself	1	2	3	4	5	6
I cannot forgive myself for a long time when I have done something wrong	1	2	3	4	5	6
I place high demands on myself to gain control over my feelings	1	2	3	4	5	6

Appendix 5.4:

Adapted version of the Online Alexithymia Questionnaire (OAQ; Thompson, 2007)

Answer the following questions as spontaneously as possible.

	Strongly agree	Agree	Undecided	Disagree	Strongly disagree
1. When asked which emotion I'm feeling, I frequently don't know the answer	1	2	3	4	5
2. I sometimes experience confusing sensations in my body	1	2	3	4	5
3. I prefer doing physical activities with friends rather than discussing each other's emotional experiences	1	2	3	4	5
4. I'm unsure of which words to use when describing my feelings	1	2	3	4	5
5. When involved in difficult or turbulent relationships, I sometimes develop confusing physical symptoms	1	2	3	4	5
6. I don't like conversations in which more time is spent discussing emotional matters than daily activities because it detracts from my enjoyment	1	2	3	4	5
7. I can describe my emotions with ease (R)	1	2	3	4	5
8. When I am upset I find it difficult to identify the feelings causing it	1	2	3	4	5
9. I have puzzling physical sensations that even friends / acquaintances / others don't understand	1	2	3	4	5
10. When helping others I prefer to assist with physical tasks rather than offering counsel about their feelings	1	2	3	4	5
11. Describing the feelings I have about other people is often difficult	1	2	3	4	5

Appendix 5.5:**Full list of 12 items generated for developing the Beliefs About Being Overwhelmed scale**

1	I have to be careful not to get overwhelmed
2	I can't cope with stress
3	I've never been able to deal with emotions
4	I just "cut off" when I get overwhelmed
5	It's better for me to back off when things are getting too stressful
6	I can't deal with anxiety
7	Above a certain level of emotion, my mind shuts down
8	I try to keep things steady: not too much or too little emotion
9	I have to avoid becoming over-stressed
10	I just can't cope with feeling low or depressed
11	My mind switches off if I'm under too much stress
12	If there's too much to deal with, I just shut off

Appendix 5.6:

The Beliefs About Being Overwhelmed scale

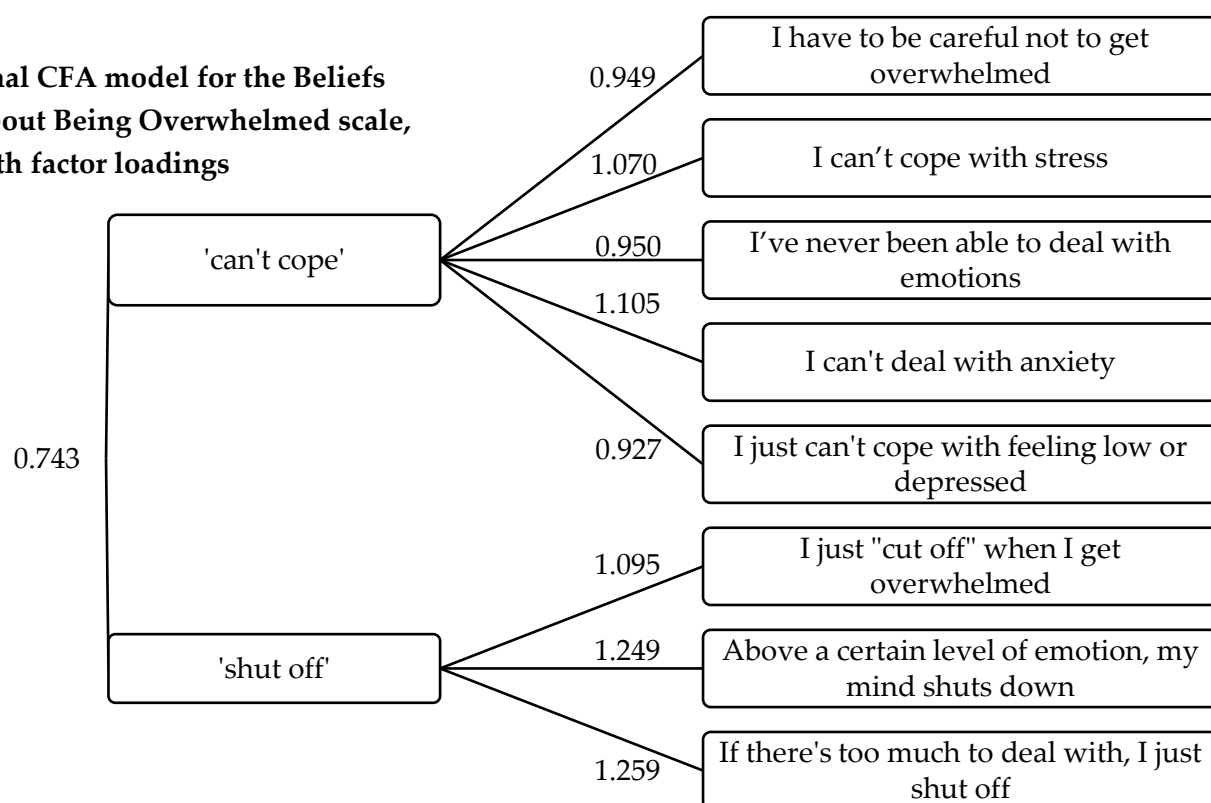
Below are some statements about stress and emotion. Please rate how closely these statements match your own beliefs:

		Not at all like me				Very much like me
1	I have to be careful not to get overwhelmed	0	1	2	3	4
2	I can't cope with stress	0	1	2	3	4
3	I've never been able to deal with emotions	0	1	2	3	4
4	I can't deal with anxiety	0	1	2	3	4
5	I just can't cope with feeling low or depressed	0	1	2	3	4
6	I just "cut off" when I get overwhelmed	0	1	2	3	4
7	Above a certain level of emotion, my mind shuts down	0	1	2	3	4
8	If there's too much to deal with, I just shut off	0	1	2	3	4

Factor 1 ('can't cope'): items 1-5.

Factor 2 ('shut off'): items 6, 7, 8.

**Final CFA model for the Beliefs
About Being Overwhelmed scale,
with factor loadings**



Appendix 5.7:

Correlation matrix: *Understanding Dissociative Experiences*

	<i>Dis</i>	<i>PT</i>	<i>CogA</i>	<i>AI</i>	<i>GSE</i>	<i>Alexi</i>	<i>NME</i>	<i>BV</i>	<i>AC</i>	<i>AS</i>	<i>Over</i>	<i>SB</i>
<i>Dis</i>	-	0.61	0.81	0.60	-0.38	-0.60	0.49	0.21	-0.40	0.56	0.59	0.42
<i>PT</i>	0.61	-	0.70	0.75	-0.48	-0.46	0.57	0.24	-0.48	0.59	0.64	0.41
<i>CogA</i>	0.81	0.70	-	0.69	-0.44	-0.52	0.54	0.24	-0.43	0.65	0.62	0.44
<i>AI</i>	0.60	0.75	0.69	-	-0.51	-0.55	0.66	0.22	-0.48	0.65	0.75	0.53
<i>GSE</i>	-0.38	-0.48	-0.44	-0.51	-	0.39	-0.30	-0.05	0.56	-0.41	-0.55	-0.20
<i>Alexi</i>	-0.60	-0.46	-0.52	-0.55	0.39	-	-0.47	-0.10	0.42	-0.49	-0.57	-0.38
<i>NME</i>	0.49	0.57	0.54	0.66	-0.30	-0.47	-	0.18	-0.32	0.55	0.57	0.46
<i>BV</i>	0.21	0.24	0.24	0.22	-0.05	-0.10	0.18	-	-0.12	0.37	0.21	0.14
<i>AC</i>	-0.40	-0.48	-0.43	-0.48	0.56	0.42	-0.32	-0.12	-	-0.45	-0.56	-0.24
<i>AS</i>	0.56	0.59	0.65	0.65	-0.41	-0.49	0.55	0.37	-0.45	-	0.64	0.43
<i>Over</i>	0.59	0.64	0.62	0.75	-0.55	-0.57	0.57	0.21	-0.56	0.64	-	0.48
<i>SB</i>	0.42	0.41	0.44	0.53	-0.20	-0.38	0.46	0.14	-0.24	0.43	0.48	-

Key:

<i>Dis</i>	Dissociation
<i>PT</i>	Persecerative Thinking
<i>CogA</i>	Cognitive Appraisals
<i>AI</i>	Affect Intolerance
<i>GSE</i>	General Self Efficacy
<i>Alexi</i>	Aleithymia
<i>NME</i>	Negative Meta-Emotion
<i>BV</i>	Body Vigilance
<i>AC</i>	Attentional Control
<i>AS</i>	Anxiety Sensitivity
<i>Over</i>	Beliefs about being Overwhelmed
<i>SB</i>	Safety Behaviours

Appendix 6.1:**Correlation matrix: *Exploring Unusual Feelings***

	<i>Diss</i>	<i>CogA</i>	<i>SB</i>	<i>Para</i>	<i>Hall</i>	<i>GSE</i>	<i>PT</i>	<i>AI</i>	<i>Alexi</i>	<i>Well</i>	<i>Sleep</i>
<i>Diss</i>	-	0.79	0.53	0.58	0.63	-0.28	0.67	0.56	-0.40	-0.43	-0.40
<i>CogA</i>	0.79	-	0.52	0.60	0.59	-0.29	0.72	0.59	-0.35	-0.42	-0.38
<i>SB</i>	0.53	0.52	-	0.45	0.41	-0.02	0.50	0.52	-0.24	-0.17	-0.26
<i>Para</i>	0.58	0.60	0.45	-	0.55	-0.13	0.52	0.45	-0.26	-0.26	-0.36
<i>Hall</i>	0.63	0.59	0.41	0.55	-	-0.22	0.52	0.42	-0.28	-0.31	-0.39
<i>GSE</i>	-0.28	-0.29	-0.02	-0.13	-0.22	-	-0.34	-0.18	0.23	0.65	0.17
<i>PT</i>	0.67	0.72	0.50	0.52	0.52	-0.34	-	0.70	-0.36	-0.45	-0.42
<i>AI</i>	0.56	0.59	0.52	0.45	0.42	-0.18	0.70	-	-0.36	-0.29	-0.34
<i>Alexi</i>	-0.40	-0.35	-0.24	-0.26	-0.28	0.23	-0.36	-0.36	-	0.32	0.21
<i>Well</i>	-0.43	-0.42	-0.17	-0.26	-0.31	0.65	-0.45	-0.29	0.32	-	0.32
<i>Sleep</i>	-0.40	-0.38	-0.26	-0.36	-0.39	0.17	-0.42	-0.34	0.21	0.32	-

Key:

<i>Diss</i>	Dissociation
<i>CogA</i>	Cognitive Appraisals
<i>SB</i>	Safety Behaviours
<i>Para</i>	Paranoia
<i>Hall</i>	Hallucinations
<i>GSE</i>	General Self Efficacy
<i>PT</i>	Perseverative Thinking
<i>AI</i>	Affect Intolerance
<i>Alexi</i>	Alexithymia
<i>Well</i>	Wellbeing
<i>Sleep</i>	Sleep quality

Appendix 6.2:

Endorsement rates of the Černis Felt Sense of Anomaly (ČEFSA) Scale items in a non-affective psychosis group

Endorsement rates for each item of the ČEFSA (as percentage of the participant group (n=902)).

		Never	Rarely	Sometimes	Often	Always	Often or always i.e. item endorsed
1.	I feel like a stranger to myself.	42.90	16.74	22.62	9.31	8.43	17.74
2.	I feel detached from my physical body (or parts of it).	52.22	14.63	18.18	10.09	4.88	14.97
3.	Places that I know seem unfamiliar.	52.00	18.85	15.63	8.65	4.88	13.53
4.	I don't fully experience emotions.	32.59	17.29	24.61	17.07	8.43	25.50
5.	I feel disconnected from the world around me.	31.71	15.19	26.94	16.19	9.98	26.16
6.	I'm absorbed in my own world and don't notice what is happening around me.	31.04	17.74	25.17	16.63	9.42	26.05
7.	I feel like other people aren't real.	57.65	15.63	14.52	8.20	3.99	12.20
8.	My personality changes seemingly at random.	39.58	17.41	23.06	11.97	7.98	19.96
9.	My body (or parts of it) feels like it doesn't belong to me.	62.75	13.97	12.42	6.21	4.66	10.86
10.	Familiar sights, smells (etc.) feel unfamiliar to me.	58.54	17.74	14.08	6.32	3.33	9.65
11.	I can't feel emotions.	45.34	17.96	18.29	11.20	7.21	18.40
12.	I feel disconnected from other people.	30.16	15.74	27.38	18.18	8.54	26.72
13.	I find myself drifting off into my own world when I'm with others.	25.83	14.08	28.49	18.18	13.41	31.60
14.	The world seems like it is fake.	47.45	13.19	19.84	10.42	9.09	19.51
15.	I feel like I don't have a personality.	49.00	16.41	18.18	9.65	6.76	16.41
16.	My body (or parts of it) feels unreal or strange.	53.44	16.63	17.85	8.54	3.55	12.08
17.	People around me seem different or altered.	41.57	16.96	24.94	10.86	5.65	16.52
18.	I feel detached from my emotions.	36.81	19.40	24.06	12.53	7.21	19.73

		Never	Rarely	Sometimes	Often	Always	Often or always i.e. endorsed
19.	I feel as if I'm experiencing life from very far away.	43.57	14.19	23.50	11.64	7.10	18.74
20.	I don't notice how much time passes.	31.37	17.63	24.17	16.96	9.87	26.83
21.	The world around me seems unreal.	44.35	16.30	20.40	11.97	6.98	18.96
22.	I act like someone else without meaning to.	51.88	15.96	16.52	9.65	5.99	15.63
23.	My body feels like it's not under my control.	49.67	16.52	18.74	8.98	6.10	15.08
24.	People I know seem unfamiliar.	50.44	18.96	19.51	7.43	3.66	11.09
25.	I feel disconnected from my emotions.	41.80	15.74	23.17	11.64	7.65	19.29
26.	The things happening around me seem unreal to me – like a dream or a movie.	39.69	16.08	23.39	11.97	8.87	20.84
27.	I lose track of my surroundings.	45.12	17.74	23.61	9.09	4.43	13.53
28.	I feel as though other people stop existing when I can't see them.	61.09	13.41	14.41	6.54	4.55	11.09
29.	I feel like I'm more than one person.	59.87	9.76	14.86	7.43	8.09	15.52
30.	My body feels numb.	52.88	13.97	20.29	7.21	5.65	12.86
31.	Things I've done many times before seem new or unfamiliar.	47.56	18.40	21.29	8.98	3.77	12.75
32.	My emotions don't seem real.	49.56	16.85	19.29	8.76	5.54	14.30
33.	I feel detached from what I'm doing.	40.35	15.08	26.50	11.75	6.32	18.07
34.	I feel like an alien or a ghost.	63.53	9.53	12.42	8.31	6.21	14.52
35.	I freeze, unable to do anything.	51.11	16.63	18.40	9.20	4.66	13.86

Appendix 7: Published manuscripts

7.1

Černis E, Freeman D, Ehlers A (2020). Describing the indescribable: A qualitative study of dissociative experiences in psychosis. *PLoS One*, 15: e0229091. DOI: 10.1371/journal.pone.0229091

7.2

Černis E, Beierl E, Molodynski A, Ehlers A, Freeman D (2021). A new perspective and assessment measure for common dissociative experiences: 'Felt Sense of Anomaly'. *PLoS One*, 16: e0247037. DOI: 10.1371/journal.pone.0247037

7.3

Černis E, Bird J, Molodynski A, Ehlers A, Freeman D (*in press*). Describing the indescribable: Cognitive appraisals of dissociation in psychosis: A new brief measure. *Behavioural and Cognitive Psychotherapy, First View*, p.1-13. DOI: 10.1017/S1352465820000958

7.4

Černis E, Evans R, Ehlers A, Freeman D (2021). Dissociation in relation to other mental health conditions: An exploration using network analysis. *Journal of Psychiatric Research*, 136, 460-467. DOI: 10.1016/j.jpsychires.2020.08.023

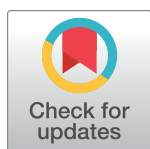
RESEARCH ARTICLE

Describing the indescribable: A qualitative study of dissociative experiences in psychosis

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Abstract

Background

Despite its long history, dissociation remains under-recognised clinically, partly due to difficulties identifying dissociative symptoms. Qualitative research may support its recognition by providing a lived experience perspective. In non-affective psychosis, identification of dissociation may be particularly important given that such experiences have been implicated in its development and maintenance. Therefore, this study aimed to understand in the context of psychosis: what it is like to experience dissociation; the impact dissociation might have; what factors begin, maintain or end dissociative experiences; and what beliefs people hold about dissociation.

Methods

Qualitative interviews were carried out with twelve NHS patients with non-affective psychosis diagnoses and experience of dissociation. Data were analysed using Thematic Analysis.

Results

Dissociation involves subjective strangeness, unreality, disconnection, and shifts in perception. It impacts on mental health (including psychotic experiences), daily functioning, emotional connection, and can lead to social withdrawal. Stress, fatigue, and excessive internal focus may be involved in development and maintenance. Participants found it very difficult to describe the experience of dissociation, and, as a result, often did not mention it to others. Even when shared, interviewees reported that their descriptions were misunderstood and therefore they did not receive information or support specific to dissociation. The consensus was that experiences of dissociation are negative, but that understanding them better helped to enable coping.

Conclusions

The core subjective experience of dissociation appears to be a felt sense of anomaly (FSA), and we therefore suggest clinicians proactively enquire about such experiences.

OPEN ACCESS

Citation: Černis E, Freeman D, Ehlers A (2020) Describing the indescribable: A qualitative study of dissociative experiences in psychosis. PLoS ONE 15(2): e0229091. <https://doi.org/10.1371/journal.pone.0229091>

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Data Availability Statement: Data cannot be shared publicly because of the terms and conditions contained within the ethics permissions granted for this study from the NHS Research Ethics Committee and Health Research, and

consented to by participants. Interviews were confidential to enable freedom of expression by participants, and participants consented into the study with the understanding that only anonymised quotations would be publicly available: not the entirety of the transcripts. Therefore, only illustrative excerpts from the transcripts, which qualify as the minimal data set, are included in the paper.

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Dissociation is distressing, and has multiple impacts, but can easily be overlooked due to difficulties describing it and behavioural similarities to negative psychotic symptoms such as withdrawal.

Introduction

Dissociation is a complex phenomenon in mental health, with a large body of historical and contemporary publications outlining many (often opposing) frameworks [1]. Despite this wealth of literature, dissociative symptoms remain repeatedly under-recognized or misidentified [2]. Recognition of symptoms may be a particular challenge in dissociation due to the ongoing conceptual debate, which has negatively impacted the clarity of the construct [1,3], and because many clinicians receive inadequate training in this area [4].

Nevertheless, dissociative experiences have been demonstrated to occur across a range of psychiatric disorders [5], and may therefore be considered trans-diagnostic at least to some extent. Indeed, dissociative experiences have been found at an ‘elevated level’—up to fifty per cent—in psychosis [6]. This is of interest given ongoing discussions about the extent of symptom overlap between psychosis and dissociation [6], and particularly given the suggestion that anomalous experiences—such as dissociation—are important in the formation and maintenance of psychotic experiences such as hallucinations [7] and persecutory delusions [8]. For example, the Garety [9] model of positive psychotic symptoms suggests that anomalous experiences drive a ‘search for meaning’, resulting in the adoption of beliefs that may form the basis of delusions.

Improvement of the recognition of dissociation is therefore an important goal clinically [2] as well as in psychosis research, where it would be potentially beneficial to investigate dissociation as a putative causal or maintenance mechanism. However, difficulties identifying dissociative phenomena impede these efforts. Qualitative research may go some way to improving this situation: such methods ‘answer questions about experience, meaning and perspective’ [10], and therefore give an opportunity for patient voice to be heard by clinicians and researchers. Surprisingly, there is little qualitative evidence regarding the lived experience of dissociation to guide our understanding, and none regarding the experience of dissociation in the context of psychosis. The latter would be of particular interest and utility given the findings of a significant overlap between psychotic and dissociative symptoms [6]. Therefore, this study sought to further our understanding of dissociation by referring to patient expertise—and specifically patients with lived experience of both dissociation and psychosis.

The current study aimed to answer the following questions:

1. What is it like to experience dissociation (in the context of non-affective psychosis)?
2. What is the impact of dissociation?
3. What factors begin, maintain, and end dissociation in the context of non-affective psychosis?
4. What thoughts and beliefs do people with non-affective psychosis have about their dissociative experiences?

These questions were chosen to learn more about the phenomenology of dissociation in psychosis (question 1), and illustrate what it is like to live with (questions 2 and 4). To facilitate clinicians’ understanding of the problem, questions 3 and 4 aim to explore the experience of dissociation in psychosis using a cognitive-behavioural framework, which is the most familiar psychological approach for many UK clinicians.

Methods

This study received ethical approval from the NHS Health Research Authority (REC reference: 18/SC/0048). All patients gave written informed consent to participate, including for the interviews to be audio-recorded and anonymised quotations to be used. Capacity to consent was established by the first author, a qualified clinical psychologist.

Participants

Twelve participants were recruited from Oxford Health NHS Foundation Trust via referral by clinical or research staff. Staff referred patients on their caseload who may have already reported dissociative experiences, or may be interested in participating. After confirming with the first author whether the person provisionally met entry criteria, staff approached the person with a participant information sheet to discuss the study. Those who were interested and felt the study may be relevant to them gave verbal consent for the first author to contact them directly to discuss the study in further detail and arrange to meet to check eligibility to participate according to the inclusion and exclusion criteria. A summary of participant recruitment is shown in Fig 1.

Inclusion criteria were: a primary diagnosis of a psychosis spectrum disorder (confirmed by the clinical team at referral, and recorded according to self-report); aged 16 or over; self-reported experience of dissociation; and a Dissociative Experiences Scale (DES-II; [11]) score above 5.4. The cut-off score on the DES-II was chosen based on Carlson and Putnam's statement that a score of 5.4 is a typical mean for the general population. This cut-off was chosen because we were interested in exploring a wide range of perspectives: including those who had since improved and were no longer regularly experiencing dissociation. When completing the DES-II, participants were encouraged to consider more recent experiences (i.e. the past two weeks) in order to elicit dissociative experiences which would be easy to recall and discuss. Participants with general population-level scores (i.e. lower levels of recent dissociation) were able to recall previous dissociative experiences clearly and discuss them in detail. In these cases, the DES-II score reflects that the participants had not experienced dissociation within the past two weeks, not that they had never experienced higher levels. It is of note that the majority of this sample (nine participants) scored far above the proposed average mean for Schizophrenia (DES-II = 15.4) and within the ranges expected for dissociative disorders [11]. The mean score was 36.91 (SD = 20.00), indicating high levels of currently-experienced dissociation within the group. 'Self-reported experience of dissociation' was assessed via discussion between participant and the first author, using the items of the DES-II and the content of the Participant Information Sheet (PIS) as prompts. The PIS featured a selection of eight items from the Dissociative Experiences Measure, Oxford (DEMO; [12]) and also stated: *'Sometimes, people have strange feelings and experiences—like feeling that they are 'spaced out', numb, unreal, disconnected, or 'trapped in a bubble'. These experiences are sometimes called 'dissociation' or 'depersonalisation'.* The term 'depersonalisation' was included in this instance since recent popular articles [e.g. 13] have used this term and it may therefore have been heard by participants before. In the discussion regarding self-reported experience, participants were asked if they identified with any of the content in the PIS or DES-II, or had experienced anything similar that was not listed. They were then asked to give some brief detail in order to determine that the item had been understood as intended.

Exclusion criteria were: insufficient comprehension of English to participate; primary diagnosis of alcohol or substance dependence; primary diagnosis of personality disorder; presence of organic syndrome or learning disability; or dissociation only experienced in the context of alcohol or illicit substance use. Additionally, two people were not invited to participate

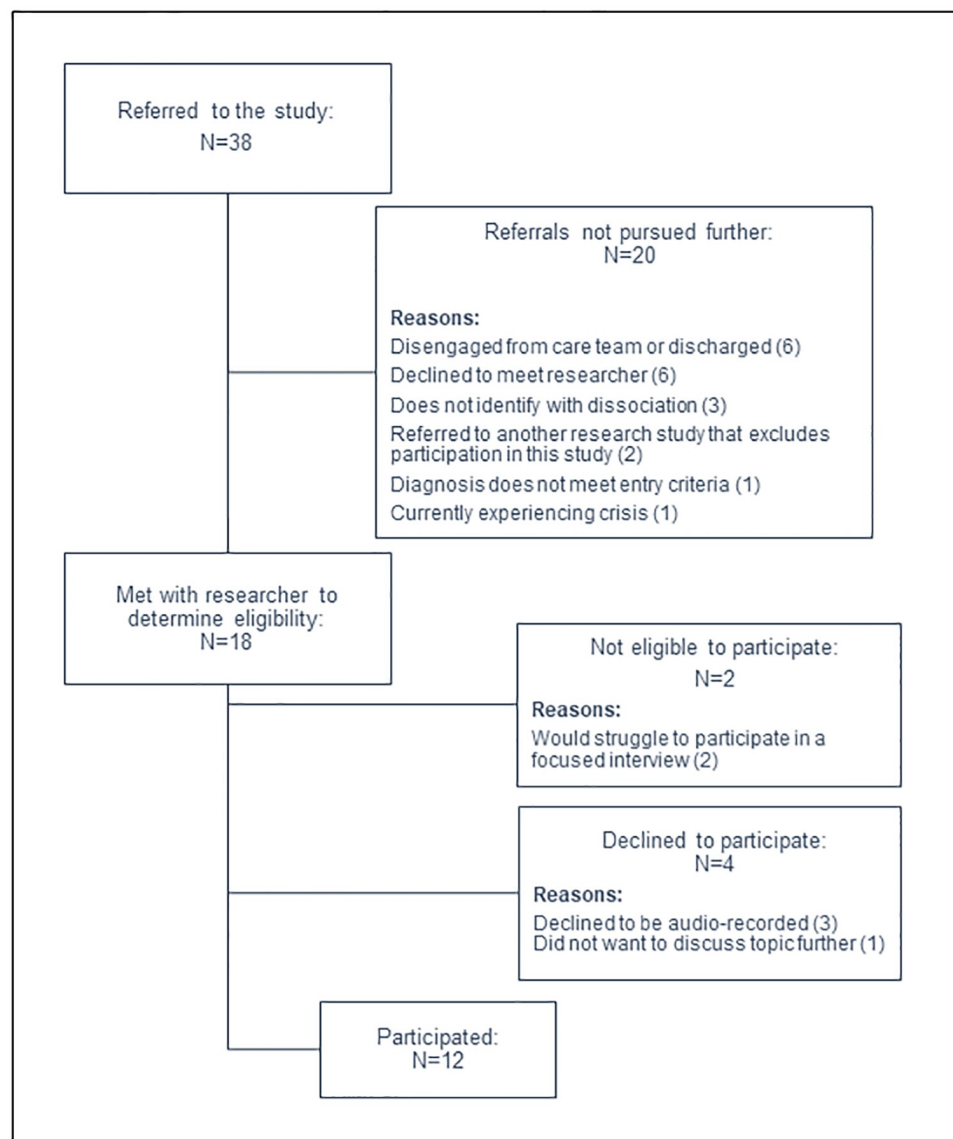


Fig 1. Summarising the referral and recruitment details of the study.

<https://doi.org/10.1371/journal.pone.0229091.g001>

following clinical judgement of their ability to participate in a focused interview. At the initial eligibility meeting, one person was unable to identify or describe their thoughts or feelings about dissociation; and a second person struggled to disengage from other distressing topics in order to answer focused questions. Participant characteristics can be seen in Table 1 (below).

Participants were not directly asked about trauma history, nor was this screened for upon entry to the study. However, four participants disclosed life experiences or re-experiencing symptoms indicative of previous trauma during interview.

Procedure

Interviews were semi-structured, audio-recorded, and conducted face-to-face by the first author. The first author is a Clinical Psychologist with experience working with psychosis,

Table 1. Summarising participant characteristics.

Participant code	Gender; Age at interview	Ethnicity	Marital status	Employment status	Recorded diagnosis	DES-II score
1	M; 16	White British	Single	Student	Psychosis NOS (First Episode)	47.14
2	M; 55	White British	Single	Voluntary work	Schizoaffective Disorder	7.14
3	M; 29	White British	Married	Self-Employed	Schizophrenia	50.71
4	F; 27	White British	Married	Housewife	Schizophrenia	9.29
5	M; 40	White British	Single	Unemployed	Schizophrenia	34.29
6	M; 64	White British	Single	Retired	Schizophrenia	42.86
7	M; 18	British Asian	Single	Student	Psychosis NOS (First Episode)	33.21
8	F; 33	White British	Single	Unemployed	Schizoaffective Disorder	52.86
9	M; 42	White British	Single	Self-Employed	Paranoid Schizophrenia	38.93
10	M; 47	White British	Single	Unemployed	Paranoid Schizophrenia	51.43
11	F; 21	White British	Single	Student	Unspecified Inorganic Psychosis	68.57
12	F; 43	Mixed: Irish & African	Single	Unemployed	Schizophrenia	6.43

<https://doi.org/10.1371/journal.pone.0229091.t001>

trauma, and dissociation. Interviews took place at participants' homes or local NHS mental health team base, according to participant preference. Interviews followed a topic guide (see [S1 File](#)) which was developed via consensus meetings, consultation with a Lived Experience Advisory Panel (LEAP), and a pilot interview. The topic guide was drafted by the first author and discussed amongst all three authors during the planning stages of the study. The study proposal and materials were then taken to the LEAP. This panel was formed of people with experience of psychosis, and mental health services and treatments. It was initially formed by the McPin Foundation to advise on a clinical trial of a psychological intervention for psychosis. Members of this panel gave feedback on the information sheet and study design, including reviewing the topic guide. No changes were made at this stage, and the LEAP agreed with the importance of the research questions posed. One volunteer from the panel then took part in a pilot interview following the topic guide. The experience and content of this interview was discussed, and feedback subsequently incorporated into the approach taken during the study interviews (e.g., that prompting for further detail was acceptable to the interviewee); no content in the topic guide was changed. The topic guide was also reviewed by the first author following the first three interviews to ensure it was still suitable. The only change made at this stage was to use participants' DES-II forms as an initial point of discussion if they found it difficult to answer the first open-ended question about their experience of dissociation (below).

As can be seen in the [S1 File](#), the topic guide was structured according to the four research questions outlined above (*Introduction*). Interviews therefore began with an open question asking the interviewee to describe their experience of dissociation using their own words; followed by questions relating to each of the four research questions listed above; and ended with an invitation to discuss any aspects of dissociation not already covered. Interviews lasted on average one hour (range: 30 minutes to 1 hour 40). The audio recordings were transcribed and anonymised, with transcriptions checked for accuracy against the audio recording.

Method of analysis

NVivo version 12 [14] was used during the coding and analysis of data. Thematic analysis was the chosen analytic method since it has been identified as an approach well-suited to under-researched areas, enabling flexibility and detailed insight—including highlighting contradictions within the data [15]. Interviews were analysed using deductive thematic analysis to separate the data into the research questions posed, and then using inductive thematic analysis

within each question to enable flexibility and fidelity to the data. A coding framework was developed by the lead author following immersion in the transcripts of the early interviews. The framework evolved through constant comparison and modification as each new interview was added to the dataset. One example of this is that initial interviews were coded with many fine-grained ('splitter') codes [16] (e.g. 'affects concentration', 'confusing', 'difficult to remember the truth'), which then began to be incorporated into fewer broader ('lumper') codes [16] (e.g. 'I can't trust my head') as similar content continued to appear in later interviews. Details of the original fine-grained codes were retained in NVivo to facilitate understanding of these broader codes. Broader codes were later gathered into 'themes' according to the thematic analysis method [15].

Interviews were analysed using a single primary coder, supported by discussions within the wider team about the methods involved (i.e. transitioning from fine-grained to broader codes). To reduce bias, time was taken between preliminary and review coding of transcripts [17], and preliminary themes were reported to the LEAP pathway through the study. Additionally, negative case analysis was also undertaken: 'actively sought' and 'spontaneously occurring' [18] data that contradicted a code was incorporated or added as a new code in order to reflect the complexity of dissociative experience. For example, the sub-theme 'negative experience: not wholly negative' (below) arose from evidence contradicting the sub-theme 'negative experience: fear'. However, it is important to note using a single primary coder is a source of bias (see Discussion). The primary coder was the first author (EC); a brief reflexive statement regarding the biases this author may have brought to the analysis can be found in the S2 File.

Results

1. What is it like to experience dissociation?

Please see Fig 2 for a summary of the results for research question one.

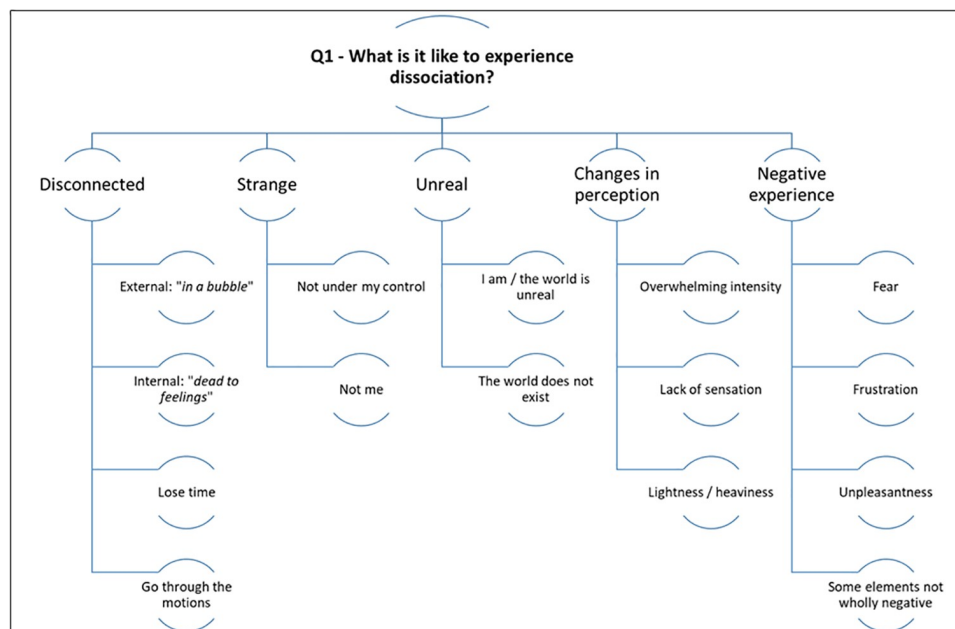


Fig 2. Summarising the themes for the first research question.

<https://doi.org/10.1371/journal.pone.0229091.g002>

Disconnected. All participants described being “detached” and “disconnected”. For some, this felt like being trapped in a metaphorical “box” (P8), “bubble” (P4), behind “a layer of *Per-spex*” (P8) or experiencing life through a “keyhole” (P1). Others experienced this in a less definite way and described feeling “murky” (P6) or hazy. Whilst these sensations often related to external events, interviewees also reported detachment from internal cues: feeling “numb”, having a “blank” mind, and being “dead to feelings” (P2).

Detachment resulted in losing time (P8: “*you just don’t really feel like you’re here . . . time kind of elapses*”), and feeling as though they were “going through the motions” of living whilst feeling none of the usual associated sensations:

P8: “*Sometimes I can even show the right emotions, I guess, but I don’t feel them*”

Feelings of disconnection also resulted in sensations of being separate from, or outside of, their body:

P5: “*. . .and suddenly I feel a bit outside of myself, dizzy, and kind of disoriented*”

Participants reported that these experiences of disconnection persisted, sometimes building in intensity, and often also felt strange and unreal (below).

Strange. Ten interviewees described the quality of the experience of dissociation as “strange”, “weird” or otherwise “a bit *disconcerting*” (P3). Two related elements appeared to contribute towards this. The first is the issue of choice or control. Participants reported not having a choice as to whether or when dissociation would occur; not having control over it once it began; and sometimes not feeling fully in control of their actions when feeling dissociated:

P5: “*You try and get control of it, but it’s like a bar of soap or something, it just keeps slipping out of your hands.*”

Secondly, people described dissociation as though it was a separate entity to themselves, including not identifying themselves as “them” at times:

P7: “*It doesn’t feel like me, but deep down I do know it’s me. It’s not a case of: I think I’m watching through someone else—it just doesn’t feel like me.*”

P6: “*Like now, I’m watching myself speaking, but that’s not me.*”

Interviewer: “*Which bit isn’t you?*”

P6: “*The speaking bit. The words that are coming out seem to be coming from me, but there is something here sort of monitoring the words and saying, ‘well I suppose he’s talking about the right sort of thing’*”

Unreal. Sensations of strangeness and disconnection appear to contribute to another major theme of ‘unreality’. Eight people described that their surroundings, experiences, or they themselves did not feel real, or that they struggled with reality:

P6: “*It’s as if what appears to be the reality around me is crumbling*”

Four people even stated that they felt as though the world around them might not exist at all.

Participants described being trapped in a “*simulation*” (P1), computer (P10), video game (P9, P12), nightmare (P2), or alternate universe (P6). These examples of artificial–unreal–environments encapsulate sensations of strange unreality (externally) and the apparent lack of personal agency (internally).

Perhaps unsurprisingly, given the above, some participants described experiencing life as fragmented:

P1: *“Life isn’t a coherent succession of events any more. It’s just different sort of sporadic moments which I just remember”*

This was a sensation participants doubted anyone else had felt before:

P6: *“I can’t imagine anyone else having the same sort of consciousness”*

Changes in perception. Interviewees commonly reported increased volume and intensely bright colours as part of their dissociative experience. Numerous reports blur the lines between anomalous perceptual experience and hallucinations:

P3: *“It’s sort of like old 3D films: it’s got extra colours around the images.”*

Understandably, some interviewees found these experiences overwhelming. This “*overwhelm*” (P2) appeared to drive the “unreality” discussed above, and linked closely with the reports of being unable to cope, “*hypersensitive*” (P9), or “*fragile*” (P2).

In terms of physical perception, participants reported a lack of bodily sensation, feeling separate from the body, or even feeling they did not have a body at all:

P12: *“And it didn’t feel like it was my body, it just felt like- I was just sort of reflecting. Like I was a mirror or a camera or something like that. I wasn’t aware that I actually had a body.”*

Interviewer: *“But then you sit and relax and then your body starts to feel unreal?”*

P10: *Yeah, like it’s not there.*

Interviewer: *[. . .] So it’s like a whole leg has gone missing or..?*

P10: *Sometimes, yeah. My arm or something, yeah.”*

This lack of sensation (or absence of a body part) linked with sensations of lightness or floating:

P6: *“It feels- I wouldn’t say weightless, but you don’t- there’s no sensation”*

Conversely, some people described dissociation in terms of heaviness, slowness or tiredness:

P3: *“It can feel like trying to move through water fast”*

Some described the sensation in terms of depth or distance (which at times overlapped with feelings of numbness):

P6: *“I don’t feel I’m outside my body, I feel I’m deep inside”*

Anomalous bodily and perceptual experiences further contributed towards difficulties feeling connected to one's self:

P9: *"I'm present in this body in emotions and stuff, but it ain't me: just a thing. [. . .] Because I don't use my facial muscles for expressions, when I do, it's like 'oh that's someone else, no, I'm not comfortable with that'."*

P10: *"And when I look in a mirror as well, I look like someone else all the time. I see a different person in different mirrors."*

Negative experience. The vast majority of interviewees felt that dissociation was a negative experience:

P8: *"it was the worst feeling in the world".*

Specifically, participants reported fear and frustration:

P2: *"Everything was frightening. And I was fearful and anxious and paranoid."*

P4: *"Always like a frustration. I'd get so frustrated that it was happening again."*

Participants also predicted that other people would be scared, upset, or worried if they understood the truth about dissociation:

P6: *"I would like my head to be opened up and for me to say, 'look, this is what it's like inside', and I think people would be very frightened."*

However, whilst many described the unpleasantness of dissociation, some interviewees explained sometimes the experiences could also be exciting or refreshing:

P8: *"Honestly? Sometimes [it's] quite refreshing because- I think the nature of how my illness plays out sometimes that I over-care, so for a while it's quite refreshing. [. . .] It's quite like, 'oh okay, this is how it feels when you don't really give a shit' [. . .] And at first it's like, 'okay, it's quite cool, I get it', but then it's not cool. It's not cool."*

Many interviewees also described how they had become accustomed to some of their dissociative experiences, expressing apparently neutral emotional experience of dissociation:

P7: *"By the evening, I'll still be a bit murky—but I'm usually murky, so it's fine."*

However, Participant 6 gave an insight into how it may not be entirely neutral:

P6: *"I'm so used to it I can talk about it quite blandly, although it is quite an intense feeling. I'm overwhelmed by it all the time. But because I'm so used to it, it doesn't bother me quite the same way it used to."*

2. What is the impact of dissociation?

Please see Fig 3 for a summary of the results for research question two.

Functioning. Eleven participants reported some minor difficulty with day-to-day functioning. Participant 1's summary *"I mean—I can function, it's just hard"*, appeared to be the

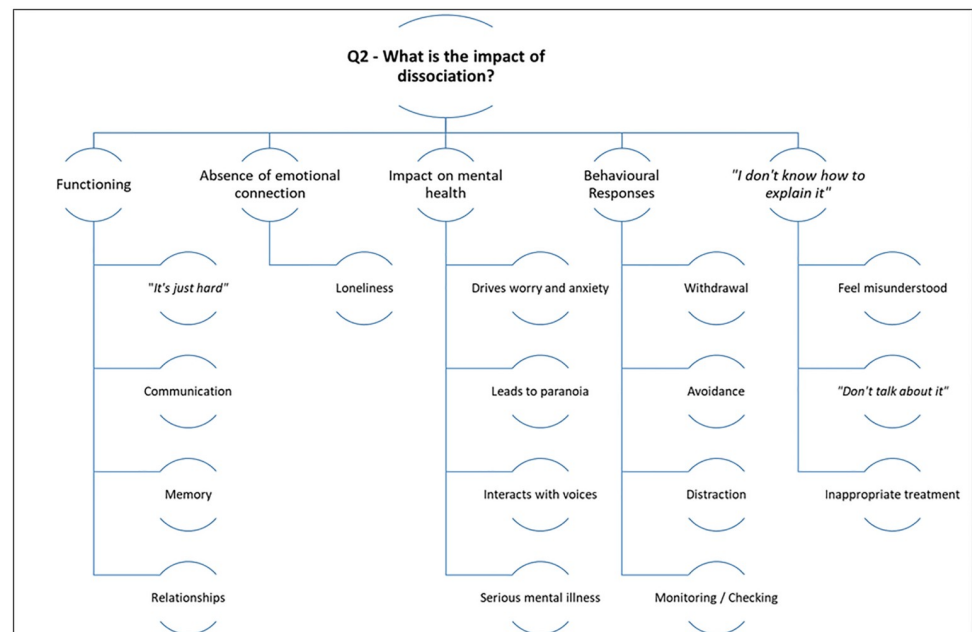


Fig 3. Summarising the themes for the second research question.

<https://doi.org/10.1371/journal.pone.0229091.g003>

general view. However, three interviewees reported dissociation had significantly disrupted their life (P4: *"I didn't finish my A Levels"*; P6: *"I had a year off school"*).

Interviewees described a number of specific 'in-the-moment' impairments which were associated with greater frustration or distress, such as communication (comprehension or speech generation). Two key ways in which memory was affected by dissociation were described: firstly, participants experienced absence of memory or difficulty retrieving memories:

P1: *"If I go into a room, I forget how I got there or I just forget large chunks of what I do throughout the day [...] I feel like it's there, it's just being blocked."*

Secondly, interviewees described feeling a lack of ownership or agency in retrieved memories:

P2: *"With some things, it's like I have the memory of something, but it's more like someone's described it to me in detail, rather than me experiencing it."*

Memory and communication difficulties also impacted social relationships. Participant 7 described feeling concerned that if friends discovered he could not recall meeting with them, the friends would be upset and conclude that he did not value their friendship. Concerns about inadvertently offending people in this way—or because of being under-responsive or non-communicative when feeling dissociated—were common. Participants expressed not wanting to upset or stress their friends and family, as well worrying what people who knew them less well would make of their dissociated state. However, close friends and family can begin to recognise the signs that the person is experiencing dissociation:

P8: *"She says she can always tell because I just- she says, 'You're just not there, it's blank, like- there's no character, there's no spark, there's no nothing. It's like your brain's just switched off from us'."*

Absence of emotional connection. Participants reported that if they did notice dissociation happening (many reported that they did not notice until it ended), they tried to “snap out of” (P11), “break through” (P8) or “get out” (P3) of it. Often, this was to try and re-connect with others: one of the most widely endorsed themes regarding the impact of dissociation was ‘loneliness’. Seven people reported feeling ‘just really lonely’ (P4) and isolated. Although this was explained as being because ‘no-one understands’ (P10) by a number of participants, most stated that it was a result of being unable to feel emotional closeness because of dissociation:

P4: “I would just burst into tears or just feel- and you know you’re not alone, because you’ve got everybody around you [. . .] but at the same time, in that moment, and in that bubble, you just feel you are the most disconnected, isolated person ever.”

Impact on mental health. For some, the desire to “snap out of” dissociation was also because of the impact it can have on mental health:

P11: “[Dissociation] can get quite linked to my mood or to a psychosis episode, so it’s important that I try and break out of it as early as I can.”

Most interviewees made a link between dissociation and anxiety, indicating that dissociative experiences lead them to worry more:

P12: “Being cut off from the real world and just sort of chattering away on my own, or staying in at home and over-thinking and ruminating and not actually—yeah, feeling part of the world.”

There were also indications that this could tip into paranoia:

P8: “I think the paranoia is where the overlap is [. . .] it’s very easy for the voices and the paranoia to creep in and fill your head with what could have happened, rather than knowing what did happen.”

Participant 8 was not the only person who discussed the connection between voices and dissociation. Others reported that dissociative episodes could act as a trigger for the voices starting (P11), or make them louder and more aggressive (P4). Participants 2 and 6 described hearing non-voice sounds which became part of the perceptual “overwhelm” described above, and which they interpreted as having a particular meaning or significance:

P6: “My hearing can change; I can hear things and I think ‘What does that mean?’ As if somebody’s trying to communicate with me a bit sometimes.”

Dissociation can therefore exacerbate worry and anxiety, which may interact with psychotic symptoms. A number of interviewees described a next stage in the sequence of events: yet more severe consequences for their mental health:

P2: “Well, I became suicidal actually”

Behavioural responses. Participants described a range of methods for coping with dissociation. The most commonly reported was the impulse to withdraw:

P4: “It’s really hard because some days, you do just want to hide.”

When withdrawal is reported as being under the person's control—rather than “zoning out” and “*just sit[ting] and star[ing] at nothing*” (P4)—it can take the form of having a “*lie down*” (P6), or finding another comfortable way of “*rid[ing] it out*” (P1) or “*let[ting] it go away*” (P7). This kind of withdrawal was linked to the belief that there is no way of preventing or stopping a dissociative experience and therefore the only option is to wait for it to pass.

Withdrawal was also related to the belief that stress and other intense emotion are negative and best avoided (see Question 3). This resulted in avoidance of busy social situations, sticking to familiar routines, and trying to stay “in the moment” to avoid becoming stressed:

P6: “*If I can just smoothly move through the experience and not allow this hook- [gesticulates near head] -not be too aware of what's going on, just allow it to flow through, then I can manage.*”

Sometimes, therapeutic coping mechanisms—particularly grounding and sensory kits—were employed to achieve avoidance of stress. However, participants noted that while these sometimes reduced the length of time spent dissociated, they did not prevent it happening entirely. Others noted that they forgot coping techniques when dissociated:

P12: “*So one minute it's like “oh..!”, next minute it's like. . . [makes “whoosh” motion]. It happens so quickly [. . .] and you forget that: “oh, I could just phone my CPN [Community Psychiatric Nurse]”. I mean, you just forget things like that.*”

As well as physical avoidance of potentially stressful situations through withdrawal, participants also described mental avoidance of difficult thoughts or thoughts about dissociation through distraction and “keeping busy”. Techniques employed included fostering a busy life-style, asking close friends or family provide distraction through conversation, or performing mental tasks or puzzles:

P7: “*Plan meals for either the week or the next two weeks, even if I have no intention of cooking them*”

Mental tasks sometimes took the form of devising tests to see whether dissociation had passed or to try and force it to pass. For example, Participant 8 recounted how they forced themselves to look at their friend's pet snake to try and invoke a fear response and “break” dissociation.

Mental avoidance of dissociation was also achieved by not talking about the experience (P3: “*I tend not to speak about it much*”). As well as feeling that no-one would understand the experience (next section), this was driven by fear of dissociation:

P6: “*I think it was really I was just terrified of what was going on and I didn't trust anyone enough to talk to them about it*”

Despite this high level of mental avoidance, participants also implied that they actively observed or judged their internal world during dissociation, sometimes engaging in monitoring or checking behaviours:

P7: “*A case of “ok, remembering this is not real”. Well, I always knew it wasn't real, but it's a case of: I can see it happening, I can just sort of move past it—it's not as if I have to stop and look at it, which was the issue before, because I needed to make sure whether or not it was happening.*”

Not knowing how to explain the experience. The difficulty of describing dissociative experiences and finding the appropriate words or language for them was a common theme of the interviews. Many relied upon metaphor to get their meaning across (such as the “box”, “bubble” etc. above). Ten of the twelve participants explicitly stated:

P5: *“I don’t really know how to explain it”*

It was therefore also a common experience for interviewees that other people did not understand what they were describing:

P8: *“When you explain it, nobody gets it”*

This led to people choosing not to speak about dissociation, and—if they did—professionals mistaking it for another problem, particularly depression or psychosis:

P6: *“They might be related, but they’re very separate experiences to me. I think that’s fundamental. When you’re actually going through the problem, it’s very difficult to get across to somebody that you’re having two separate qualitative experiences. I’ve got the mysticism [dissociation], and I’ve got the schizophrenia.”*

As well as feeling misunderstood and unheard, participants suggested that people experiencing dissociation may undergo inappropriate or irrelevant treatment (such as Participant 12, who described being on medication for bipolar disorder: *“obviously I didn’t have the symptoms, so it was working on just ‘me’.”*).

3. What factors begin, maintain, or end a dissociative experience?

Please see Fig 4 for a summary of the results for research question three.

Factors that begin dissociation. Whilst some participants stated that dissociation *“can happen completely randomly”* (P1), the majority of participants noticed that anxiety or “stress” could trigger a dissociative experience. This was true for emotional distress more broadly; including low mood, feeling “upset”, or worsening psychotic symptoms. For those who experienced voice-hearing, a number had heard voices (or “noises”) long before they had felt disconnected, one person suggested that the two came together (although they believed them to be separate phenomena), and others indicated that feeling disconnected allowed “space” for voices to intrude and worsen. A similar pattern was reported for paranoid thinking: some participants cited paranoia as causing stress and anxiety, which in turn caused them to dissociate; whilst others described feeling paranoid as a result of feeling unreal or feeling that something had been altered in themselves or their surroundings.

Participants reported that listening intently to voices, *“dwelling on a situation”* (P4) or *“getting into your own head”* (P5) by focusing on thoughts and emotions could cause dissociation. This included dwelling on dissociation itself, in which case dissociation was seen to *“trigger itself off”* (P4).

Related to internal focus, participants reported that dissociation was more likely to happen when they were alone or feeling isolated. Isolation was also noted as something that may have initially contributed to dissociation alongside stress: nine participants described dissociation beginning during a significantly stressful period in their lives—and three made explicit reference to feeling unsupported or alone during these times. These stressful periods included surviving a domestically violent relationship, having a *“turbulent”* family life when young, being

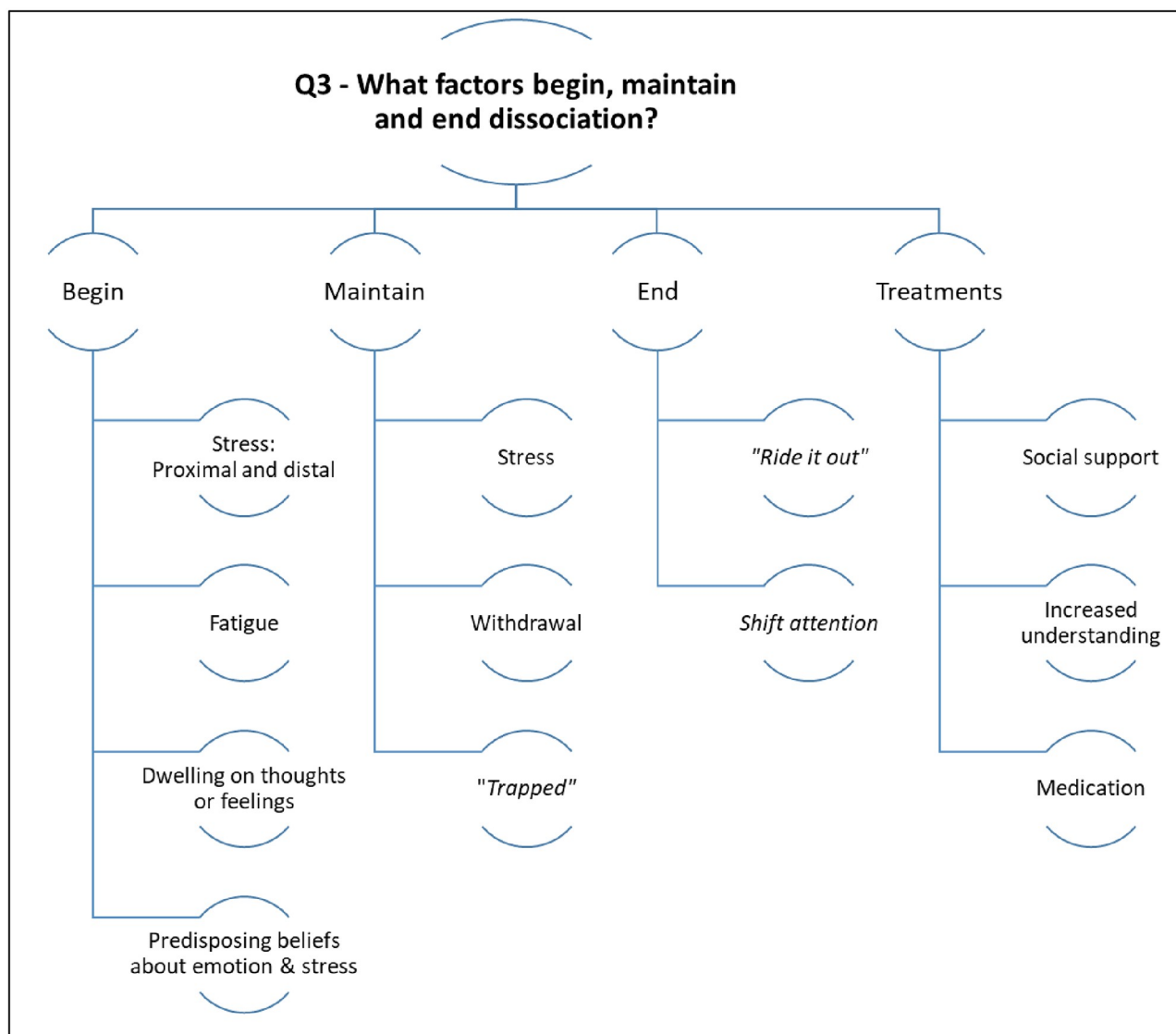


Fig 4. Summarising the themes for the third research question.

<https://doi.org/10.1371/journal.pone.0229091.g004>

physically attacked, experiencing bereavement, and having to drop out of university due to mental ill-health and stress.

Proximal precipitating factors identified included feeling “*mentally exhausted*” (P1), “*sitting doing nothing in particular*” (P6), and feeling “*overwhelmed*” by too much mental or perceptual stimulation (including from psychotic experiences). “*Feeling overwhelmed*” was discussed with particular reference to emotion, which six participants reported that they “*didn’t want*”, since “*things like emotions I’ve never been able to cope with*” (P9). Such discussions also highlighted longstanding beliefs that intense emotion was potentially dangerous due to participants’ relative “*fragility*” and (in)ability to cope.

These participants explained how they tended to avoid or “*repress every single emotion*” (P11), sometimes due to beliefs about the danger of emotion:

P9: "Yeah, no, I didn't want emotions. From the earliest I can remember."

Interviewer: "Any particular reason why you didn't want emotions?"

P9: "I'm uncomfortable with them."

Interviewer: [...] "What would happen if you didn't stop [your emotions]?"

P9: "Well, they can become so intense that you have no control over it. [...] They'd be psychotic."

This seems particularly relevant to the development of dissociation: some participants identified that emotion could bring on dissociation (P6: "you get charged emotionally [...] and that can bring on layers of unreality as well") and therefore dissociation is "a withdrawal from excessive emotion" (P11). However, the exact chain of events is unclear, as some interviewees noted that avoiding emotion may actually have led to them experiencing dissociation (P11: "it was some form of emotional leakage").

Other predisposing factors identified by participants were: a tendency to daydream excessively when young, having a busy or enquiring mind (prone to dissecting events), and poor sleep. Further, participants expressed negative self-beliefs of being "bad" or "different"; these may also be predisposing factors.

Factors that maintain dissociation. The factors of stress, tiredness, isolation, and dwelling on internal events identified above were also cited as relevant to the persistence and re-occurrence of dissociative experiences.

Additionally, withdrawal behaviour may perpetuate dissociation: participants reported disengaging from activities which might be potentially positive because they believed it would be impossible to feel the positive emotion. This arguably continues the absence of emotional connection:

P6: "The few relationships I've had with women have been with women I've not really fancied particularly, because there's not a large emotion in my mind. If I feel a large charge of emotion, I have to back off."

The way in which participants spoke about dissociation also implied two further potential maintenance factors, although these were less clear. The first is "being trapped in" (P12) the experience (including losing insight). Participants reported that as a result of "being trapped", they found it difficult to respond to dissociation, which allowed the episode to continue unchecked:

P11: "There are dissociation images which are engaging ones, where I think I'm in them."

This may interact with beliefs about control over dissociation. Secondly, previous positive experiences of dissociation might promote ambivalence about dissociation and affect how someone responds when they feel it coming on:

P6: "In a way, it's sort of an adventure"

Factors that end dissociation. Interviewees reported that dissociation can end suddenly or by slowly fading away. Two participants suggested that dissociation might never end, but rather, one's attention shifts elsewhere. Indeed, being distracted—particularly by other people talking directly to you—appeared to be one of the most common routes out of dissociation. When this was sudden, participants talked about being "snapped out of" dissociation.

Four participants reported that there was nothing that could be done to end dissociation (recalling the issue of control discussed above), and that all that could be done was to “*ride it out, sort of wait for it to finish*” (P1). However, two participants identified that they noticed dissociation had ended when they were “*not doing anything—just sort of trying to relax*” (P3).

In terms of treatment approaches, it was evident that participants welcomed support for dissociative experiences. Two participants suggested that a lack of medical intervention earlier in their lives had led to worse outcomes for their mental health, and seven participants noted that dissociation was easier to manage once they had achieved a better understanding and acceptance of it. The support of others—discussions with friends and family, or formal support groups—were cited as important for achieving this and for managing mental health more broadly.

Interviewees also named specific treatment techniques as effective including medication (P4: “*I take my medication religiously every day*”), using a box of sensory objects for grounding (P8: “*It reminds me of my Nan’s dog’s ears, which always seems to bring me back*”), and making lifestyle changes:

P12: “*I started swimming regularly [. . .] There were things I was trying to do to change, like CBT or giving up smoking, trying to have less caffeine. . .*”

However, although these were often reported as being helpful, it should be noted that participants also found limitations to these treatment approaches. For example, some noted that grounding techniques might only reduce the length of dissociation, rather than preventing it; care plan or psychological techniques might be forgotten or inaccessible during dissociative episodes; and medication was not always effective for the specific experience of dissociation.

4. What thoughts and beliefs do people have about dissociative experiences?

Please see Fig 5 for a summary of the results for research question four.

During the experience. Some interviewees said that they are aware of their thinking changing during dissociation. Participant 6 described their thoughts “*going skewiff*” or “*wonky*”, and Participant 11 said that their thoughts might speed up or “*completely slow down*”. Five participants referred to “*going blank*” and having “*just nothing in your head*” (P8). These experiences made it challenging for people to identify any thoughts arising during dissociation.

When people could identify thoughts, these often reflected the sensations and experiences described in Question 1 (for example, feeling overwhelmed: P6: “*it’s too much*”; or finding things unreal: P1: “*it’s just like a game*”). These could occur alongside awareness of or insight into the experience (P9: “*Ah, you’re going through this again*”).

Interviewees described focusing on what was happening, and anxiously searching for explanations:

P10 “*Why me? What have these things happened to me?*”

Participants described either actively trying to figure out what was happening or passively observing the experience to learn more about it. Potential answers to these questions ranged from benign (P7 “*Am I dreaming?*”), to catastrophic (P4 “*I’m completely losing my mind.*”). Some also appeared more psychotic in nature:

P12: “*I’m not part of the world any more. I’m not going to get away to the other planet and live like everyone else.*”

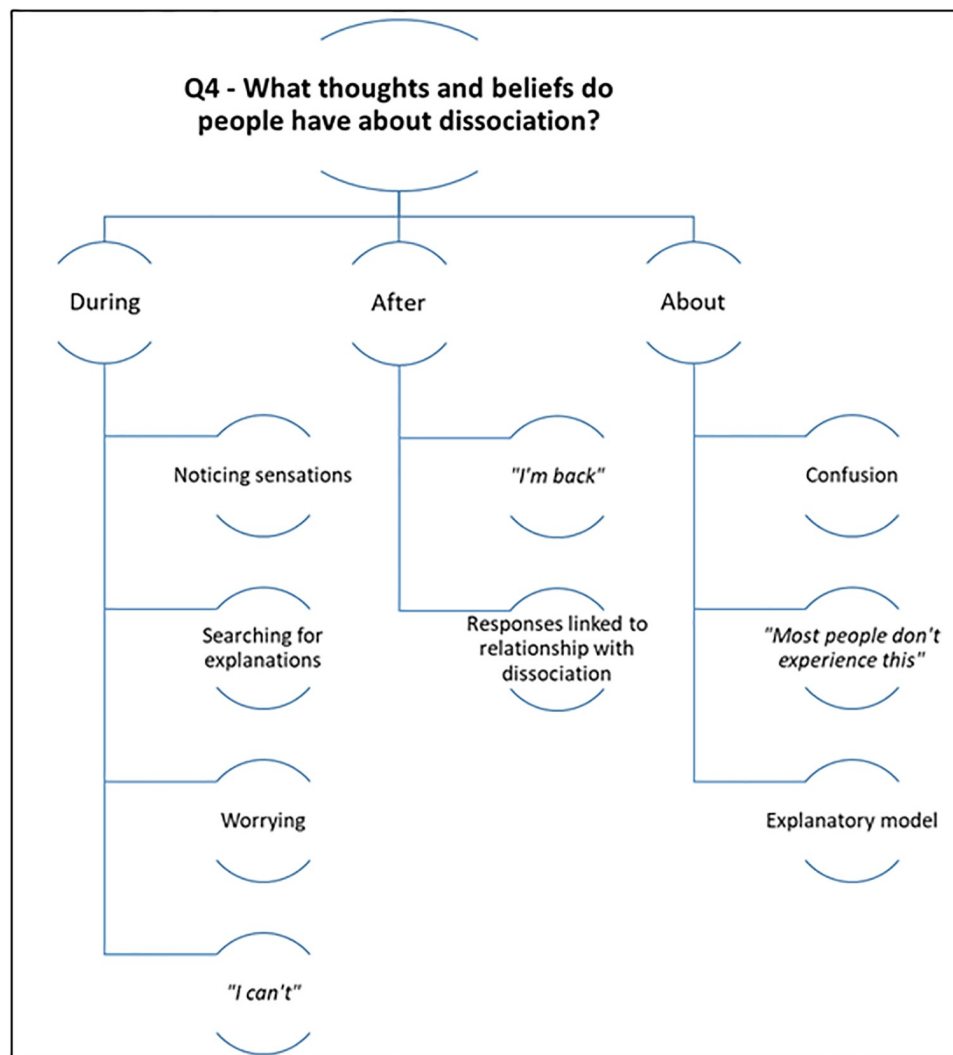


Fig 5. Summarising the themes for the fourth research question.

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Anxious cognitions in general were frequently reported, including: worrying that dissociation was about to happen, that it meant something was wrong, worrying about the consequences of the dissociative feelings, worrying others would notice, and worrying how long the sensations would last. Thoughts about wanting the experiences to stop or end once it had begun were also reported.

Interviewees reported thoughts about being unable—or prevented from—doing the things they would usually do and not being able to cope with the sensation continuing. These thoughts appeared connected to others reflecting hopelessness, loss of motivation, or passive acceptance the situation:

P6: “What’s the point?”

After the experience. Participants reported surprise (P4: “Ooh, I’m back now”) and relief when realising dissociation had ended. One participant reported feeling slightly “guilty” afterwards, linked to appraisals that it had not been “them” in control during dissociation and

therefore that they could not claim to have personally achieved what had been done during that episode. This caused internal conflict, as the participant reported knowing logically that it had been them.

“Returning” from dissociation, for some, involved checking what the impact of the episode was (P8: “*Ok, what have I missed?*”), and re-adjusting to the world after being numb or detached:

P8: “*It’s like all of a sudden, that little box that was around you isn’t there now and everything’s like “bam!” in your face, or in your ears, or the smell or- everything’s more heightened. I struggle with that; I don’t like it.*”

About the experience. The most common theme when asking about dissociation was that of confusion: not knowing what it is or why it happens. For some, this was acutely distressing:

P6: “*I used to be so desperate to find out what was going on and why I was the way I was. I used to look around, look at people, look at things, as if I’m crying out ‘is there somebody out there than understands what’s going on to me?!’*”

The distress and confusion might be partially explained by beliefs that dissociation is unusual, or that one’s mind is unusual compared to others:

P1: “*most people don’t experience this*”

Perhaps to help themselves understand what—and why—they feel this way, participants often developed “*a theory*” (P12) about dissociation. For example, Participant 5 suggests dissociation might be “*a kind of thought disorder type thing, maybe*”, and Participant 8 explains:

P8: “*I sometimes wonder whether it’s like my brain has reached the max it can cope with, so it’s just like ‘I’m going to shut off’*”.

Whilst these are somewhat psychological explanations, two interviewees used physical explanations: wondering if they have a brain tumour or blood clot in the brain. One participant even underwent scans to determine whether this was true. Other explanations showed the influence of hallucinations, paranoia, aberrant salience, and jumping to conclusions and appeared more psychotic-like in content—such as being trapped in a video game or computer simulation.

Explanations influenced how dangerous participants perceived dissociation to be. They also varied in conviction over time: sometimes taking on a delusional intensity, and other times acting as placeholders for experiences the participant was struggling to describe to others:

P6: “*My description of it was as if I was the second coming of Christ. I wasn’t a religious person, but that was the only way I could think of explaining it*”

Discussion

Key findings

The aim of the current study was to better understand dissociation in the context of non-affective psychosis. Regarding the lived experience, this appears best described as a negative, highly

subjective experience where the core feature is a “felt sense” of strangeness. The most reported ‘types’ of ‘strangeness’ in this sample were finding that things somehow felt ‘unreal’ or feelings of unanticipated detachment. Feeling unanticipated emotional detachment from others was associated with significant distress. People also experienced unanticipated unfamiliarity, and a sense of automaticity (rather than voluntary or effortful control).

Dissociation is conceptualised as a multi-dimensional construct, with a vast range of symptoms and experiences proposed to fall within its bounds [e.g. 19]. It is unsurprising, therefore, that the open and exploratory approach taken by this study resulted in omissions of particular experiences described in other reports of dissociation, instead bringing to the fore those symptoms that were the most problematic or most noteworthy to the people experiencing them. For example, no participant described dissociative amnesia; however, several described memory blanking and experiencing their memories as unfamiliar. In line with Lynn et al. [1], who state that ‘it can be challenging, if not impossible, to distinguish amnesia from encoding failure’, a number of participants stated that they were aware that their lack of memory for events related to periods when they were feeling unreal or detached. The results therefore highlight interviewees’ subjective experience of their memory as somehow altered or anomalous.

It is striking that feeling unable to describe dissociative experiences was such a strong theme in the results. Participants struggled to find the words to describe dissociation, often relying on “as if” statements or metaphors to describe highly subjective and sometimes subtle experiences. The result of this difficulty—perhaps exacerbated by fear, mental avoidance, and concerns about others’ reactions—was that people did not feel able to talk about these events. Lack of reporting to clinicians may partially explain why dissociation is so often under-recognised [2]. We therefore recommend that clinicians proactively ask about dissociative experiences, as clients are unlikely to describe these unprompted. Further, it was a common experience that attempting to describe dissociation resulted in the listener misunderstanding. Within this small sample of lived experience alone, clinicians reportedly interpreted descriptions of dissociation as depression, worsening psychosis, or bipolar disorder. It seems likely that people with non-affective psychosis describing dissociation to their care team repeatedly feel unheard or misunderstood, and may receive inappropriate treatment.

However, recognising the distinction between dissociation and psychosis may be especially challenging when assessing presentations featuring negative psychotic symptoms. In particular, the Positive and Negative Syndrome Scale (PANSS; [20]) negative scale items of “blunted affect”, “emotional withdrawal”, and “passive/apathetic social withdrawal” may present similarly to one of the main types of experience described by participants (emotional detachment) and one of their main responses (withdrawal). Further questions may therefore need to be asked when assessing a patient presenting with these symptoms in order to understand the possible cause.

Placing the findings in context

According to interviewees, there are many interactions between dissociation and psychosis. Hallucinations or hallucination-like experiences contributed to feelings of strangeness; paranoia was identified as a potential consequence of dissociation; and a range of psychotic features (including voices) acted as triggers and modifiers for dissociation. Some readers may argue that it is difficult—or impossible—to make distinctions between psychotic and dissociative symptoms, taking the stance that these experiences overlap, and that many apparently psychotic symptoms may in fact be dissociative (and vice versa). For example, auditory hallucinations have been described as dissociative by Moskowitz and colleagues [21]. Whilst it is not within the scope of this paper to answer the question of whether or which symptoms require

re-categorising, it is important to note that participants commented on the distinguishable nature of these experiences. That is to say, people with psychosis diagnoses experience dissociation as distinct from their psychotic symptoms, describing these as having the anomalous (detached, strange, and unreal) qualities described above. Further, they reported a sense of frustration when clinicians did not understand that they were describing two separable phenomena (dissociation and psychosis).

Whilst the exact pattern of causal relationships between dissociative and psychotic experiences is unknown (whatever the extent of their overlap), these results appear to support the Garety et al [9] model of the development of positive psychotic symptoms. Namely, participants described how they found dissociative experiences confusing and distressing, and subsequently engaged in a “search for meaning”. For some, the result was an explanation with a psychotic-like quality (e.g. the world is a computer simulation). Completing the chain of events proposed in the model, sometimes these explanations were held with such conviction that they met criteria for a paranoid or grandiose delusion.

Our findings also support Hunter et al.’s [22] cognitive-behavioural conceptualisation of depersonalisation and derealisation (DP/DR; a form of dissociation) within the novel context of non-affective psychosis. Hunter et al. suggest that DP/DR can result from anxiety, stress, or fatigue and is maintained by avoidance, safety behaviours, and cognitive biases (such as symptom monitoring). Our results imply additional factors may also be important: beliefs about one’s ability to cope with stress or (extreme) emotion, perceived powerlessness, and ambivalence about dissociation. The results of this study may therefore be of use in the search for ‘transtheoretical variables’ to explain dissociation [1].

Strengths & limitations

The results of this study are limited by its methodology: it is unclear how these findings generalise outside of the context of non-affective psychosis, for example, in other diagnoses or even in non-clinical (‘non-pathological’) dissociative experiences [23]. Further, participants were not asked to review transcripts for accuracy, and only a single coder was used during analysis. This reduces the validity of the results through the introduction of risk of bias. However, the sample size was adequate for a qualitative method, negative case analysis was included, and the topic guide was developed in collaboration with a Lived Experience Advisory Panel, piloted, and reviewed after the first three interviews. These elements of the methodology improve the credibility of the findings, which have good face validity and appear to triangulate with existing literature outside of psychosis [e.g. 22].

It is interesting that the DES-II scores of nine participants were in the range expected for people with dissociative disorder diagnoses, and it is a limitation of the study that co-morbid dissociative disorders were not asked about or recorded. However, given the under-recognition of such difficulties [2], it is unlikely that many of the participants had a formal diagnosis of dissociation, even if they met criteria for these. Some may argue that participants may have been mis-diagnosed with a psychotic disorder, and in fact better fit the criteria for a dissociative disorder. We believe that this is unlikely to be true for all participants, many of whom described key psychotic symptoms, such as delusions. Again, it is not the aim of this study to distinguish between psychotic or dissociative presentations other than to highlight patients’ lived experience of these being separable and important in their own right. Any misdiagnosis must surely serve to further illustrate the need for clinicians to be better informed and feel more confident in recognising and asking about dissociative phenomena.

Future directions

Based on these results, we suggest that the core subjective experience of dissociation is a ‘felt sense of anomaly’ (FSA). This may relate to the internal world (thoughts, emotions, or memories), the physical body, or the external world (the environment and other people). The anomaly may be a sense of unfamiliarity, unreal-ness, detachment or some other sense of deviation from normal experience. Clinicians may wish to listen out for descriptions of FSA when assessing patients, as these kinds of experiences may be suggestive of dissociation and require further exploration. Holding this common denominator in mind may therefore aid clinicians in their recognition of dissociation by simplifying a confusing array of symptoms [24] into a broad, but nevertheless descriptive heuristic.

The potential causal and maintenance factors highlighted in these results indicate specific interventions which may be helpful for ameliorating dissociation and the distress it causes. For example, stress, fatigue, avoidance, and withdrawal imply that techniques such as grounding, problem-solving, pacing, activity scheduling, and behavioural experiments may be effective in the treatment of dissociation. Motivational interviewing may be appropriate where people have high levels of ambivalence towards dissociation. Whilst some of these techniques have already been suggested as interventions for dissociation [e.g. 25], others constitute potentially novel applications and warrant further exploration.

Enhancement of interventions for dissociation may be particularly important in non-affective psychosis, given the above discussion of Garety et al. [9]. The results of this study suggest that having a better understanding of dissociation modifies or negates the need for a “search for meaning”: interviewees described seeking an explanation when they did not understand what they were experiencing, and conversely, feeling less afraid and more capable once they understood dissociation better. It is possible that psychoeducation or reducing dissociation would similarly influence the “search for meaning” implicated in the Garety et al. model. It would then be of interest to determine whether this would in turn prevent or modify the subsequent development and maintenance of psychotic experiences.

Supporting information

S1 File. Topic guide.
(DOCX)

S2 File. Reflexive statement (EČ).
(DOCX)

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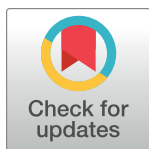
A new perspective and assessment measure for common dissociative experiences: 'Felt Sense of Anomaly'

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Abstract

Background

Dissociative experiences occur across a range of mental health disorders. However, the term 'dissociation' has long been argued to lack conceptual clarity and may describe several distinct phenomena. We therefore aimed to conceptualise and empirically establish a discrete subset of dissociative experiences and develop a corresponding assessment measure.

Methods

First, a systematic review of existing measures was carried out to identify themes across dissociative experiences. A theme of 'Felt Sense of Anomaly' (FSA) emerged. Second, assessment items were generated based on this construct and a measure developed using exploratory (EFA) and confirmatory (CFA) factor analyses of 8861 responses to an online self-report survey. Finally, the resulting measure was validated via CFA with data from 1031 patients with psychosis.

Results

'Felt sense of anomaly' (FSA) was identified as common to many dissociative experiences, affecting several domains (e.g. body) and taking different forms ('types'; e.g. unfamiliarity). Items for a novel measure were therefore systematically generated using a conceptual framework whereby each item represented a type-by-domain interaction (e.g. 'my body feels unfamiliar'). Factor analysis of online responses found that FSA-dissociation manifested in seven ways: anomalous experiences of the self, body, and emotion, and altered senses of familiarity, connection, agency, and reality ($X^2(553) = 4989.435$, $p < 0.001$, CFI = 0.929, TLI = 0.924, RMSEA = 0.052, SRMR = 0.047). Additionally, a single-factor 'global FSA' scale was produced ($X^2(9) = 312.350$, $p < 0.001$, CFI = 0.970, TLI = 0.950, RMSEA = 0.107, SRMR = 0.021). Model fit was adequate in the clinical (psychosis) group ($X^2(553) =$

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Ethics Committee of the University of Oxford, the NHS Research Ethics Committee, and Health Research Authority, and consented to by participants. Surveys were confidential to enable freedom of expression by participants, and participants consented into the study without being consulted as to the sharing of anonymised data. Therefore, only descriptive statistics, which qualify as the minimal data set, are included in the paper.

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1623.641, $p < 0.001$, CFI = 0.927, TLI = 0.921, RMSEA = 0.043, SRMR = 0.043). The scale had good convergent validity with a widely used dissociation scale (DES-II) (non-clinical: $r = 0.802$), excellent internal reliability (non-clinical: Cronbach's $\alpha = 0.98$; clinical: Cronbach's $\alpha = 0.97$), and excellent test-retest reliability (non-clinical: ICC = 0.92). Further, in non-clinical respondents scoring highly on a PTSD measure, CFA confirmed adequate model fit ($X^2(553) = 4758.673$, CFI = 0.913, TLI = 0.906, RMSEA = 0.052, SRMR = 0.054).

Conclusions

The Černis Felt Sense of Anomaly (ČEFSa) scale is a novel measure of a subset of dissociative experiences that share a core feature of FSA. It is psychometrically robust in both non-clinical and psychosis groups.

Introduction

'Some have criticized the concept of dissociation itself, pointing out that it has become over-inclusive and therefore meaningless [. . .] Between critics and specialists yawns an unbridged chasm, so that the field has remained in disconnected state' [1].

Since Janet's influential work [2], which outlined dissociation as an altered state of consciousness resulting from traumatic events, the array of phenomena encompassed within the term dissociation has expanded to such an extent that—as the quotation above highlights—any unifying concept has become obscured. This lack of clarity, combined with the often difficult to describe nature of the phenomena, makes dissociation a challenging field of mental health research. Because dissociation has become 'a vague term used to describe a broad range of phenomena' [3], theorists, clinicians, and researchers may be using the same term to refer to rather different phenomena, depending on which—often unstated—assumptions are being made. This contributes to the continued under-recognition and misidentification of dissociation clinically [4], and impedes progress in research [5,6]. Therefore, this paper seeks to define a circumscribed area within the broad concept of "dissociation", delineate precisely which phenomena fall within this category, and develop a corresponding measure to facilitate its study.

In response to the heterogeneity, several theorists have taken the approach of suggesting that sub-categories of dissociative experience exist. Most notably, Holmes et al. [7] propose that there are two distinct forms of dissociation: detachment and compartmentalisation. The former describes experiences involving altered states of consciousness, such as depersonalisation, derealisation and other forms of separation from one's internal or external environment. The latter—compartmentalization—refers to deficits or loss of control in specific functions, such as in dissociative amnesia, dissociative seizures, or functional neurological symptoms. Holmes and colleagues [7] state that although both forms of dissociation may exist on a spectrum of severity, they are nevertheless independent and need not co-occur. By referring to both forms as 'dissociation', we may be conflating two separable phenomena.

In this study, we therefore propose to seek out phenomenological subcategories of dissociative experience *de novo*, using multiple sources of information, and without prior hypotheses as to what distinctions may arise. This approach follows that taken by clinician-researchers such as Clark and Ehlers [8,9], whose translational treatment-development work demonstrates that before a theoretical basis for understanding a particular phenomenon can exist, it must first be clearly understood at the phenomenological level.

At present, the majority of research uses the Dissociative Experiences Scale as a measure of dissociation (DES; [10,11]). This is the longest-standing and most widely-used measure of dissociative experiences, containing 28 items such as 'Some people are told that they sometimes do not recognize friends or family members' and 'Some people find that they sometimes are able to ignore pain'. Whilst this measure has had significant impact in the field and greatly facilitated discourse about dissociative experiences in clinic and research, the DES does have limitations [7,12]. Most relevant here is the observation that the DES omits some experiences (most notably emotional numbing) that would be required for a comprehensive measurement of dissociation. Accordingly, it would be beneficial to research and clinical endeavours if any new characterisations of dissociative sub-categories were accompanied by a comprehensive measure of that construct.

Therefore, we describe here a novel definition of a category of dissociative experiences using a patient-informed, data-driven approach, and then develop its corresponding measure.

A systematic review of phenomenology

In the absence of a consensus regarding the symptoms and mechanisms of dissociation, we first sought to identify a coherent set of experiences on the basis of the phenomenology studied to date under the term. To achieve this, a systematic search of the literature for measures of dissociation was undertaken (See Table 1 for search terms and Fig 1 for the PRISMA diagram; the search and data extraction was performed by EC). Measures were chosen since these must necessarily specify which phenomena are most relevant or prototypical when assessing the concept to be measured, and therefore should provide descriptions of notable, fundamental examples of dissociative phenomenology. Specifically, papers were sought where a measure of dissociation (or an incorporated concept, e.g. depersonalization) was subjected to factor analysis. The aim was to inspect the factors produced by these analyses and search for common themes among measures.

Table 2 summarises the 77 papers which factor analysed 26 measures of dissociation. The DES received the most attention of any individual measure, with 28 factor analyses carried out on the adult version of this scale. Of these, just over half found absorption ($n = 19$) and depersonalization ($n = 18$) were a factor in dissociation; half incorporated some form of memory difficulty or amnesia; and seven found a single factor structure. By contrast, non-DES measures (41 studies, 24 measures) were more mixed, and less likely to incorporate absorption (4 studies, 2 measures), or memory problems (11 studies, 9 measures). However, factors relating to depersonalisation experiences were still relatively common (present in 20 studies of 13

Table 1. Summarising the search method and results of the systematic review of existing dissociation measure studies.

Method

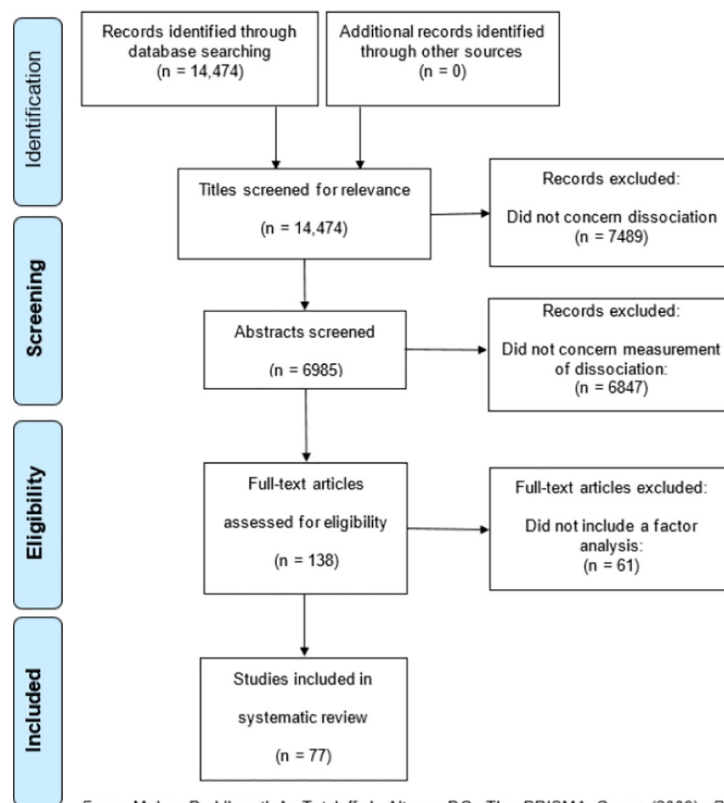
The search was run on 15th July 2019 in Ovid Medline using the search terms: dissociation; dissociative; depersonali*; dereali*; "intrusi* + memor*"; flashback*; unreality; fugue; reliving; "conversion+disorder". (Note that the wildcard "dissociat*" was not used as this returns many papers entitled "Dissociating... [X] and [Y]..." which are not in the dissociation or wider clinical psychology literature).

The search was limited to English language, and to journal article or review formats. Due to the occurrence of the word 'dissociation' used in other contexts (as above), search terms were limited to the title and abstract of the paper, ensuring that a full-text search did not pick up irrelevant uses of the terms.

Results

Despite the conservative approach to search criteria, a large number of irrelevant results were produced. Therefore, a total of 14474 papers were retrieved meeting the above criteria. Titles and abstracts were then searched by hand using Mendeley Reference Manager (v.1.19.2) to identify relevant papers. This produced a smaller group of 138 papers discussing the measurement of dissociation (Fig 1).

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For more information, visit www.prisma-statement.org.

Fig 1. PRISMA 2009 flow diagram for the systematic review of dissociation measure studies.

<https://doi.org/10.1371/journal.pone.0247037.g001>

measures), and a similar proportion of factor analyses resulted in a single factor structure (12 studies of 6 measures). Across Table 2, excluding single factor results, approximately 70 unique factors have been implicated in dissociation.

Table 2 illustrates the argument that experiences described as “dissociative” cover such a wide range of domains and processes that these are now difficult to unify completely in an understandable way. Although experiences of derealization, depersonalisation and amnesia were described by a number of measures, Table 2 shows no unanimous inter-measure themes of phenomenology.

Definition & framework development

In order to identify a common denominator for a proportion of people’s dissociative experiences, the dissociation measures identified in the systematic review above were examined. This inspection found that many items of these measures contain words which imply the presence of a ‘felt sense of anomaly’, such as that described in the results of a recent qualitative study [13]. This qualitative study aimed to improve understanding of the lived experience of dissociation by interviewing 12 people with psychosis diagnoses who reported co-morbid dissociative experiences. The results of the study indicated that dissociation is commonly experienced as a subjective ‘felt sense’ that something is ‘wrong’, ‘off’, ‘odd’, or somehow anomalous. These sensations grouped into themes describing a type of anomaly, including ‘strange’, ‘unreal’ or

Table 2. Summarising the results of N = 77 studies which carried out factor analysis on measures of dissociation or closely-related concepts (e.g. depersonalisation).

Reference	Factors					Sample characteristics
Dissociative Experiences Scale (Bernstein & Putnam, 1986):						
Allen, Coyne & Console (1997)	Detachment from one’s own actions		Detachment from the self and the environment			n = 266 female inpatients DES mean = 35.1 (SD = 23.2)
Amdur & Liberzon (1996)	Depersonalization / derealization	Memory disturbance	Absorption		Distractibility	n = 129 male patients DES mean = 30.43 (SD = 17.94)
Armour, Contractor, Palmieri & Elhai (2014)	Absorption		Amnesia		Depersonalization / derealization	n = 165 university students DES mean not stated
Brunner, Parzer, Schmitt & Resch (2004) <i>German version</i>	Dissociative amnesia		Absorption / imaginative involvement		Depersonalisation / derealization	n = 52 patients, 1056 control DES mean = 2.81 (SD = 1.67) (BPD); 1.40 (SD = 1.06) (schizophrenia); 1.72 (SD = 1.13) (controls)
Carleton, Abram & Asmundson (2010) <i>DES items & Tellegen Absorption Scale items</i>	Imaginative involvement		Dissociative amnesia		Attentional dissociation	n = 841 undergraduates, 635 community women DES mean not stated
Darves-Bornoz, Degiovanni & Gaillard (1999) <i>French version</i>	Depersonalisation / derealisation		Amnesic fragmentation of identity		Absorption-imaginative involvement	n = 140 victims of rape DES mean = 24.1 (SD = 16.5)
Dunn, Ryan & Paolo (1994)	Depersonalization / derealization	Moderate amnesiac dissociation	Absorption-imaginative involvement		Severe amnesiac dissociation	n = 493 male substance use patients DES mean not stated
Espirito Santo & Abreu (2009) <i>Portuguese version</i>	Depersonalization-Derealization	Absorption	Distractibility		Memory disturbances	n = 570 mixed patient & general population DES mean = 18.81 (SD = 13.82)
Fischer & Elnitsky (1990) <i>Including the Perceptual Alteration Scale items</i>	Single factor					n = 507 undergraduates DES mean not stated
Holtgraves & Stockdale (1997)	Single factor					n = 201 (study 1) & 195 (study 2) undergraduates DES mean not stated
Korlin, Edman & Nyback (2007)	Single factor					n = 342 general population; 181 patients DES mean not stated

(Continued)

Table 2. (Continued)

Reference	Factors						Sample characteristics		
Dissociative Experiences Scale (Bernstein & Putnam, 1986) cont'd:									
Laroi, Billieux, Defeldre, Ceschi & van der Linden (2013) <i>French version</i>	Automatic pilot related dissociation			Defensive dissociation			n = 188 (study 1) & 210 (study 2) university students DES mean not stated		
Lipsanen, Saarijarvi & Lauerma (2003) <i>Finnish version</i>	Single factor						n = 924 general population DES mean = 8.41 (SD not stated)		
Mazzotti et al. (2016)	Absorption		Compartmentalization		Detachment		n = 780 patients; 2303 undergraduates and non-psychiatry patients DES mean = 14.63 (SD = 11.78) (general population); 20.02 (SD = 16.29) (psychiatry patients)		
Olsen, Clapp, Parra & Beck (2013)	Absorption			Depersonalization			n = 575 (study 1) & 459 (study 2) female undergraduates DES mean not stated		
Ray & Faith (1995)	Absorption / derealization		Depersonalization		Segment amnesia		In situ amnesia	n = 1190 undergraduates DES mean = 67.97 (SE = 1.03) (altered response format)	
Ray, June, Turaj & Lundy (1992) <i>Revised version</i>	Fantasy / absorption	Segment amnesia	Depersonalization		In situ amnesia		Different selves	Denial	n = 264 university students DES mean not stated
Ross, Ellason & Anderson (1995)	Absorption / imaginative involvement			Activities of dissociated states		Depersonalization / derealization		n = 274 patients with DID <i>Full text not available to authors</i>	
Ross, Joshi & Currie (1991)	Absorption / imaginative involvement			Activities of dissociated states		Depersonalization / derealization		n = 1055 general population DES mean = 10.8 (SD = 10.1)	
Ruiz, Poythress, Lilienfeld & Douglas (2008)	Absorption			Depersonalization		Amnesia		n = 1551 offenders DES mean = 18.6 (SD = 13.6)	
Sanders & Green (1994)	Imaginative involvement			Depersonalization / derealization		Amnesia		n = 860 undergraduates <i>Full text not available to authors</i>	

(Continued)

Table 2. (Continued)

Reference	Factors				Sample characteristics
Schimmenti (2016a) <i>Italian version</i>	Single factor				n = 794 general population DES mean = 18.60 (SD = 13.85)
Schwartz & Frischholz (1991)	Amnestic dissociation	Absorption & imaginative involvement	Depersonalisation / derealization		<i>Full text unavailable to authors</i>
Dissociative Experiences Scale (Bernstein & Putnam, 1986) cont'd:					
Simeon et al (1998)	Absorption	Amnesia	Depersonalization / derealization		n = 50 patients with DPD; 20 controls DES mean = 23.41 (SD = 13.63) (DPD); 4.02 (SD = 2.91) (controls)
Soffer-Dudek, Lassri, Soffer-Dudek & Shahar (2015)	Absorption / imaginative involvement	Depersonalization / derealization	Amnesia		n = 679 undergraduates DES mean not stated
Stockdale, Gridley, Balogh & Holtgraves (2002)	Absorption	Depersonalization	Amnesia		n = 971 undergraduates DES mean not stated
Wright & Loftus (1999) <i>Standard, verbal, & comparative versions</i>	Single factor				n = 75 undergraduates DES mean = 12.73 (SD = 2.39)
Zingrone & Alvarado (2001)	Single factor				n = 308 university students DES mean = 21.70 (SD = 12.87)
Adolescent Dissociative Experiences Scale (Armstrong, Putnam, Carlson, Libero & Smith 1997)					
Armstrong et al. (1997)	Amnesia	Absorption	Passive influence	Depersonalization / derealization	n = 102 referred for psychological evaluation A-DES mean = 4.85 (SD = 1.14) (dissociative disorders)
De Pasquale, Sciacca & Hichy (2016) <i>Italian version</i>	Dissociative amnesia	Absorption & imaginative involvement	Depersonalisation / derealization	Passive influence	n = 633 students A-DES mean = 2.02 (SD = 1.47)
Farrington, Waller, Smerden & Faupel (2001)	Single factor				n = 810 students A-DES mean = 2.66 (SD = 1.81)
Kerig et al (2016)	Depersonalization / derealization	Amnesia	Loss of conscious control		n = 784 in juvenile detention A-DES mean = 58.07 (SD = 48.69)

(Continued)

Table 2. (Continued)

Reference	Factors			Sample characteristics
Muris, Merckelbach & Peeters (2003)	Single factor			n = 331 students A-DES mean = 1.27 (SD = 1.18)
Nilsson & Svedin (2006a) <i>Swedish version</i>	Single factor			n = 400 students; 20 outpatients A-DES mean = 0.84 (SD = 1.05) (non-clinical); 3.28 (SD = 1.89) (clinical)
Schimmenti (2016b) <i>Italian version</i>	Single factor			n = 1806 students A-DES mean = 1.92 (SD = 1.43)
Yoshizumi, Hamada, Kaida, Gotow & Murase (2010) <i>Japanese version</i>	Depersonalization	Disintegration of conscious control	Amnesia	n = 2272 students A-DES mean = 2.21 (SD = 1.69)
Peritraumatic Dissociative Experiences Questionnaire (Marmar, Weiss & Metzler, 1997)				
Birmes et al. (2005) <i>French version</i>	Single factor			n = 48 (group 1); 43 (group 2) emergency department patients (critical incident victims) DES mean not stated
Boelen, Keijsers & van den Hout (2012)	Single factor			n = 168 grief processes research programme participants DES mean not stated
Brooks et al. (2009)	Altered awareness		Derealization	n = 247 patients at trauma hospitals DES mean not stated
Bui et al. (2011) <i>Child version</i>	Single factor			n = 133 child emergency department patients DES mean not stated
Marshall, Orlando, Jaycox, Foy & Belzberg (2002) <i>Modified version</i>	Single factor			n = 284 youth exposed to community violence DES mean not stated

(Continued)

Table 2. (Continued)

Reference	Factors				Sample characteristics
Sijbrandij et al. (2012)	Altered awareness		Derealization		n = 219 police officers; 343 trauma-exposed civilians DES mean not stated
Cambridge Depersonalisation Scale (Sierra & Berrios, 2000)					
Aponte-Soto, Velez-Pastrana, Martinez-Taboas & Gonzalez (2014)	Anomalous body experience	Emotional and sensory numbing	Alienation from surroundings	Perceptual alterations	n = 300 general population DES mean = 13.20 (SD = 14.19)
Blevins, Witte & Weathers (2013)	Unreality and detachment		Emotional and physical numbing		n = 534 undergraduates DES mean not stated
Fagioli et al. (2015) <i>Italian version</i>	Detachment from the Self	Anomalous bodily experiences	Numbing	Temporal blunting	n = 149 inpatients & outpatients DES mean not stated
Sierra, Baker, Medford & David (2005)	Anomalous body experience	Emotional numbing	Anomalous subjective recall	Alienation from surroundings	n = 150 depersonalisation patients DES mean = 24.1 (SD = 14.7)
Somatoform Dissociation Questionnaire (Nijenhuis, Spinhoven, van Dyck, van der Hart & Vanderlinden, 1996)					
El-Hage, Darvez-Bornoz, Allilaire & Gaillard (2002) <i>French version</i>	Sensory neglect		Subjective reactions to perceptive distortions	Vigilance modulation disturbance	n = 140 outpatients DES mean = 14.6 (SD = 12.9)
Mueller-Pfeiffer et al. (2010) <i>German version</i>	Single factor				n = 225 psychiatry patients DES mean = 4.5 (SD = 2.6) (non-dissociative group); 32.9 (SD = 15.8) (dissociative group)
Nijenhuis et al. (1996)	Single factor				n = 100 outpatients DES mean not stated
Nijenhuis, Spinhoven, van Dyck, van der Hart & Vanderlinden (1998)	Single factor				n = 31 outpatients with dissociative symptoms DES mean not stated
Multidimensional Inventory of Dissociation (Dell, 2006)					
Dell (2013)	Discovering dissociated actions		Lapses of recent memory and skills	Gaps in remote memory	n = 2569 clinical & non-clinical DES mean not stated
Dell (2006)	Single factor				n = 817 (multiple groups) DES mean not stated

(Continued)

Table 2. (Continued)

Reference	Factors					Sample characteristics
Somer & Dell (2005) <i>Hebrew version</i>	Single factor					n = 151 undergraduate & general population DES mean not stated
Curious Experiences Survey (Goldberg, 1999)						
Cann & Harris (2003)	Absorption		Depersonalization	Amnesia		n = 194 undergraduates DES mean not stated
Goldberg (1999)	Broad factor: Dissociation (31 items)	Subscale: dissociation (17 items)	Subscale: depersonalisation	Subscale: absorption	Subscale: amnesia	n = 755 general population DES mean not stated
Dissociation Questionnaire (Vanderlinden, Van Dyck, Vandereycken, Vertommen & Verkes, 1993)						
Vanderlinden et al. (1993)	Identity confusion	Loss of control over behaviour, thoughts & emotions		Amnesia	Absorption	n = 98 eating disorder patients DES mean not stated
Nilsson & Svedin (2006b) <i>Swedish version</i>	Identity confusion	Loss of control		Amnesia	Absorption	n = 74 outpatient adolescents; 400 control adolescents DES mean not stated
Perceptual Alterations Scale (Sanders, 1986)						
Sanders (1986)	Modification of Affect		Modification of Control	Modification of Cognition		<i>Full text not available to the authors</i>
Fischer & Elnitsky (1990)	Single factor					n = 507 undergraduates DES mean not stated
Questionnaire of Experiences of Dissociation (Riley, 1988)						
Ray & Faith (1995)	Depersonalization	Process amnesia	Fantasy / daydream	Dissociated body behaviour	Trance	n = 1190 undergraduates DES mean = 67.97 (SE = 1.03) (altered response format)
Ray et al. (1992) <i>Revised version</i>	Depersonalization	Process amnesia	Fantasy / daydream	Dissociated body behaviour	Trance	n = 264 undergraduates DES mean = 2.17 (SE = 0.03)
Scale of Bodily Connection (Price & Adams Thompson, 2007)						
Price & Adams Thompson (2007)	Body awareness			Body dissociation		n = 291 undergraduates DES mean not stated
Price, Adams Thompson & Chieh Cheng (2017)	Body awareness			Body dissociation		n = 3634 (various groups) DES mean not stated

(Continued)

Table 2. (Continued)

Reference	Factors								Sample characteristics
Clinician-Administered Dissociative States Scale	Bremner et al. (1998)		Amnesia		Depersonalisation		Derealization		n = 68 PTSD patients DES mean not stated
Dissociative Symptoms Scale	Carlson et al. (2018)	Depersonalization / Derealization		Gaps		Sensory Misperceptions		Cognitive-Behavioural Reexperiencing	n = 1592 multiple groups DES mean not stated
The Dissociative Experiences Measure, Oxford	Černis, Cooper & Chan (2018)	Unreality	Numb & Disconnected		Memory Blanks		Zoned Out	Vivid Internal World	n = 691 general population DES mean not stated
Self-Experience Lifetime Frequency Scale	Heering et al. (2016)			Disturbance of self-awareness		(Milder forms of) diminished self-affection or depersonalisation			n = 426 psychosis patients; 526 healthy siblings; 297 healthy controls DES mean not stated
Depersonalization scale including 12 items of Dixon's (1963) scale	Jacobs & Bovasso (1992)	Inauthenticity		Self-negation		Self-objectification		Derealization	n = 368 undergraduates DES mean not stated
Scale	Reference				Factors				Sample characteristics
Wessex Dissociation Scale	Kennedy et al. (2004)		Stage 1 (hallucinations / pseudo-hallucinations)		Stage 2 (including cognitive blanking, intrusions, numbing of affect)		Somatic dissociation		n = 80 psychology services patients; 80 undergraduates DES mean = 20.7 (SD = 16.2) clinical; 9.77 (SD = 7.68) non-clinical
State Scale of Dissociation	Kruger & Mace (2002)		Identity confusion, derealization, depersonalization	Conversion	Amnesia	Identity alteration	Hypermnesia		n = 67 patients; 63 controls DES mean not stated
Traumatic Dissociation & Grief Scale	Laor et al. (2002)		Perceptual distortions	Body-self distortions		Irritability	Guilt & anhedonia		n = 303 children (202 displaced by earthquake; 101 not directly affected) DES mean not stated
Trait Dissociation Questionnaire	Murray, Ehlers & Mayou (2002)	Lability of mood & impulsivity	Sense of split self	Detachment from others & the world	Emotional numbing	Confusion & altered time senses	Amnesia for important life events	Memory lapses	n = 27 inpatient & 439 outpatient accident & emergency department patients 31.6% inpatients & 28.3% outpatients DES mean not stated

(Continued)

Table 2. (Continued)

Reference	Factors						Sample characteristics
Scale unknown: 'Questionnaire responses from 189 victims of life-threatening accidents'	Noyes & Slymen (1979)	Depersonalization	Hyperalertness	Mystical consciousness			<i>Full text not available to authors</i>
Steinberg dissociation questionnaires (5 measures) (Steinberg & Schnall, 2000)	Sar, Alioğlu & Akyuz (2017)	Cognitive-emotional self-detachment	Perceptual detachment	Bodily self-detachment	Detachment from reality		n = 1301 undergraduates DES mean not stated
Conversion Disorder Scale for Children	Sarfraz & Ijaz (2014)	Feeling of disability	Body pain	Seizures			n = 107 outpatients & controls <i>Full text not available to authors</i>
Dissociation Tension Scale	Stiglmayr et al. (2010)			Single factor			n = 294 psychiatry patients DES mean not stated
Child Dissociative Checklist (Putnam, Helmers & Trickett, 1993)	Wherry, Neil & Taylor (2009)	Variability	General externalising problems	Pathological dissociation			n = 232 children with abuse histories DES mean not stated
Dissociative Symptoms Severity Scale—Child form	Yalin Sapmaz et al. (2017)			Single factor			n = 30 adolescent patients; 83 controls A-DES mean = 122.30 (SD = 52.61) (clinical); 65.96 (SD = 53.52) (controls)

NB: References can be found in S1.

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'disconnected' and could occur in relation to external or internal stimuli. This was defined as 'a felt sense of anomaly' (FSA).

Inspection of the above dissociation measures revealed that many items refer to experiences as 'different', 'altered', or otherwise suggest that the respondent has noticed changes from what they might have expected (e.g. 'some people have the experience of looking in a mirror and not recognizing themselves'; DES-II; [11]). As a result, we considered that there was adequate basis in the measures found in the systematic review to consider FSA as a phenomenological constant in many common dissociative experiences.

Whilst examining the measures in Table 2 for FSA, it became clear that there were further 'types' of FSA and a broader range of ways in which these could be experienced than those found by Černis, Freeman and Ehlers [13]. We therefore developed a theoretical framework for conceptualising a subset of 'FSA-type' dissociation where different 'domains' can be affected by a 'type' of anomaly. The 'domain' affected by FSA may be that of physical sensation, perception (of external or internal stimuli), mental content or processes (such as memory), or

in the experience of selfhood. The 'type' of anomaly may take the form of: unfamiliarity, unreality, automaticity or lack of control (where this would be unexpected), or unanticipated sense of detachment or absence.

This framework is summarised in an 'FSA matrix' (see Table 3), where each cell constitutes an experience where a domain is affected by a type of anomaly. For example, one's mind [domain] could be experienced as detached [type]—as in reports of being unable to easily access one's memories; or one's self [domain] may feel unfamiliar [type], such as in depersonalisation. In this way, the core experience of FSA unites these disparate experiences—all of which have previously been described as dissociative. The matrix in the format 'domain x type' enables the identification of which experiences may be included in this subset of dissociative experiences.

This conceptual framework was used to systematically generate items for a new measure; the development of which, in turn, empirically tests the proposed framework. The key aim of the empirical work reported in this paper is to develop a measure of FSA-type dissociation, using possibly the largest ever sample size for the development of a measure of dissociation or related constructs.

Part 1: Developing the measure

First, the experience statements systematically generated using the FSA matrix were used as an item pool for generating a measure of FSA. Measure development took place within a non-clinical (general population) group.

Table 3. The 'FSA matrix' used to systematically generate items for the development of a novel dissociation measure focusing on felt sense of anomaly, with one example shown per cell.

		Types of Anomaly				
		Unreal	Unfamiliar	Automatic	Disconnected	Absent
Domains	Mind	My thoughts don't seem real.	Some of the things in my head don't seem to be mine.	I can't access my thoughts or memories at will.	I feel detached from my own mind.	My mind goes completely empty.
	Affect	My emotions don't seem real	I have emotions that don't feel like they're mine.	My emotional reactions don't fit with the situation I am in.	I feel disconnected from my emotions.	I can't feel emotions.
	Physiology	My body (or parts of it) feels unreal or strange.	My body (or parts of it) feels like it doesn't belong to me.	My body (or parts of it) feels like it has a mind of its own.	I feel disconnected from the sensations in my body.	My body feels numb.
	Perception	The things happening around me seem unreal to me—like a dream or a movie.	One or more of my senses seem strange, distorted, or odd to me.	My sense of sight, touch, hearing (etc.) don't respond to me.	I feel as if I'm experiencing life from very far away.	I don't notice how much time passes.
	Identity	I feel that I'm not a real person.	I don't recognize myself.	I act like someone else without meaning to.	I feel disconnected from who I really am.	I feel like I don't exist.
	Behaviour	My actions feel fake or unreal.	Things I've done many times before seem new or unfamiliar.	I feel like I'm on automatic pilot.	I feel disconnected from my own actions.	I freeze, unable to do anything.
	World	The world around me seems unreal.	Places that I know seem unfamiliar.	-	I feel that I'm not part of the world around me.	I am absorbed in my own world and do not notice what is happening around me.
	Others	Other people seem unreal.	People I know seem unfamiliar.	-	I feel detached from the people I am close to.	Other people stop existing when I can't see them.
		Unreal	Unfamiliar	Automatic	Disconnected	Absent

(NB: Two cells (Automatic x World; Automatic x Others) are blank, as it would not be considered anomalous if these did not respond to a person's attempts at control.).

<https://doi.org/10.1371/journal.pone.0247037.t003>

Methods

Study design. The study was a questionnaire development study using an online cross-sectional self-report survey. A subsample of respondents also provided test-retest data for the novel questionnaire by completing the new measure twice more (Week 1 and Week 2).

Ethical approval. The study received ethical approval from the Central University Research Ethics Committee of the University of Oxford (ref: R57488/RE002).

Participants. Participants were recruited via social media, the majority via Facebook Ads. The advertisements were titled “*Mapping dissociation in mental health*” and stated that questionnaires concerned “common thoughts and feelings”. The information sheet described dissociation as “*strange feelings and experiences such as ‘spacing out’, feeling ‘unreal’, or feeling detached from the world around you*”. Inclusion criteria were deliberately very broad: any adult (age 18 years or over) normally resident in the UK. There were no exclusion criteria, and no required level of current or past dissociation. Due to the online survey format, it was not possible to directly assess capacity to consent. However, this was assumed since the participant was required to open the survey hyperlink, read the information sheet, and complete the consent statements independently. Upon declining to consent, the survey was not shown and the end page with resources for further support was instead displayed.

13186 responses were recorded by Qualtrics [14]. 144 (1.09%) did not consent to the study, and 307 (2.33%) indicated consent but then left the survey without continuing onto the first page of measures. After removing participants who did not meet the inclusion criteria, or had high levels of missing data (greater than 20% in any of the measures required for analysis), the final sample was 8861. The characteristics of the sample can be found in Table 4.

Procedures. Questionnaires were completed online using Qualtrics. Therefore, informed consent and assessment were both carried out online. The questionnaire landing page contained the participant information sheet and statements regarding informed consent, as per the British Psychological Society guidelines for ethical internet-mediated research [15]. Participants were told that the aim of the study was to explore dissociation and common thoughts, feelings, and experiences, and that they need not have experienced dissociation in order to take part. After acknowledging the consent statements, participants were asked the demographic questions, and shown the item pool and measures described below (see *Measures*).

Table 4. Summarising the descriptive statistics for the three subsamples used for measure development.

	Sample 1 (n = 2953)	Sample 2 (n = 2954)	Sample 3 (n = 2954)
Gender	287 (9.7%) male	317 (10.7%) male	280 (9.5%) male
	2557 (86.6%) female	2544 (86.1%) female	2568 (86.9%) female
	80 (2.7%) other	75 (2.5%) other	78 (2.6%) other
Ethnicity	2751 (93.1%) White	2751 (93.1%) White	2768 (93.7%) White
“Have you ever experienced mental health difficulties?”	2528 (85.6%) Yes	2497 (84.5%) Yes	2508 (84.9%) Yes
	360 (12.2%) No	405 (13.7%) No	388 (13.1%) No
“If yes, are these still ongoing?”	1929 (65.3%) Yes	1900 (64.3%) Yes	1943 (65.8%) Yes
	534 (18.1%) No	537 (18.2%) No	519 (17.6%) No
	Range Mean (SD)		
Age	18–88 40.04 (15.67)	18–84 40.02 (15.84)	18–85 40.38 (15.78)
	Mean (SD)	Mean (SD)	Mean (SD)
Dissociative Experiences Scale (DES)*	2.37 (1.85)	2.41 (1.89)	2.40 (1.89)
PTSD Checklist (PCL-5)*	30.07 (20.14)	29.29 (20.22)	27.00 (19.93)

*t-tests for differences in mean scores between genders male and female found no significant statistical differences in any sample.

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The survey was accessible on desktop and mobile web browsers. Incomplete datasets were retrieved automatically after a week of non-activity and added to the dataset.

Data collection began on May 24, 2018 and ended on July 23, 2018. Test-retest data were collected between September 3 and 13, 2018.

Measures. *Černis Felt Sense of Anomaly Scale (ČEFSA)*. First, an initial item pool of 98 items was systematically generated by EČ, DF and AE by completing the cells of the aforementioned FSA matrix (Table 3). For example, the cell at the juncture of affect [domain] and unreal [type] would produce the item "my emotions don't seem real". Using this method, a minimum of two items per cell were generated (with the exception of 'world x automatic' and 'others x automatic' where it was considered that it would not be anomalous to experience the world or others as not under one's control). Generated items were required to clearly relate to both the domain and the type of anomaly. Further, they were not to describe a reaction or behaviour (as these may be idiosyncratic, and are not dissociative phenomena in their own right), nor could items be written such that the item might have surface validity for another disorder (in order to minimise misinterpretation by respondents). Items were validated against these criteria via discussion between EČ, DF and AE.

Additionally, six items were generated that were 'global', in that they only described FSA without reference to specific domain or type (e.g. 'I feel odd', 'Things seem strange'; see S2). These items were generated to develop a supplementary brief "Global FSA" scale (see *Statistical analysis*).

All 104 items were checked for readability by volunteers with lived experience of mental health problems. In particular, volunteers checked that it was clear to a layperson what the items were asking, and that the language used was easily accessible throughout.

Items were rated for the past two weeks on a Likert scale from "0 Never" to "4 Always", with the instruction 'Please read the following items and rate how often you have experienced these over the past TWO WEEKS'.

Dissociative Experiences Scale II (DES-II; [11]). The DES-II comprises 28 items each rated from 0% to 100%. Items cover dissociative and amnesic experiences such as "Some people sometimes find that they are approached by people that they do not know, who call them by another name or insist that they have met them before." Higher scores indicate greater dissociation. No time period is specified in the instructions.

Post-Traumatic Symptom Disorder Checklist (PCL-5; [16]). To assess PTSD symptoms over the past month, the PCL-5 contains 20 items such as "feeling very upset when something reminded you of the stressful experience", rated on a five-point Likert scale from "0 not at all" to "4 extremely". Participants were asked to rate "the most upsetting event" they had experienced, indicated via selecting from a list including "end of a relationship", "natural death of a significant other", "severe accident", and "other not listed". Higher scores indicate greater trauma symptomatology.

Statistical analysis. Analyses were conducted in R, version 3.5.1 [17] with packages psych [18] and lavaan (version 0.6–3; [19]). For analysis, the sample was split into three equal subsamples of nearly 3000 people. This was to enable refinement of the item pool via two exploratory factor analyses with appropriately large samples, and then a test of the factor structure in a third subsample via confirmatory factor analysis. Sample splitting was done by randomly allocating cases to subsets using a function in R.

The global items were separated from items developed using the FSA matrix and analysed separately. This was done for two reasons: first, because the construct underlying these items was distinct (they represent general FSA, rather than an interaction between a type and domain); and second, to fulfil the aim of providing a very brief, standalone tool with which to measure the underlying common denominator of FSA.

Following measure development and confirmatory factor analysis, the psychometric properties of the final scale(s) were assessed. Validity was tested via convergent validity with an existing dissociation measure (the DES-II) using Pearson correlation. Further, confirmatory factor analyses were carried out to test the factor structure in participants scoring above and below the clinical cut-off on the PTSD measure (PCL-5; [16]). Reliability was assessed via internal consistency (Cronbach's alpha) and one-week test-retest reliability (intra-class correlation).

Results

Each of the three subsamples had a mean age of 40 years, scored within the general population range [11] on the DES, and highly on the PCL-5 (see Table 4). In each sample, approximately 86% of respondents were female, 93% were White, and 85% reported lifetime mental health difficulties (with a further two thirds of these reporting that such experiences are ongoing).

Items developed from the FSA matrix: The Černis Felt Sense of Anomaly scale. Exploratory Factor Analysis (EFA) with oblique rotation was carried out on the first two subsamples, with items that loaded weakly to a factor (less than 0.3) or cross-loaded strongly across multiple factors (loadings for different factors within 0.2 of each other) discarded after each EFA. The first EFA ($n = 2953$) indicated that a seven-factor solution was the most appropriate using parallel analysis and model comparison tests (X^2 (4088): 20333.396, $p < 0.001$, CFI = 0.922, TLI = 0.909, RMSEA = 0.037, SRMR = 0.018). Factors were identified as 'Anomalous Experience of the Self', 'Anomalous Experience of the Physical Body', 'Altered Sense of Familiarity', 'Anomalous Experience of Emotion', 'Altered Sense of Connection', 'Altered Sense of Agency', and 'Altered Sense of Reality'. After the second EFA ($n = 2954$), only five items meeting the aforementioned criteria were retained per factor. These were selected based on which combination of five items produced a theoretically well-rounded set of items (i.e. not all asking about the same experience). This was achieved via consensus between EČ, DF and AE. The result was a measure of 35 items, each of which load strongly to their factor (X^2 (2138) = 10215.014, $p < 0.001$, CFI = 0.944, TLI = 0.931, RMSEA = 0.036, SRMR = 0.016). The final scale (the Černis Felt Sense of Anomaly; ČEFSA scale) can be found in S 2.

On the third and final subsample, a Confirmatory Factor Analysis (CFA) ($n = 2954$) was carried out to test the seven-factor structure of the 35-item measure. This showed a good model fit for a second-order factor structure (X^2 (553) = 4989.435, $p < 0.001$, CFI = 0.929, TLI = 0.924, RMSEA = 0.052, SRMR = 0.047), where the high loadings of each of the seven factors indicate that they well-represent the higher-order construct of FSA-type dissociation (Fig 2).

The ČEFSA showed good psychometric properties (Table 5). There was good convergent validity with the DES-II ($r = 0.802$, $p < 0.001$), and excellent test-retest reliability over a week (ICC = 0.92; 95% CI = 0.88–0.94; $p < 0.001$). Internal consistency within the seven subscales was excellent (Cronbach's alphas of 0.86 to 0.92).

Further, CFAs were carried out after dividing cases in the sample with less than 20% missing data for ČEFSA items and the PCL-5 (Weathers et al., 2013) ($N = 7021$) into two groups: those scoring above ($N = 2836$), and those below ($N = 4135$) the clinical cut off of 33 on the PCL-5 (above group: mean = 50.38, SD = 11.07; below group: mean = 15.33, SD = 9.86). Both demonstrated a good model fit, indicating that the factor structure of the ČEFSA is robust even in a population with clinically significant trauma symptoms (high: X^2 (553) = 4758.673, $p < 0.001$, CFI = 0.913, TLI = 0.906, RMSEA = 0.052, SRMR = 0.054; low: X^2 (553) = 5487.204, $p < 0.001$, CFI = 0.919, TLI = 0.913, RMSEA = 0.046, SRMR = 0.050).

Global FSA items: The Global Felt Sense of Anomaly scale. The same methodology was followed to separately develop and validate the Global FSA Scale: EFA with oblique rotation in

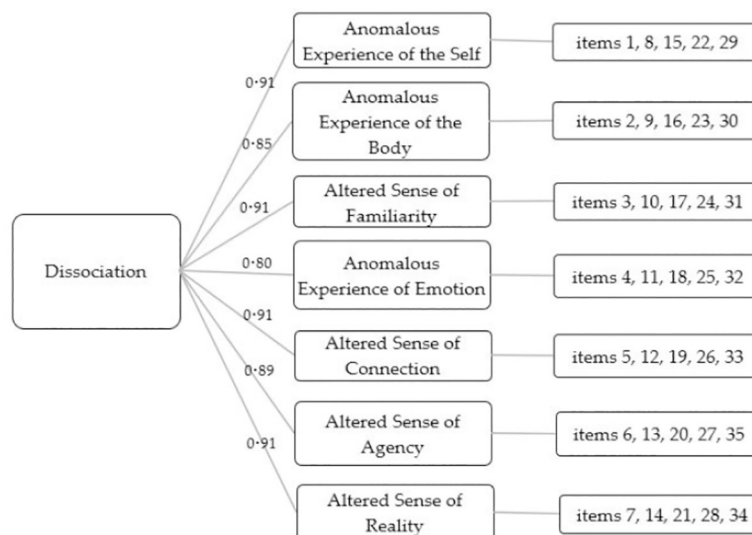


Fig 2. The second-order seven-factor structure of the Černis Felt Sense of Anomaly measure, with factor loadings onto the latent variable (dissociation).

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the first and second subsamples indicated a single factor structure (1st EFA: $X^2(9) = 275.050$, $p < 0.001$, CFI = 0.975, TLI = 0.958, RMSEA = 0.100, SRMR = 0.019; 2nd EFA: $X^2(9) = 301.402$, $p < 0.001$, CFI = 0.969, TLI = 0.949, RMSEA = 0.105, SRMR = 0.021). Following the second EFA, only five items were retained, following the same procedure as described for the main scale, above. Additionally, one item was reworded for clarity, and therefore the CFA was carried out in the test-retest subsample ($n = 240$), as these participants answered the newer version of the item. The CFA indicated that the one-factor structure with 5 items was a good model fit ($X^2(9) = 312.350$, $p < 0.001$, CFI = 0.970, TLI = 0.950, RMSEA = 0.107, SRMR = 0.021).

The Global FSA Scale was also found to have good psychometric properties (Table 5). Again, the scale demonstrated good convergent validity with the DES-II ($r = 0.699$, $p < 0.001$), good test-retest reliability (ICC = 0.84; 95% CI = 0.78–0.89; $p < 0.001$), and excellent internal consistency (Cronbach's alpha = 0.95).

Relationship between measures. Correlations were carried out between the Global FSA Scale and seven factors derived from the FSA matrix (Černis Felt Sense of Anomaly scale). These indicated a high level of correlation (Table 6).

Additionally, the internal consistency was high when the items of the main seven-factor scale and the Global FSA scale were analysed together (Cronbach's alpha = 0.98). This indicates that as well as being used independently as a 5-item 'screening' for FSA, the general items scale may potentially act as an optional 'eighth factor' when assessing FSA-type dissociation in full.

Part 2: Validation in a clinical group

Next, the measure resulting from initial development in Part 1 was tested for psychometric fit in a clinical group. Whilst dissociation has been demonstrated to have associations with a broad range of mental health presentations [20], a group of patients with non-affective psychosis diagnoses were recruited to validate the new scale in a clinical group. 1038 people with psychosis diagnoses were surveyed as part of the *Exploring Unusual Feelings* study which aimed to explore the relationship between dissociation, psychotic symptoms, and other psychological factors. It is appropriate to study dissociation within the context of psychosis since dissociation is thought to be transdiagnostic [21], and to occur at an elevated level in psychosis diagnoses

Table 5. Summarising the psychometric properties of the Černis Felt Sense of Anomaly (ČEFSA) scale, and the 5 global felt sense of anomaly items which can act as a standalone brief measure.

<i>Psychometric</i>		<i>Statistic</i>
Items developed from FSA matrix (35 items, 7 factors) (the Černis Felt Sense of Anomaly scale):		
Test re-test reliability (n = 240)	ICC statistic	0.92
	Lower bound	0.88
	Upper bound	0.94
	Degrees of freedom	239; 239
	K	2
	P	<0.001
	F statistic	25
Internal consistency (n = 2954)	Factor	Cronbach's alpha
	Anomalous Experience of the Self	0.87
	Anomalous Experience of the Body	0.91
	Altered Sense of Familiarity	0.90
	Anomalous Experience of Emotion	0.92
	Altered Sense of Connection	0.91
	Altered Sense of Agency	0.86
	Altered Sense of Reality	0.89
	Total (35 items)	0.97
Convergent validity (n = 2954) (vs. DES-II)	Pearson's r	0.802
Global Felt Sense Of Anomaly Scale (5 items, 1 factor):		
Test re-test reliability (n = 240)	ICC statistic	0.84
	Lower bound	0.78
	Upper bound	0.89
	Degrees of freedom	239; 239
	K	2
	P	<0.001
	F statistic	12
Internal consistency (n = 240)	Cronbach's alpha	0.95
Convergent validity (n = 240) (vs. DES-II)	Pearson's r	0.699

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[22]. Further, as outlined in *Definition & Framework Development*, above, the concept of FSA has been established as relevant to this patient group in a qualitative study with 12 people with psychosis [13].

Table 6. Summarising the correlation statistics (r) between the Global FSA scale and the factor scores and Černis Felt Sense of Anomaly (ČEFSA) scale total and factor scores.

Factor	r statistic
ČEFSA total score	0.856
Anomalous Experience of the Self	0.797
Anomalous Experience of the Body	0.761
Altered Sense of Familiarity	0.767
Anomalous Experience of Emotion	0.674
Altered Sense of Connection	0.848
Altered Sense of Agency	0.682
Altered Sense of Reality	0.801

NB: All p values <0.001.

<https://doi.org/10.1371/journal.pone.0247037.t006>

Methods

Study design. The design was a cross-sectional self-report questionnaire study.

Ethical approval. The study received ethical approval from the NHS Health Research Authority, London (City & East) Research Ethics Committee (ref: 19/LO/1394).

Procedure & participants. This study was supported by the National Institute of Health Research (NIHR) Clinical Research Network (CRN). Participants were recruited by CRN research assistants and clinical studies officers embedded in clinical teams and Research and Development departments across 36 NHS trusts. Research workers from these teams approached patients meeting the inclusion criteria, assessed capacity to consent, gained informed consent, and supported participants to complete the assessment pack. Inclusion criteria were broad: any person (age 16 years or over), currently under the care of an NHS mental health service, with a diagnosis of non-affective psychosis, who was willing and able to give informed consent to participate. Exclusion criteria were: insufficient English language to complete the questionnaires with support, and an affective psychosis diagnosis (i.e. psychotic depression, bipolar disorder).

Recruitment took place between 18th October 2019 and 19th March 2020. Datasets from 1038 participants were returned. For this analysis, only cases without high levels of missing data in the ČEFSA measure (less than or equal to 20% missing) were retained for analysis. This resulted in a participant group of 1031 patients for the ČEFSA validation, and 1028 for the Global FSA measure validation analysis.

In the ČEFSA validation group (n = 1031), the majority of participants were White (66.83%), male (69.74%), under the care of mental health services as an outpatient (74.30%) and had a diagnosis of Schizophrenia (64.60%). The mean age of the sample was 41.54 (SD = 12.32) years. See Table 7 for full demographic details.

Table 7. Showing the demographic data for the clinical participant group (n = 1031).

Demographic		n (% of group)
Gender	Female: Male: Other:	303 (29.39%) 719 (69.74%) 5 (0.48%)
Ethnicity	White (any): Black (any): Asian (any): Mixed / Multiple: Other:	689 (66.83%) 176 (17.07%) 98 (9.51%) 44 (4.27%) 18 (1.75%)
Diagnosis	Schizophrenia Schizoaffective Delusional Disorder Psychotic Disorder NOS* First Episode Psychosis Other psychosis disorder	666 (64.60%) 153 (14.84%) 14 (1.36%) 69 (6.69%) 105 (10.18%) 24 (2.33%)
Care team type	Inpatient Outpatient Early intervention	265 (25.70%) 766 (74.30%) 124 (12.03%)
Demographic	Range	Mean (Standard Deviation)
Age	18–74	41.54 (12.32)
Measure	Range	Mean (Standard Deviation)
Černis Felt Sense of Anomaly scale**	0–140	39.54 (30.48)

*including Unspecified Non-Organic Psychosis.

** *t-tests for differences in mean scores between genders male and female found no significant statistical differences.

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The Global FSA scale validation group ($n = 1028$) did not differ significantly from the ČEFSA validation group in terms of any demographics presented in Table 7. Their mean score on the Global FSA scale was 7.85 ($SD = 5.61$; range = 0–20).

Measures. Participants completed the Černis Felt Sense of Anomaly (ČEFSA) and the Global FSA scales as developed in Part 1, above.

Statistical analysis. Analyses were conducted in R, version 3.6.3 [17] with packages psych (version 1.9.12.31; [18]) and lavaan (version 0.6–5; [19]).

The measure model fit was assessed using Confirmatory Factor Analysis (CFA) with MLR robust maximum likelihood estimator in the clinical group ($n = 1015$). Due to restrictions within the study design, it was not possible to collect data for assessing convergent validity against another dissociation measure, nor test-retest reliability. Internal reliability was analysed using Cronbach's alpha.

Results

Černis Felt Sense of Anomaly (ČEFSA) scale. Confirming that factor analysis was appropriate, Bartlett's test of Sphericity was significant ($\chi^2 = 4269.89$, $df = 595$, $p < 0.001$) and the Kaiser-Meyer-Olkin test of sampling adequacy was high ($KMO = 0.98$).

Confirmatory Factor Analysis (CFA) indicated an adequate fit for an 8-factor second-order model ($X^2(553) = 1623.641$, $p < 0.001$, $CFI = 0.927$, $TLI = 0.921$, $RMSEA = 0.043$, $SRMR = 0.043$), with factor loadings as shown in Table 8. In this group, the ČEFSA had good internal consistency (whole scale Cronbach's alpha = 0.97).

Global FSA scale. Confirming that factor analysis was appropriate, Bartlett's test of Sphericity was significant ($\chi^2 = 684.543$, $df = 10$, $p < 0.001$) and the Kaiser-Meyer-Olkin test of sampling adequacy was adequate ($KMO = 0.89$).

CFA indicated an adequate fit for a 1-factor model ($X^2(5) = 12.127$, $p = 0.033$, $CFI = 0.996$, $TLI = 0.991$, $RMSEA = 0.037$, $SRMR = 0.011$). In this group, the global FSA scale had good internal consistency (whole scale Cronbach's alpha = 0.92).

Discussion

The aim of this paper is to demarcate a substantial subset of dissociative experiences using a data-driven approach. Since there continues to be controversy regarding the mechanisms of dissociation [6], we have taken the 'bottom-up' approach of focusing on the phenomenological level to achieve this. By so doing, we have demonstrated that a seemingly disparate set of

Table 8. Summarising the factor loadings and internal consistencies of the Černis Felt Sense of Anomaly scale.

Factor:	Factor loading onto the latent construct of dissociation	Internal consistency: Cronbach's alpha
Anomalous Experience of the Self	0.96	0.83
Anomalous Experience of the Body	0.89	0.85
Altered Sense of Familiarity	0.92	0.84
Anomalous Experience of Emotion	0.78	0.89
Altered Sense of Connection	0.98	0.87
Altered Sense of Agency	0.96	0.84
Altered Sense of Reality	0.92	0.85
Whole scale (35 items):		0.97

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common dissociative experiences can be unified by the phenomenological common denominator of 'a felt sense of anomaly' (FSA).

The development of the ČEFSA (Černis Felt Sense of Anomaly) scale constitutes the first empirical test of the theoretical framework of the subset of 'FSA-type' dissociation outlined here. This framework posits that a set of common dissociative experiences take the form of a felt sense of anomaly, which may be of a particular 'type' (e.g. unfamiliarity, unreality) and may occur in a particular 'domain' of experience (e.g. physical body, external world). The second-order seven-factor solution of the ČEFSA closely follows the structure of the FSA matrix developed from this framework. Four factors of the ČEFSA (Altered Sense of Familiarity, of Connection, of Agency, and of Reality) reflect nearly all 'type' columns of the matrix. The remaining three factors of the ČEFSA (Anomalous Experience of the Self, of the Body, and of Emotion) reflect three of the eight 'domain' rows of the matrix—one might hypothesise that these are particularly important domains in the context of FSA-type dissociation.

Importantly, this scale may also be a valuable tool for the assessment of FSA-type dissociation. The ČEFSA is a novel measure of dissociative experiences which share a core feature of FSA, and is psychometrically robust, easy to read, and appropriate for both non-clinical respondents (including those reporting trauma symptoms) and clinical respondents with diagnoses of psychosis. The correlation between the ČEFSA and DES was high, likely because of the number of items within the DES that concern FSA. However, the ČEFSA has the additional benefit of being developed through a systematic delineation of the concept of FSA. Consequently, it reflects an underlying theoretical framework, and reflects this construct comprehensively. As a result, the ČEFSA includes less severe, or more difficult to articulate experiences that may not have received adequate attention previously such as 'I feel like I don't have a personality' and 'I can't feel emotions' in the Anomalous Experience of the Self and Anomalous Experience of Emotion factors.

Of course, it remains to be seen whether 'FSA-type' dissociative experiences represent a separable construct or type of dissociation with a shared aetiology. Whilst we envisage FSA-type dissociation as a set of experiences at the milder end of a dissociation spectrum (albeit causing considerable distress; [13]), it currently stands only as a working hypothesis, and requires thorough investigation. Specifically, further exploration of this construct and the factor structure of the corresponding measure within other clinical groups would be a logical and necessary next step for the development of the ideas proposed here, particularly as dissociation is considered transdiagnostic [21] and FSA-dissociation has recently been demonstrated to relate to a broad range of subclinical mental health presentations, including depression and anxiety as well as psychotic and post-traumatic symptoms [20].

Despite being a working hypothesis, we hope that the construct of FSA-type dissociation will prove useful in clinic and research because of its emphasis on the core lived experience of FSA. It is a strength of the present study that the proposed theoretical framework is consistent with first-person reports, and that the measure items were approved by experts by experience. Centring the framework on this core experience distils the surface-level complexity of such presentations into a broad but nevertheless descriptive heuristic which may aid recognition of such symptoms when they arise. It also enables clarity about which experiences are included in this subtype (for example, by using the FSA matrix), which is perhaps less straightforward with definitions which are built upon proposed mechanisms.

It is important to note that the construct of FSA-type dissociation proposed here does not preclude existing suggestions of dissociative subtypes. For example, domains relating to the self, the body and internal experiences also describe 'depersonalisation', and domains relating to the external world and other people describe 'derealisation'. There is also feasible overlap between Holmes et al.'s [7] detachment and the 'disconnected' (and possibly 'unreal' and

	Unreal	Unfamiliar	Automatic	Disconnected	Absent	
Mind	My thoughts don't seem real.	Some of the things in my head don't seem to be mine.	I can't access my thoughts or memories at will.	I feel detached from my own mind.	My mind goes completely empty.	Depersonalisation
Affect	My emotions don't seem real.	I have emotions that don't feel like they're mine.	My emotional reactions don't fit with the situation I am in.	I feel disconnected from my emotions.	I can't feel emotions.	
Physiology	My body (or parts of it) feels unreal or strange.	My body (or parts of it) feels like it doesn't belong to me.	My body (or parts of it) feels like it has a mind of its own.	I feel disconnected from the sensations in my body.	My body feels numb.	
Perception	The things happening around me seem unreal to me – like a dream or a movie.	One or more of my senses seem strange, distorted, or odd to me.	My sense of sight, touch, hearing (etc.) don't respond to me.	I feel as if I'm experiencing life from very far away.	I don't notice how much time passes.	
Identity	I feel that I'm not a real person.	I don't recognize myself.	I act like someone else without meaning to.	I feel disconnected from who I really am.	I feel like I don't exist.	
Behaviour	My actions feel fake or unreal.	Things I've done many times before seem new or unfamiliar.	I feel like I'm on automatic pilot.	I feel disconnected from my own actions.	I freeze, unable to do anything.	Derealisation
World	The world around me seems unreal.	Places that I know seem unfamiliar.	-	I feel that I'm not part of the world around me.	I am absorbed in my own world and do not notice what is happening around me.	
Others	Other people seem unreal.	People I know seem unfamiliar.	-	I feel detached from the people I am close to.	Other people stop existing when I can't see them.	

Compartmentalisation
Detachment

Fig 3. The 'FSA matrix' with previous conceptualisations overlaid. (NB: Detachment and compartmentalisation refer to constructs outlined by Holmes et al. [7]).

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'unfamiliar') 'type' of FSA, and between compartmentalisation and the 'automatic' (and possibly 'absent') types (Fig 3). Accordingly, it would be of interest to explore this suggestion further using the ČEFSA and the recently published Detachment and Compartmentalization Inventory (DCI; [23]).

There are, of course, limitations to the proposed theoretical framework. One major criticism may be the omission of traditional 'dissociative amnesia' experiences from the FSA matrix. This symptom is considered a cardinal feature of dissociation, comprising a diagnostic entity in its own right [24], and forming a factor in many established dissociation measures (Table 2), including the DES [11]. Whilst detachment or unfamiliarity of memory falls within the framework of FSA-type dissociation, the relationship of FSA to frank dissociative amnesia (such that another 'part' of the personality retains a memory that is entirely inaccessible by another 'part') is unclear. Further exploration is required to determine whether such experiences may be described by the conjunction of 'absent' and 'mind' in the FSA-matrix, or whether a 'felt sense of anomaly' simply does not occur with dissociative amnesia in the same way as other items included in the ČEFSA scale. Indeed, an inherent feature of FSA is the subjective experience of (and plausibly, appraisal of) anomaly—however, many compartmentalisation symptoms are defined by a subjective *absence* or inaccessibility of experience until after the event has passed [7]. The ČEFSA scale therefore does not capture processes where the person completely loses awareness of their current surroundings or responds to content in memory as if it represented the present, and further research is required to determine the compatibility of the concept of FSA with these processes. However, we emphasise that FSA-type dissociation does not preclude the possibility of dissociative amnesia, and that the ČEFSA scale includes experiences where memory is experienced with a subjective sense of strangeness, including detachment and unfamiliarity.

A key limitation of the measure development is the sampling method in Part 1. Recruitment via Facebook ads attracted a sample which does not accurately reflect the general population, since it relies upon people who engage with social media and are willing to partake in online questionnaires. In particular, there is a large skew towards female gender and White ethnicity in the sample demographics, as well as a high level of self-reported mental health difficulties. This is further reflected in the relatively high group mean scores on the PTSD measure and high number of people exceeding the clinical cut-off score of 33, which suggests that this sample—although drawn from the general population—contains higher levels of post-traumatic stress than expected. People who have dissociative symptoms may also be overrepresented, likely resulting from self-selection bias due to the title of the study. Further, the quality of the data is unclear, as there is some evidence that up to eleven percent of Facebook profiles may be duplicates [25]. It is also a limitation of the study that test-retest data could not be collected in Part 2.

Conclusions

This study defines a discrete set of common dissociative experiences unified by a phenomenological common denominator ('Felt Sense of Anomaly'; FSA), and demonstrates that the proposed framework underlying these experiences finds support in non-clinical (general population) and psychosis groups. The measure developed here is intended to support clinicians and researchers to detect this type of experience, which we hope will facilitate progress in the challenging field of dissociation more broadly.

Supporting information

S1 File.
(DOCX)

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MAIN

Cognitive appraisals of dissociation in psychosis: a new brief measure

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Abstract

Background: Catastrophic cognitive appraisals, similar to those in anxiety disorders, are implicated in depersonalisation, a form of dissociation. No scales exist to measure appraisals of dissociative experiences. Dissociation is common in psychosis. Misinterpretations of dissociative experiences may maintain psychotic symptoms. Therefore, assessing appraisals in this context may be valuable.

Aims: The primary aim was to develop a measure of key appraisals of dissociation in psychosis. Secondary aims were to test the relationship between appraisals and psychotic experiences (paranoia and hallucinations), and determine whether appraisals explain additional variance in psychotic symptoms above dissociative symptoms.

Method: Fifty items were generated from transcripts of interviews with patients. The measure was developed and psychometrically validated via factor analysis of data from 9902 general population participants and 1026 patients with psychosis. Convergent validity, test-re-test reliability, and internal reliability were assessed. Regression analyses tested relationships with psychotic symptoms.

Results: A 13-item single-factor measure was developed. Factor analysis indicated good model fit [$\chi^2(65) = 247.173$, comparative fit index (CFI) = 0.960, root mean square error of approximation (RMSEA) = 0.052]. The scale had good convergent validity with a rumination (non-clinical: $r = 0.71$; clinical: $r = 0.73$) and dissociation measure ($r = 0.81$; $r = 0.80$), high internal consistency ($\alpha = 0.93$; $\alpha = 0.93$), and excellent 1-week test-re-test reliability [intraclass correlation (ICC) = 0.90]. It explained variance in psychotic symptoms (paranoia: 36.4%; hallucinations: 35.0%), including additional variance compared with dissociation alone (paranoia: 5.3%; hallucinations: 2.3%).

Conclusions: The Cognitive Appraisals of Dissociation in Psychosis (CAD-P) measure is a psychometrically robust scale identifying appraisals of dissociative experiences in psychosis and is associated with the presence of psychotic experiences. It is likely to prove useful for clinical assessment and research.

Keywords: cognitive appraisals; dissociation; hallucinations; paranoia; psychosis

Introduction

Dissociation is characterised by experiences of disconnection or alteration, such as feeling detached from one's own thoughts and emotions, finding one's own reflection unfamiliar, or seeing the world as 'flat' or unreal (Kennedy *et al.*, 2013). Increasingly, dissociative experiences are being recognised as important transdiagnostic phenomena, occurring in diagnoses other than post-traumatic stress disorder (PTSD) (Lyssenko *et al.*, 2018), and as

important clinical phenomena in their own right. For example, research is demonstrating how such experiences are independently associated with distress and increased self-harm (Černis *et al.*, 2019) and suicidality (Calati *et al.*, 2017). However, dissociation remains under-recognised by clinicians (Bailey and Brand, 2017).

Hunter and colleagues (2003) outline a cognitive model for the dissociative diagnosis of depersonalisation disorder (DPD), and Baker and colleagues (Baker *et al.*, 2007) propose a model for the dissociative experiences of ‘depersonalisation and feelings of unreality’. Both models highlight the role of ‘catastrophic attributions’ for the dissociative experience as central to the occurrence of the disorder, in a manner similar to that found in anxiety disorders, and particularly panic disorder (Clark, 1999). As in panic disorder, Hunter and colleagues propose that the transient symptoms experienced in DPD are misinterpreted as indicative of impending catastrophe. In panic disorder, this may be heart palpitations being mistaken as a sign of imminent heart attack; whilst in DPD a feeling of detachment may be taken as a sign of becoming ‘mad’. Cognitive appraisals of dissociative symptoms as dangerous therefore result in an increase in anxiety (further exacerbating the dissociative symptoms), and lead to behaviours intended to neutralise the threat, but which actually serve to heighten attention towards them – such as monitoring symptoms and increasing introspection (Hunter *et al.*, 2003). In the course of empirically testing this model, Hunter *et al.* (2014) demonstrated that a DPD group were less likely than a non-clinical group to make normalising attributions when prompted to generate as many reasons in one minute why they might experience various DPD, anxiety and neutral symptoms. In a second task, the DPD group were found to endorse catastrophic appraisals about mental illness or brain dysfunction in a manner similar to an anxiety disorder (obsessive compulsive disorder or panic disorder) comparison group. Both these findings support the hypothesis that anxiety-like cognitive appraisals may be important in this form of dissociation: however, they do not identify cognitive appraisals that are specific to dissociative experiences.

Dissociation may be particularly common in psychosis (Renard *et al.*, 2017). Based on patient reports, we have characterised dissociation in this context as taking the form of an unanticipated subjective experience of anomaly (felt sense of anomaly, FSA), which may include experiences of disconnection, unfamiliarity and unreality (Černis *et al.*, 2020). Consideration of dissociation may be important in psychosis research given the ‘robust and well-replicated’ associations between dissociation and psychotic symptoms (Longden *et al.*, 2020), and suggestions that anomalous experiences – such as dissociation – may contribute to the development and maintenance of psychotic symptoms (Freeman, 2016; Garety *et al.*, 2001). Consistent with the depersonalisation literature, anxiety processes have also been implicated in dissociation in this context (Černis *et al.*, 2014; Freeman *et al.*, 2013). However, to date, there has been no research into the cognitive appraisals that may be important in the maintenance of dissociation.

Clinicians can elicit in assessment appraisals of dissociation, but this process can be greatly aided by a questionnaire of key appraisals tested in large populations. It is also the case that before research can investigate the role of cognitive appraisals, a method for eliciting and measuring them is required. The objective of this study, therefore, was to develop a measure of key cognitive appraisals of dissociative experiences arising in the context of psychosis to aid clinicians and researchers in the detection, assessment and treatment of dissociation.

Part 1: Development of the measure with a general population sample

Method

Procedure and participants

The design was an online cross-sectional self-report questionnaire study. Participants were recruited via social media, the majority via Facebook advertisements. The advertisements were

titled ‘Understanding Dissociative Experiences’ and stated that researchers were seeking participants to ‘to complete questionnaires about different kinds of thoughts’, and that they need not have experienced dissociation to take part. The information sheet described dissociation as a range of experiences ‘where people describe feeling “strange” or “disconnected” – they might feel like they are “spacing out”, feel “unreal” or feel emotionally detached from the world’. Inclusion criteria were deliberately broad: any adult (age 18 years or over), usually resident in the United Kingdom (UK). There were no exclusion criteria.

All responses were collected via online surveys using Qualtrics (2018). The survey landing page contained the participant information sheet and statements regarding informed consent (British Psychological Society, 2017). Surveys were accessible on desktop and mobile web browsers. Incomplete surveys were retrieved automatically after a week of non-activity and added to the dataset.

There were three phases of data collection. Data collection for Phase 1 (full item pool) ran from 11 to 21 January 2019; and for Phase 2 (refined item pool) from 30 January to 26 February 2019. Phase 3 (test–re-test) data were collected from a subsample of Phase 2 participants between 5 and 23 April 2019. Following the removal of cases with high levels of missing data in the item pool (greater than 20% missing), sample sizes for the three phases were $n = 1615$, $n = 8287$ and $n = 140$, respectively. For all samples, the majority of participants were White (>94.00%) and female ($\geq 80.00\%$). The mean ages of the samples were 49.94 ($SD = 14.40$), 45.84 ($SD = 14.86$) and 46.69 years ($SD = 15.27$), respectively. See Table 1 for full demographic details.

Measures

Fifty items about cognitive appraisals of dissociation (e.g. ‘this might last forever’) were developed by the lead author from transcripts of interviews carried out for a qualitative study (Černis *et al.*, 2020). In this qualitative study, 12 NHS patients with psychosis diagnoses and experience of dissociation were asked directly what thoughts they had in response to dissociation. Nine of the 12 patients scored within the range expected for dissociative disorders on the Dissociative Experiences Scale (Carlson and Putnam, 1993), with the mean score of 36.91 ($SD = 20.00$) indicating high levels of currently experienced dissociation within the group (Černis *et al.*, 2020).

Participants in the online study rated the 50 items (see Supplementary material) for the past two weeks on a Likert scale from ‘0, never’ to ‘4, always’ with the instruction ‘please rate how often you think the following when you are feeling strange, disconnected, unreal or “dissociated”’. Participants were prompted to answer to the best of their ability, and only to rate sensations that they believed were not caused by a physical health condition (e.g. migraine).

As well as a refined selection of the new items, participants in Phase 2 also completed two further measures, as follows.

Perseverative Thinking Questionnaire (PTQ; Ehrling et al., 2011). This measure was included to enable the assessment of the new measure’s convergent validity. Without an existing measure of cognitive appraisals of dissociation available for comparison, a measure of proneness to more general ruminative negative thinking was judged to be an appropriate alternative. Indeed, Hunter *et al.* (2003) implicate ‘compulsive self-scrutiny’ (p. 1459) in the maintenance of depersonalisation, suggesting a negative and ruminative quality to the cognitive processes involved in this form of dissociation.

The PTQ is a 15-item scale assessing trait ruminative negative thinking, such as ‘I keep thinking about the same issues all the time’. Items are rated from ‘0, never’ to ‘4, almost always’ and refer to how the respondent ‘typically think[s] about negative experiences or problems’. The range of this scale is 0 to 60. Higher scores indicate greater severity of trait negative ruminative thinking.

In the Phase 2 group ($n = 8287$), the Cronbach’s alpha for the PTQ was 0.97 and model fit for a one-factor 15 item scale structure was adequate for the large sample size [$\chi^2 = 8099.36$, d.f. = 90, $p < 0.001$, comparative fit index (CFI) = 0.907, Tucker–Lewis index (TLI) = 0.892, root mean

Table 1. Demographic data and descriptive statistics for all groups

Participant group		Phase 1	Phase 2	Test-re-test (subset of Phase 2)	Clinical
N		1615	8287	140	1026
Age		49.94 (14.40)	45.84 (14.86)	46.69 (15.27)	41.49 (12.29)
Mean (SD)					
Gender	Female:	1433 (88.73%)	7103 (85.71%)	112 (80.00%)	300 (29.24%)
<i>n</i> (%)	Male:	142 (8.79%)	962 (11.61%)	20 (14.29%)	717 (69.88%)
	Other:	35 (2.17%)	165 (1.99%)	6 (4.29%)	5 (0.49%)
Ethnicity	White (any):	1551 (96.04%)	7866 (94.92%)	133 (95.00%)	687 (66.96%)
<i>n</i> (%)	Mixed/multiple:	25 (1.55%)	175 (2.11%)	3 (2.14%)	43 (4.19%)
	Asian (any):	12 (0.74%)	80 (0.97%)	2 (1.43%)	98 (9.55%)
	Black (any):	3 (0.19%)	20 (0.24%)	0 (0%)	175 (17.06%)
	Other:	6 (0.37%)	38 (0.46%)	0 (0%)	17 (1.66%)
Measure	CAD-P	19.05* (10.70)	16.58 (11.79)	Week 1: 20.12 (10.69) Week 2: 19.87 (11.17)	18.70 (13.35)
Mean (SD)					
	ČEFSA	—	41.76 (26.14)	—	39.65 (30.51)
	PTQ	—	34.97 (13.83)	—	30.32 (16.38)
Have you ever experienced mental health difficulties?	Yes	1222 (75.67%)	6584 (79.45%)	—	—
<i>n</i> (%)	No	360 (22.29%)	1557 (18.79%)		
If ‘yes’, are these ongoing?	Yes	886 (72.50%)	4919 (74.71%)	—	—
<i>n</i> (%)	No	312 (25.53%)	1520 (23.09%)		
Diagnosis <i>n</i> (%)	Schizophrenia	—	—	—	662 (64.52%)
	Schizoaffective				153 (14.91%)
	Delusional disorder				14 (1.36%)
	Psychotic disorder NOS**				69 (6.73%)
	First episode psychosis				105 (10.23%)
	Other SSD				23 (2.24%)

CAD-P Cognitive Appraisals of Dissociation in Psychosis

ČEFSA Černis Felt Sense of Anomaly scale

PTQ Perseverative Thinking Questionnaire

SSD Schizophrenia Spectrum Disorder

*Contains item ‘I’m so lonely’ which was later amended to ‘I am all alone’

**Not otherwise specified (NOS) also includes unspecified non-organic psychosis

square error of approximation (RMSEA) = 0.106, standardised root mean square residual (SRMR) = 0.037].

Černis Felt Sense of Anomaly (ČEFSA) scale (Černis et al., submitted). The ČEFSA is a 35-item scale assessing dissociative experiences taking the form of subjective experiences of strangeness (FSA). This includes items such as 'I don't fully experience emotions' and 'I feel like a stranger to myself' rated on a 5-point Likert scale from '0, never' to '4 always'. The range of this scale is 0 to 140 and rates the past 2 weeks. Higher scores indicate greater levels of FSA-type dissociative experiences.

Model fit in the Phase 2 group for this scale's 7-factor 35-item structure was good ($\chi^2 = 14831.29$, d.f. = 539, $p < 0.001$, CFI = 0.920, TLI = 0.911, RMSEA = 0.057, SRMR = 0.048), with a high Cronbach's alpha (0.97).

Statistical analysis

Analyses were conducted in R, version 3.5.1 (R Core Team, 2018) with packages psych (version 1.8.12; Revelle, 2018) and lavaan (version 0.6-3.1295; Rosseel, 2018). Exploratory factor analyses (EFA) with oblimin rotation and maximum likelihood estimator were carried out to assess the structure of items and refine the item pool by discarding poor-fitting items. Items were judged to fit poorly if they loaded weakly to a factor (less than 0.3), had commonalities less than 0.3, or loaded with similar strength onto multiple factors (loadings within 0.2). Note this latter criterion only applied during Phase 1, as Phase 2 analysis indicated a one-factor structure. The number of factors to extract was determined through parallel analysis and inspection of the scree plot.

The final measure model was assessed using confirmatory factor analysis (CFA) with MLR robust maximum likelihood estimator. The measure's psychometric properties were also assessed, including a test-re-test reliability statistic, which used the test-re-test phase data collected specifically for this purpose. Convergent validity with the ČEFSA and PTQ were also assessed via Pearson's correlation, and internal reliability using Cronbach's alpha. Test-re-test reliability was examined using the intraclass correlation (ICC) between Week 1 and Week 2 data collected specifically for this purpose (test-re-test group).

Results

Measure development

Phase 1. Confirming that factor analysis was appropriate for the general population group, Bartlett's test of sphericity was significant ($\chi^2 = 51,166.67$, d.f. = 1225, $p < 0.001$) and the Kaiser-Meyer-Olkin test of sampling adequacy was high (KMO = 0.97).

Following the criteria for removing poor-fitting items, and after removing items with inconsistent theoretical content (e.g. appraisals referring to oneself, rather than to dissociative experiences), EFA of Phase 1 data ($n = 1615$) led to 27 of the original 50 items being discarded. Additionally, two items were re-worded at this stage to improve clarity of meaning (shown in Supplementary material): 'I'm so lonely' became 'I am all alone', and 'This must mean I'm not human' was re-worded to 'This must mean I'm an alien, ghost, or not human'.

Phase 2. In Phase 2, a new sample of general population respondents ($n = 8287$) completed the refined pool of 23 items. Confirming that factor analysis was appropriate, Bartlett's test of sphericity was significant ($\chi^2 = 12,3890.00$, d.f. = 253, $p < 0.001$) and the Kaiser-Meyer-Olkin test of sampling adequacy was high (KMO = 0.97). This sample was split using R's random sampling function into a development ($n = 4143$) and validation ($n = 4144$) sample for analysis.

In the development sample, the scree plot and parallel analysis tests indicated that a one-factor structure was the most appropriate fit for the data. Following factor analysis, a further six items

Table 2. Factor loadings for the final items of the measure for the non-clinical and clinical validation groups

		Participant group	
		Non-clinical (Phase 2, validation sample) (<i>n</i> = 4144)	Clinical (<i>n</i> = 1026)
Item			
1	I can't trust my own mind.	0.78	0.69
2	Someone has done something to me.	0.58	0.64
3	Something is terribly wrong.	0.78	0.76
4	I'm losing my mind.	0.82	0.78
5	I'm not really 'me'.	0.76	0.77
6	I am all alone.	0.71	0.66
7	I don't look right to other people right now.	0.75	0.71
8	I must be sick.	0.76	0.70
9	I'm not in the same world as everyone else.	0.65	0.73
10	This is because I am evil.	0.55	0.58
11	Now I won't be able to do the things I wanted.	0.72	0.68
12	It's not me in control right now.	0.73	0.74
13	This might last forever.	0.73	0.72

were discarded for poor fit, and four items due to high correlated residuals with other items. The resulting 13-item one-factor model explained 52% of the variance.

CFA in the validation sample demonstrated a good fit for this model ($\chi^2 = 900.639$, d.f. = 65, $p < 0.001$, CFI = 0.962, TLI = 0.955, RMSEA = 0.056, SRMR = 0.025). Factor loadings of the final items in this sample are shown in Table 2.

Measure reliability and validity

The 13-item Cognitive Appraisals of Dissociation in Psychosis (CAD-P) measure had excellent internal consistency ($n = 4144$, Cronbach's $\alpha = 0.93$). It was also found to have excellent one-week test-re-test reliability [$n = 140$, ICC = 0.90, 95% confidence interval (CI) = 0.85–0.94, $p < 0.001$].

Furthermore, good convergent validity was found when tested by Pearson's correlation with the PTQ (Ehring *et al.*, 2011) ($n = 8287$, $r = 0.71$, $p < 0.001$), and with the ČEFSA (Černis *et al.*, submitted) ($n = 8287$, $r = 0.81$, $p < 0.001$). As there was a significant difference between genders on the PTQ ($p = 0.023$; females: mean = 34.97, $SD = 13.85$; males: mean = 33.85, $SD = 13.96$), convergent validity was also tested for females and males separately. Both indicated high correlation between the CAD-P and PTQ (females: $n = 7103$, $r = 0.71$, $p < 0.001$; males: $n = 962$, $r = 0.72$, $p < 0.001$).

Part 2: Clinical validation

Method

Procedure and participants

The design was a cross-sectional self-report questionnaire study. The study was supported by the National Institute of Health Research (NIHR) Clinical Research Network (CRN). Participants were recruited by CRN research assistants and clinical studies officers embedded in clinical teams and Research and Development departments across 36 NHS trusts. Inclusion criteria were broad: any person (age 16 years or over), currently under the care of an NHS mental health service, with a diagnosis of non-affective psychosis, who was willing and able to give informed consent to participate. Exclusion criteria were: insufficient English language to complete the questionnaires with support, and an affective psychosis diagnosis (i.e. psychotic depression, bipolar disorder).

Recruitment took place between 18 October 2019 and 19 March 2020. Datasets from 1038 participants were returned. For this analysis, only cases without high levels of missing data in the CAD-P measure (less than or equal to 20% missing) were retained for analysis. This resulted in a participant group of 1026 patients.

In this group, the majority of participants were White (66.96%), male (69.88%) and had a diagnosis of schizophrenia (64.52%). The mean age of the sample was 41.49 years ($SD = 12.29$). See Table 1 for full demographic and descriptive details.

For the second part of the analysis, only cases without high levels of missing data (less than or equal to 20% missing) on the CAD-P, ČEFSA and the two psychosis symptom measures were retained. This resulted in a subgroup of $n = 1015$. The demographic details and descriptive statistics for this subgroup can be found in the Supplementary material.

Measures

Participants answered the 13-item version of the CAD-P developed in Part 1 (see Appendix for the full scale), as well as the Perseverative Thinking Questionnaire (Ehring *et al.*, 2011) and the Černis Felt Sense of Anomaly (ČEFSA) scale (Černis *et al.*, submitted), as described in Part 1. In this group ($n = 1026$) both scales had good internal reliability (ČEFSA: Cronbach's $\alpha = 0.97$; PTQ: 0.96) and good model fit (ČEFSA: $\chi^2 = 1530.378$, d.f. = 539, $p < 0.001$, CFI = 0.932, TLI = 0.925, RMSEA = 0.042, SRMR = 0.042; PTQ: $\chi^2 = 450.929$, d.f. = 90, $p < 0.001$, CFI = 0.949, TLI = 0.941, RMSEA = 0.063, SRMR = 0.029). Participants also completed measures of paranoia and hallucinations, as follows.

Revised Green Paranoid Thoughts Scale (R-GPTS Persecution; Freeman et al., 2019). The R-GPTS is a scale assessing paranoia via ideas of reference and persecution subscales. The persecution subscale of the R-GPTS was used in this study. This subscale consists of ten items (e.g. 'Certain individuals have had it in for me'), rated over the past month on a 5-point Likert scale from '0, not at all' to '4, totally'. Higher scores indicate higher levels of paranoia, with a score above 18 indicating 'severe' levels of perceived persecution.

In the clinical group ($n = 1026$), the Cronbach's α for this scale was good (0.92), as was the model fit ($\chi^2 = 4007.887$, d.f. = 45, $p < 0.001$, CFI = 0.968, TLI = 0.959, RMSEA = 0.060, SRMR = 0.025).

Specific Psychotic Experiences Questionnaire (SPEQ-H; Ronald et al., 2013). The SPEQ consists of four scales which each assess a key psychotic experience. The hallucinations scale (SPEQ-H) was used in this study. This asks respondents to rate how frequently they have recently had particular experiences (e.g. 'How often do you: hear noises or sounds when there is nothing about to explain them?') using a 6-point Likert scale ('0, not at all' to '5, daily'). Higher scores indicate higher levels of hallucinatory experiences. This scale was adapted to include two further items assessing voice hearing: 'How often do you... hear voices saying words or sentences when there is no one around that might account for it' and '...hear two or more unexplained voices talking to each other'. Indicating that the additional items are consistent with the original items, the Cronbach's α for the adapted SPEQ-H in this group ($n = 1026$) was high (0.93). Model fit for a single-factor scale structure was also adequate for a large sample size ($\chi^2 = 711.491$, d.f. = 44, $p < 0.001$, CFI = 0.831, TLI = 0.789, RMSEA = 0.122, SRMR = 0.065).

Statistical analysis

Analyses were conducted in R, version 3.6.3 (R Core Team, 2020) with packages psych (version 1.9.12.31; Revelle, 2019) and lavaan (version 0.6-5; Rosseel *et al.*, 2019).

Psychometric validation

The single factor model identified in Part 1 was assessed using CFA with MLR robust maximum likelihood estimator in the clinical subsample ($n = 1007$). Convergent validity of the scale with the ČEFSA and PTQ were assessed via Pearson's correlation, and its internal reliability via Cronbach's alpha. Test-re-test data were not collected for this population.

Relationship to psychosis variables

Additionally, to begin to demonstrate the value of the CAD-P measure in psychosis research, linear regression models were used to determine whether cognitive appraisals of dissociation explained more variance in psychotic symptoms (paranoia and hallucinations) than dissociative experiences alone.

Data from the subgroup of 1015 participants with low ($\leq 20\%$) missing data on the CAD-P, ČEFSA, R-GPTS and SPEQ-H were used for this analysis. Missing data for all four scales were imputed using the mice package (version 3.8.0; van Buuren and Groothuis-Oudshoorn, 2020) in order to obtain total scores. Simple and multiple linear regression analyses were then carried out entering the ČEFSA and CAD-P measures as independent variables and the R-GPTS and SPEQ-H measures as dependent variables. As well as inspecting and comparing the estimates of each regression model, models were also formally tested for significant difference using ANOVA analyses.

Results*Psychometric validation*

CFA in the clinical group indicated a single factor model had a good fit to the data ($\chi^2 = 253.630$, d.f. = 65, $p < 0.001$, CFI = 0.959, TLI = 0.950, RMSEA = 0.053, SRMR = 0.029). Factor loadings for the final items in this group are shown in Table 2.

In this sample, the CAD-P had good internal consistency (Cronbach's $\alpha = 0.93$) and good convergent validity with the ČEFSA (Černis *et al.*, submitted) ($r = 0.80$, $p < 0.001$) and the PTQ (Ehring *et al.*, 2011) ($r = 0.73$, $p < 0.001$). As there was a significant difference between genders for the PTQ ($t = 2.74$, $p = 0.006$; females: mean = 32.57, $SD = 16.98$; males: mean = 29.36, $SD = 16.09$), convergent validity between the PTQ and CAD-P was also confirmed for females and males separately (females: $r = 0.70$, $p < 0.001$; males: $r = 0.75$, $p < 0.001$).

Relationship to psychosis variables

Paranoia. With the R-GPTS Persecution scale as the dependent variable, simple regression analysis with the ČEFSA as the independent variable found that ČEFSA scores explained 34.3% of the variance in R-GPTS scores ($\beta = 0.586$, 95% CI: 0.566–0.606, $p < 0.001$). On its own, CAD-P explained 36.4% of the variance in R-GPTS ($\beta = 0.604$, 95% CI: 0.559–0.649, $p < 0.001$).

When both ČEFSA and CAD-P were entered as independent variables, the multiple regression model explained 39.6% of the variance in R-GPTS scores (ČEFSA: $\beta = 0.291$, 95% CI: 0.260–0.322, $p < 0.001$; CAD-P: $\beta = 0.374$, 95% CI: 0.303–0.446, $p < 0.001$): an increase of 5.3% compared with ČEFSA alone. An ANOVA confirmed that this model was a significantly better fit to the data than either simple regression model ($F = 53.72$, d.f. = 1, $p < 0.001$).

Hallucinations. A simple linear regression model with SPEQ-H as the dependent variable and ČEFSA as the independent variable explained 40.1% of the variance in SPEQ-H scores ($\beta = 0.634$, 95% CI: 0.609–0.659, $p < 0.001$). A simple linear regression model with CAD-P as the independent variable explained 35.0% of the variance ($\beta = 0.593$, 95% CI: 0.532–0.653, $p < 0.001$).

Including both variables in a multiple regression model explained 42.4% of variance in SPEQ-H scores (ČEFSA: $\beta = 0.441$, 95% CI: 0.401–0.481, $p < 0.001$; CAD-P: $\beta = 0.245$, 95% CI: 0.153–0.337, $p < 0.001$): an increase of 2.3% compared with the simple regression model of ČEFSA alone. An ANOVA found that the multiple regression model was a statistically significantly better fit to the data than either simple regression model ($F = 129.28$, d.f. = 1, $p < 0.001$).

Discussion

To the authors' knowledge, this study – and its resulting measure – are the first to explicitly address cognitive appraisals of dissociative experiences in the context of psychosis. The measure identifies 13 key cognitive appraisals, all loading onto a single factor. A copy of the full scale can be found in the Appendix. The CAD-P scale has good psychometric properties in both non-clinical and clinical (psychosis) groups: the model-fit is robust, internal reliability is high, and convergent validity with related measures is also good. Where test–re-test reliability was assessed, this was also high for a 1-week interval. When added to regression models, the CAD-P explained additional variance in both paranoia and hallucinations scores in a clinical group, above and beyond that explained by a dissociation measure alone. In general, therefore, the novel scale appears to fulfil the study aim of providing a method for assessing cognitive appraisals relevant to dissociation in psychosis for clinical and research purposes.

Items of the CAD-P, such as 'I must be sick' and 'I'm losing my mind' are consistent with the proposed similarities between dissociation and anxiety appraisals (Baker *et al.*, 2007; Hunter *et al.*, 2003; Hunter *et al.*, 2014). These appraisals reflect concerns about dissociative experiences being inherently dangerous, or a sign of imminent danger. However, this study also suggests that a number of other appraisals may be important to the experience of dissociation in psychosis. Items reflecting negative beliefs about self ('This is because I'm evil') and other people ('Someone has done something to me') reflect current understanding of beliefs common in patients experiencing high levels of paranoia (Collett *et al.*, 2016; Stopa *et al.*, 2013). Further, and of particular note, a number of items indicate concerns about control and ownership over oneself and one's actions ('I can't trust my own mind', 'I'm not really "me"' and 'It's not me in control right now'). Whilst maladaptive beliefs about control are a feature of a number of mental health disorders, these statements suggest that experiencing one's self and internal world as 'other' can directly lead people to doubt their autonomy and control. Following Maher (1974), who proposed that within a context of particular beliefs and cognitive biases, anomalous experiences 'demand explanation' which may culminate in the adoption of an explanatory delusional belief, it is understandable how the above appraisals might result in delusions of control or passive influence. It is interesting to note that these particular psychotic symptoms have been found to be more common in dissociative identity disorder than in psychosis patients (Laddis and Dell, 2012). These items of the CAD-P, therefore, appear to capture concerns that are specific to the experience of dissociation, but which may be highly relevant to the 'fuzzy' boundary between dissociation and psychosis (Renard *et al.*, 2017). Further exploration of dissociation – and cognitive appraisals of such experiences – may therefore be particularly appropriate in clinically high-risk (CHR) or prodromal presentations. The broad range of items might be a strength of the CAD-P: clinicians may wish to use the scale initially to enquire further about which appraisals cause the most distress or are the most relevant to their client's specific circumstances. Subsequent treatment could then be tailored to these appraisals, for example, through the use of behavioural experiments in therapies following a cognitive behavioural approach.

Another strength of the CAD-P is its good psychometric properties in the non-clinical and clinical groups. Regarding convergent validity, it is promising that the CAD-P correlated highly in both samples with the PTQ (Ehring *et al.*, 2011). The PTQ measures ruminative

negative thinking style, which may be expected to occur as a result of catastrophic cognitive appraisals. Rumination can also be seen as a form of intense internal focus, which Hunter and colleagues (Hunter *et al.*, 2003) propose may be common in depersonalisation. The current study determined a correlational relationship between the cognitive appraisals of dissociation and rumination – however, our understanding of dissociation may benefit from research which seeks to determine direction of effect between the two constructs. The CAD-P may be a valuable tool for research such as this in studies using experimental designs, network analysis methods, and treatment outcome (mechanism) studies.

This utility was demonstrated in the current study by using the CAD-P to demonstrate that cognitive appraisals of dissociation explained additional variance in paranoia (persecution) and hallucinations over and above dissociation alone. Interestingly, there were differences between the results for hallucinations and paranoia. For paranoia, cognitive appraisals of dissociation explained approximately the same proportion of variance as FSA-dissociation. However, for hallucinations, cognitive appraisals of dissociation explained closer to half the proportion of variance as did FSA-dissociation. Tentatively, these findings could be interpreted as reflecting the robust relationship between dissociative experience and hallucinations (Longden *et al.*, 2020), and the importance of cognition in the development of paranoia (Freeman, 2016). A clinically relevant aim for future research may therefore be to explore the impact on psychotic symptoms of cognitive restructuring for appraisals of dissociation; in particular, whether this may be a mechanism to lessen positive psychotic symptoms. Exploration of these appraisals in relation to negative psychotic symptoms would also be of interest, particularly as many of the CAD-P items contain negative beliefs, or describe passive responses to dissociative experiences.

Limitations of the current study include the manner in which items were developed. As item development drew upon only 12 clinical interviews, it is possible that important cognitions were not elicited and therefore not added to the item pool. For example, cognitive appraisals regarding brain damage or functional impairment have been demonstrated as important in PTSD patients (Samuelson *et al.*, 2017), and may also be relevant to dissociation or psychosis.

The sampling method presents another potential limitation of the current study. Whilst providing large sample sizes – a strength of the study that allowed for rigorous analysis – recruitment via Facebook advertisements in Part 1 resulted in a biased sample. The non-clinical samples were drawn from the general population of the UK only, and contained a very high proportion of female and White respondents, with notably high levels of self-reported ongoing mental health difficulties. It is likely that this is the result of self-selection bias due to the title and description of the study sample. Despite the large number of male respondents and respondents from a range of ethnic groups, the participant pool was therefore not representative of the general population. Due to the sampling method, participation was limited to those aged 18 or over. Further validation of the CAD-P in a younger age range would extend the utility of the scale. In particular, this is likely to be important in studies of participants with CHR presentations, where the age range might be expected to include people below the age of 18.

Finally, there are two methodological limitations. Test–re–test data were not collected from the clinical participants in Part 2. As a result, despite the strong test–re–test result in the non-clinical sample (Part 1), this property of the scale remains unknown in clinical contexts and requires further validation. Convergent validity of the CAD-P was assessed using only one dissociation measure. Analysis of validity using a broader range of dissociative measures (particularly the Dissociative Experiences Scale; Carlson and Putnam, 1993) would also be beneficial.

Nonetheless, the CAD-P scale may prove to be a useful tool for researchers and clinicians to identify, assess and investigate cognitive appraisals in individuals with dissociation, especially in the context of psychosis.

Supplementary material. To view supplementary material for this article, please visit: <https://doi.org/10.1017/S1352465820000958>

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Appendix: The Cognitive Appraisals of Dissociation in Psychosis (CAD-P) measure

Please rate how often you think the following when you are feeling strange, disconnected, unreal or 'dissociated'.

Please note that this should NOT be whilst under the influence of drugs, alcohol or legal highs.

		Never	Rarely	Sometimes	Often	Always
1	I can't trust my own mind.	0	1	2	3	4
2	Someone has done something to me.	0	1	2	3	4
3	Something is terribly wrong.	0	1	2	3	4
4	I'm losing my mind.	0	1	2	3	4
5	I'm not really 'me'.	0	1	2	3	4
6	I am all alone.	0	1	2	3	4
7	I don't look right to other people right now.	0	1	2	3	4
8	I must be sick.	0	1	2	3	4
9	I'm not in the same world as everyone else.	0	1	2	3	4
10	This is because I am evil.	0	1	2	3	4
11	Now I won't be able to do the things I wanted.	0	1	2	3	4
12	It's not me in control right now.	0	1	2	3	4
13	This might last forever.	0	1	2	3	4

Scoring: sum score of all items.

Note that: raw scores cannot distinguish between many appraisals occurring infrequently, and a small number of appraisals experienced very frequently. In clinical contexts, therefore, further interpretation of responses may be required.



Dissociation in relation to other mental health conditions: An exploration using network analysis

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ABSTRACT

Dissociative experiences, traditionally studied in relation to trauma and PTSD, may be important phenomena across many different psychological conditions, including as a contributory causal factor for psychotic experiences. In this study, the aim was to explore, using network approaches, how dissociative experiences taking the form of a Felt Sense of Anomaly (FSA) relate to both common mental health conditions and psychotic experiences. 6941 individuals from the general population completed online assessments of FSA-dissociation, post-traumatic stress symptoms (PTSS), anxiety, depression, insomnia, worry, distress tolerance, hallucinations, grandiosity, paranoia, and cognitive disorganization. An undirected partial correlation network analysis was used to explore the network structure, then Bayesian inference with Directed Acyclic Graphs (DAGs) was used to identify potential directions of relationships between dissociation and mental health symptoms. Dissociation was found to be highly connected in both network models. Both networks found direct relationships between dissociation and hallucinations, grandiosity, paranoia, cognitive disorganization, anxiety, depression, and PTSS. In the DAGs analysis, the direction of influence between dissociation and hallucinations, PTSS, anxiety and depression was unclear, however it was found to be probable that dissociation influences paranoia (97.66% of sampled DAGs found the direction dissociation to paranoia, versus 2.34% finding the reverse direction), cognitive disorganization (99.74% vs. 0.26%), and grandiosity (93.49% vs. 6.51%). Further, dissociation was found to be a probable influence of insomnia and distress tolerance via indirect pathways. In summary, dissociation is connected to many mental health disorders, and may influence a number of presentations, particularly psychotic experiences. The importance of dissociation in mental health may therefore currently be under-recognised.

1. Introduction

Dissociation has been most studied in relation to trauma and PTSD (Ozer et al., 2003). However, dissociation might be best considered a set of transdiagnostic experiences (Schimmenti and Carretti, 2014) that are common (Loewenstein, 2018), and clinically significant in their own right (Lyssenko et al., 2017). Dissociation has been linked with depression (Baker et al., 2007), anxiety (Evren et al., 2008), panic disorder (Fikretoglu et al., 2007), paranoia (Černis et al., 2014), worry (Freeman et al., 2013), and sleep difficulties (Giesbrecht and Merckelbach, 2004). However, despite hypotheses that ‘dissociation may accompany almost every psychiatric disorder and may influence their

phenomenology as well as response to treatment’ (p.172; Šar, 2014), dissociation remains under-recognised (Loewenstein, 2018). This may be exacerbated by a lack of clarity about the role of dissociation in mental health. In this study, we set out to explore how dissociation may fit within a wide range of mental health symptoms.

1.1. Dissociation

The exact definition of the term ‘dissociation’ has been subject to ongoing debate: it has been used to refer to a broad range of experiences, which some argue lacks a unifying ‘single, coherent referent’ (Cardena, 1994). The current study uses the definition of Černis et al. (in prep.)

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who identified from patient interviews and systematic review a subset of dissociative experiences sharing the phenomenological common denominator of a ‘felt sense of anomaly’ (FSA). This subjective feeling of ‘strangeness’ (Černis et al., 2020) can take various forms (such as unfamiliarity or detachment) and can occur in relation to various domains, such as one’s body, emotions, or external environment.

1.2. Dissociation and mental health presentations

Arguments have been made both for dissociation having a causal role in other mental health symptoms and for dissociation resulting from other symptoms. For example, sleep difficulties are one of the key ‘transtheoretical’ factors highlighted by Lynn et al. (2019) as a potential cause of dissociation. This view builds on work demonstrating that experimentally restricted sleep led to increases in dissociative experiences (van Heugten-van der Kloet et al., 2015). Further, affective symptoms, such as anxiety and depression have been found to be predictors for dissociation (Evren et al., 2008). By contrast, positive psychotic symptoms – such as delusions – have been suggested to result from dissociation: Garety et al. (2001) and Freeman (2016) implicate ‘anomalous experiences’ in the formation of these difficulties. However, this causal relationship, and many others across mental health are presently unexplored.

1.3. Network analyses

Arising from the network approach to conceptualising mental health presentations (Borsboom, 2017), network analyses have grown in popularity over the past decade as a method for exploring and visualising complex systems of symptoms (Robinaugh et al., 2019). Estimated network psychometrics (Epskamp et al., 2016) model the covariance and pairwise interactions between variables in a network, and can be plotted graphically to visualise these statistical relationships as ‘edges’ between variables (‘nodes’) in order to ‘uncover data patterns’ at the ‘initial stages of phenomena detection’ (Robinaugh et al., 2019). The exploratory value of network analysis methods has seen them rise in popularity in empirical studies. Whilst the majority of these have used ‘undirected’ partial correlation networks, several recent studies have used Bayesian inference with Directed Acyclic Graphs (DAGs) (Bird et al., 2018; Kuipers et al., 2018; Moffa et al., 2017). Unlike undirected networks, DAGs estimate and incorporate information about the likely direction of the conditional dependence relationships between variables. Researchers have begun using this information to make hypotheses about causal relationships. Although there are several caveats to using DAGs in this way – particularly in mental health (Dawid, 2010), interpreted cautiously, this exploratory method can also be highly valuable where it may be helpful to ‘visualise and quantify complex dependencies in the data’ (Robinaugh et al., 2019).

1.4. The current study

Network analyses, therefore, may be helpful to explore dissociation. To date, only Schimmenti and Šar (2019) have applied these methods specifically to dissociation: to visualise relationships between items of the Dissociative Experiences Scale. Like that study, the current study uses two network analyses: an undirected network to estimate the conditional associations between variables, and DAGs to hypothesise the possible directions of these relationships. Undirected analyses are easily parameterised and well-identified, giving a sufficiently robust estimation of the true underlying structure of relationships between variables, whilst DAGs are more difficult to identify but are valuable for hypothesis-generation.

The relationships explored here will be those between dissociation and other mental health presentations: post-traumatic stress, depression, anxiety, worry, insomnia, paranoia, grandiosity, hallucinations and cognitive disorganization. Distress tolerance was also included in

the analysis as a psychological process, since the leading theoretical view is of dissociation as a way of coping with distress (Dorahy, 2006).

2. Methods

2.1. Design and participants

The design was an online cross-sectional self-report questionnaire study, with ethical approval granted by the University of Oxford Central University Research Ethics Committee (ref: R57488/RE002). The study was carried out in accordance with the Declaration of Helsinki.

Participants were recruited via social media, the majority via Facebook adverts. A general population sample was considered appropriate since all variables are considered to exist along a continuum of severity and therefore expected to be present, albeit at lower levels, in this group. Advertisements were titled “Mapping dissociation in mental health” and stated that questionnaires concerned “common thoughts and feelings”. The information sheet described dissociation as “strange feelings and experiences such as ‘spacing out’, feeling ‘unreal’, or feeling detached from the world around you”. Inclusion criteria were deliberately broad: any adult (age 18 years or over). There were no exclusion criteria.

During the recruitment period (May 24th, 2018 to July 23rd, 2018), 13,186 responses were recorded by Qualtrics (2018). 144 (1.09%) did not consent to participate, and 307 (2.33%) indicated consent but left the survey without continuing to the first page of measures. After removing participants who did not meet the inclusion criterion, or had high levels of missing data (greater than 20% in any of the measures), a sample of 6941 was obtained for the DAGs analysis.

Of the 6941 participants, the majority were female (87.2%, $n = 6050$; male: $n = 646$; other: $n = 183$) and White (93.7%; $n = 6412$). The mean age of the sample was 40.3 years ($SD = 15.7$), with a range from 18 to 86. Additionally, 85.5% of the sample answered “yes” to the question “have you ever experienced mental health difficulties?”.

2.2. Procedures

Informed consent and assessment were both carried out online using Qualtrics (2018). The questionnaire landing page contained the participant information sheet and statements regarding informed consent, as per British Psychological Society (2017) guidelines for ethical online research. The survey was accessible on desktop and mobile web browsers.

After acknowledging the consent statements, participants were shown seven self-report measures. Unfinished surveys were retrieved automatically after a week of inactivity and added to the dataset.

2.3. Measures

Cronbach’s alphas for each scale are shown in Table 1. All scales demonstrated ‘good’ or ‘excellent’ internal consistency in this sample.

2.3.1. Černis felt sense of anomaly scale (ČEFSA; Černis et al., in prep.)

This scale measures dissociation in terms of “a felt sense of anomaly” (FSA). The scale comprises 40 items that assess eight factors. The factors are: anomalous experiences of the self (“I feel like a stranger to myself”), of the body (“My body feels numb”), and of emotion (“I don’t fully experience emotions”), and altered senses of familiarity (“Places that I know seem unfamiliar”), connection (“I feel disconnected from the world around me”), agency (“I freeze, unable to do anything”), and of reality (“The world seems like it is fake”). The eighth factor is a ‘global FSA’ scale (“Things seem strange”). All items are rated in reference to the past two weeks on a Likert scale from “0, Never” to “4, Always”. Higher scores indicate higher levels of dissociative experiences involving FSA. In this sample, the internal consistency of the scale was excellent (Cronbach’s $\alpha = 0.98$).

Table 1

Showing the means and standard deviations of the sample for each scale in the survey.

Scale	Sample mean (SD)	Cronbach's alpha for this sample	Scale min – max score	Scale caseness cut-off score
Černis Felt Sense of Anomaly scale	49.74 (32.86)	0.98	0–160	–
Hospital Anxiety and Depression Scale: <i>Anxiety</i>	11.17 (4.83)	0.87	0–21	8
Hospital Anxiety and Depression Scale: <i>Depression</i>	7.63 (4.69)	0.85	0–21	8
Penn State Worry Questionnaire	57.43 (15.71)	0.95	16–80	45
Insomnia Severity Index	11.90 (6.33)	0.88	0–28	10
Specific Psychotic Experiences Questionnaire: <i>Paranoia</i>	23.74 (18.08)	0.95	0–75	–
Specific Psychotic Experiences Questionnaire: <i>Hallucinations</i>	7.21 (8.64)	0.91	0–45	–
Specific Psychotic Experiences Questionnaire: <i>Grandiosity</i>	3.11 (3.66)	0.86	0–40	–
Specific Psychotic Experiences Questionnaire: <i>Cognitive disorganization</i>	7.09 (3.20)	0.84	0–11	–
Post-Traumatic Symptom Disorder Checklist	29.62 (20.09)	0.95	0–80	33
Distress Tolerance Scale	45.74 (14.58)	0.92	15–75	–

NB: Cronbach's alphas above 0.8 are considered to indicate 'good' internal consistency, and above 0.9 'excellent'.

2.3.2. The hospital anxiety and depression scale (HADS; Zigmund and Snaith, 1983)

The HADS is a 14-item scale comprising two subscales assessing anxiety and depression in the past week. Items such as “I feel tense or ‘wound up’” (anxiety) and “I feel as if I am slowed down” (depression) are rated on a 0 to 3 scale. Higher scores indicate more severe anxiety or depression.

2.3.3. Penn state worry questionnaire (PSWQ; Meyer et al., 1990)

The PSWQ comprises 16 items assessing worry (“I have been a worrier all my life”), rated on a 5-point Likert scale from “1 Not at all typical of me” to “5 Very typical of me”. Higher scores indicate higher levels of worry. Respondents are instructed to consider the past two weeks.

2.3.4. Insomnia severity Index (ISI; Morin, 1993)

The ISI assesses insomnia and its impact on day-to-day life over the past two weeks using seven items scored on a 0 to 4 Likert scale. Higher scores indicate more problematic sleep.

2.3.5. Specific psychotic experiences questionnaire (SPEQ; Ronald et al., 2013)

The SPEQ comprises four scales which each assess a key psychotic experience: paranoia, hallucinations, grandiosity, and cognitive disorganization.

The *paranoia* and *hallucinations* scales ask respondents to rate how frequently they have recently had particular thoughts (e.g. ‘How often have you thought: I am under threat from others’) or experiences (e.g. ‘How often do you: hear noises or sounds when there is nothing about to explain them?’), respectively, using a six-point Likert scale (‘not at all’ to ‘daily’). The *grandiosity* scale asks respondents how much they agree with the statements (e.g. ‘I have a special mission’) for the past month, on a four-point Likert scale (‘not at all’ to ‘completely’). Finally, the *cognitive disorganization* scale also assesses the past month, asking for ‘yes/no’ responses to items such as ‘are you easily confused if too much happens at the same time?’. For all scales, higher scores indicate more severe psychotic experiences.

2.3.6. Post-traumatic symptom disorder checklist (PCL-5; Weathers et al., 2013)

To assess trauma symptoms over the past month, the PCL-5 contains 20 items such as “feeling very upset when something reminded you of the stressful experience”, rated on a five-point Likert scale from “0 not at all” to “4 extremely”. Participants were asked to rate “the most upsetting event” they had experienced, which included traumatic and other upsetting life events as indicated via selecting from a list including “end of a relationship”, “natural death of a significant other”, and “severe accident”. Higher scores indicate greater post-traumatic symptomatology.

2.3.7. Distress tolerance scale (DTS; Simons and Gaher, 2005)

Using a five-point Likert scale from “1, strongly agree” to “5, strongly disagree”, the DTS measures beliefs and responses to strong emotions, such as “feeling distressed or upset is unbearable to me”. Higher scores indicate less tolerance of strong emotions. Respondents are asked to ‘think of times that you feel distressed or upset’, rather than a specific timeframe when answering.

2.4. Statistical analysis

Analyses were conducted in R, version 3.6.3 (R Core Team, 2020). Multiple imputation (using ‘mice’ package) was used for missing data to allow calculation of scale total scores, meaning that all variables were continuous. The proportion of imputed data was very low: less than 0.1% of the data for each scale. Visual inspection of variable histograms revealed a non-normal distribution. Therefore, data were transformed to a normal distribution (‘gaussianized’) using the ‘DAGtools’ (v0.1.001) package prior to analysis.

2.4.1. Undirected network

As a first step in exploring the relationships within the data, a Gaussian Graphical model was estimated. These undirected networks can also be visualised using the qgraph package such that the strength of the conditional relationship between variable (node) pairs (once all other variables have been conditioned upon) are represented by the weight of the edge between them (i.e. line width and shading). In this way, the absence of an edge between two nodes indicates conditional independence between those two variables, once all other variables have been conditioned upon.

Undirected networks are more easily parameterised and make no assumptions regarding the direction of relationships between nodes. These qualities are helpful in estimating the true underlying structure of the data (‘identification’), as it eliminates the problem of Markov equivalence: one of the key limitations of DAGs. Markov equivalence refers to cases where the same set of conditional independence parameters could be represented by numerous different configurations between nodes, including contradictory information about directions of effect. Without additional knowledge, it would be unclear which model most closely represented the real-world situation from which the data was collected. Undirected networks also do not assume acyclicity (that nodes do not have reciprocal relationships – an assumption that is particularly unlikely to be true in mental health research). These networks can therefore provide a more robust estimate of the true structure of the relationships within the data than DAGs.

To estimate and visualise the undirected network, the packages ‘bootnet’ (v1.3) and ‘qgraph’ (Epskamp et al., 2012) were used. Due to the large sample size, ggmModSelect was used to fit a Gaussian graphical model to the data via stepwise model selection in order to optimise model fit. The argument ‘principal direction’ was used during estimation

to recode all variables in the same direction: i.e. in order that higher scores for all variables indicated more severe negative outcomes. Non-parametric bootstrapping (5000 bootstraps) was used to assess the accuracy and stability of the estimated network (*Supplementary Material*). In the final graph, positive partial correlations are shown by a blue and negative correlations by a red line. The strength of the pairwise partial correlations between nodes is indicated in both cases by the weight of the edge.

2.4.2. Bayesian inference with directed acyclic graphs

An advantage of the Bayesian inference with DAGs method is that it can hypothesise the direction of direct and indirect pathways between nodes. This is valuable in a field where much is unknown. In a DAG, if variable B is directly dependent on variable A, this is indicated by a directed edge ($\rightarrow$) between the nodes, such that 'A $\rightarrow$ B'. This can be interpreted both as "controlling for other parents of B, B is dependent upon A", and "A is a direct cause of B". As in undirected networks, nodes not joined by an edge can be interpreted as being (conditionally) independent from each other given some subset of the other variables.

There are important limitations to this method, in addition to the problems of assumed acyclicity and Markov equivalence discussed above. Firstly, it is important to note that mathematical independence is not necessarily indicative of real-world causal independence (Dawid, 2010) and therefore these networks require careful interpretation: they should be considered hypothesis-generating when the true underlying causal structure is unknown. This method also assumes causal sufficiency: that there are no hidden common causes shared by nodes, and that all important causal variables have been included in the network.

An advantage of incorporating Bayesian inference into the DAGs methodology is that it enables the probability of each edge to be estimated. Whilst this does not remove the problems and limitations described above, it does provide further detail with which to better interpret the network. In this analysis, the final graph was calculated by averaging the results of 50,000 sample DAGs, obtained by using the BiDAG package to run the partition Markov Chain Monte Carlo algorithm (Kuipers & Moffa, 2017; Kuipers, Suter & Moffa, 2018) for 10 million iterations. The exact method of this analysis and the preceding transformation of the data follows the same protocol as detailed in Bird et al. (2018). For this study, a directed edge (i.e. A $\rightarrow$ B) in the final graph indicates that this specific direction occurred in over 90% of the sampled DAGs for which that edge was present. Only these cases were considered as sufficient for drawing hypotheses about probable direction of influence. Edges are shown as undirected (i.e. A-B) where the edge was present in over 50% of cases, but the above criterion regarding direction was not met. Causal effects are shown as z-scores with 90% credible intervals (CIs). In practice, a credible interval may be interpreted in a similar manner to a confidence interval, but it is calculated according to the probability distribution given the data. The results of the DAGs analysis therefore provide information both about how often a directed relationship between two variables is found, and the strength of this causal effect.

3. Results

Table 1 shows the mean scores for each scale. Generally, scores were within the non-clinical range, with mildly elevated anxiety, worry, and sleep difficulties according to scale cut-offs.

3.1. Undirected network

Fig. 1 shows the undirected network (see *Supplementary Material* for full details). In summary, dissociation had direct relationships with all variables except distress tolerance. Dissociation was highly central in the network in terms of degree centrality (1.50), closeness (0.0149), and betweenness (14). The stability of centrality estimates was very high (coefficient 0.75 for each) and the accuracy of network estimation

(reflected in edge-weight 95% bootstrapped confidence intervals; CIs) was good. The strongest edge in the network was between worry and anxiety (edge-weight = 0.452, CI = 0.431–0.472) – this was statistically significantly stronger than any other edge. The next strongest edges in the network were between dissociation and hallucinations (edge-weight = 0.273, CI = 0.247–0.298), and dissociation and post-traumatic stress symptoms (PTSS; 0.249, CI = 0.195–0.246). The edge-weight between dissociation and hallucinations was not significantly higher than that between dissociation and PTSS but it was significantly higher than all other edges involving dissociation. Dissociation's weakest edges were with grandiosity (0.103, CI = 0.0797–0.127), and insomnia (–0.0574, CI = –0.0913 to –0.0236). An edge was not found between dissociation and distress tolerance.

3.2. Directed Acyclic Graphs (DAGs)

Table 2 summarises the results of the DAGs analysis for the relationships between dissociation and all other variables.

3.2.1. Affective symptoms

The table can be interpreted as follows: from anxiety to dissociation, there was a pathway (direct or indirect) present in 48.85% of the 50,000 DAGs sampled – that is, anxiety influences dissociation in 48.85% of sampled graphs. The average strength of the causal effect within these 48.85% of graphs was 0.53 (with a 90% credible interval (CI) 0.27–0.64). In 100% of the 48.85% of DAGs sampled which showed a pathway from anxiety to dissociation, a direct edge between anxiety and dissociation was present, and this had an average strength of 0.43 (90% CI = 0.21–0.63). The opposite direction, from dissociation to anxiety, was present in 51.15% of sampled graphs, with average strength 0.51 (CI = 0.20–0.63). Again, 100% of the 51.15% of sampled DAGs showing a pathway from dissociation to anxiety contained a direct pathway. The average strength of this direct pathway was 0.42 (CI = 0.17–0.62). Therefore, there is a significant direct relationship between anxiety and dissociation but no clear direction of influence, as roughly equal proportions of the 50,000 DAGs sampled showed each direction.

Depression and PTSS also show significant direct relationships with dissociation. The direction is unclear in depression (72.49% dissociation influences depression; 27.51% vice versa), but more suggestive with PTSS (86.19% dissociation influences PTSS; 13.81% vice versa). However, neither meets the guideline described above for drawing hypotheses about probable direction of influence (i.e. direction present in at least 90% of sampled DAGs).

3.2.2. Psychotic symptoms

The above results contrast with the results for cognitive disorganization, where 0.26% of the sampled DAGs found an edge from cognitive disorganization to dissociation, but 99.74% showed the opposite, with 100% of these showing a direct pathway with average strength 0.25. This can be interpreted as suggesting that the probability that dissociation contributes to cognitive disorganization is close to 1.

It was found to be highly probable that dissociation also influences two other psychotic experiences (rather than vice versa): 97.66% and 93.49% of sampled DAGs found that dissociation influences paranoia and grandiosity respectively. The exception was hallucinations, where the direction of the relationship was less clear: 70.25% of sampled DAGs found that dissociation influences hallucinations, but the remaining 29.75% found the opposite direction. This proportion is insufficient to draw inferences about direction of effect.

3.2.3. Indirect relationships

Relationships between dissociation and insomnia, worry, and distress tolerance were strongly indicated to follow the direction of dissociation influencing each of these variables (insomnia: 90.13%; worry: 82.76%; distress tolerance: 98.48%). However, the majority of influence came from indirect pathways with very small effect sizes (see

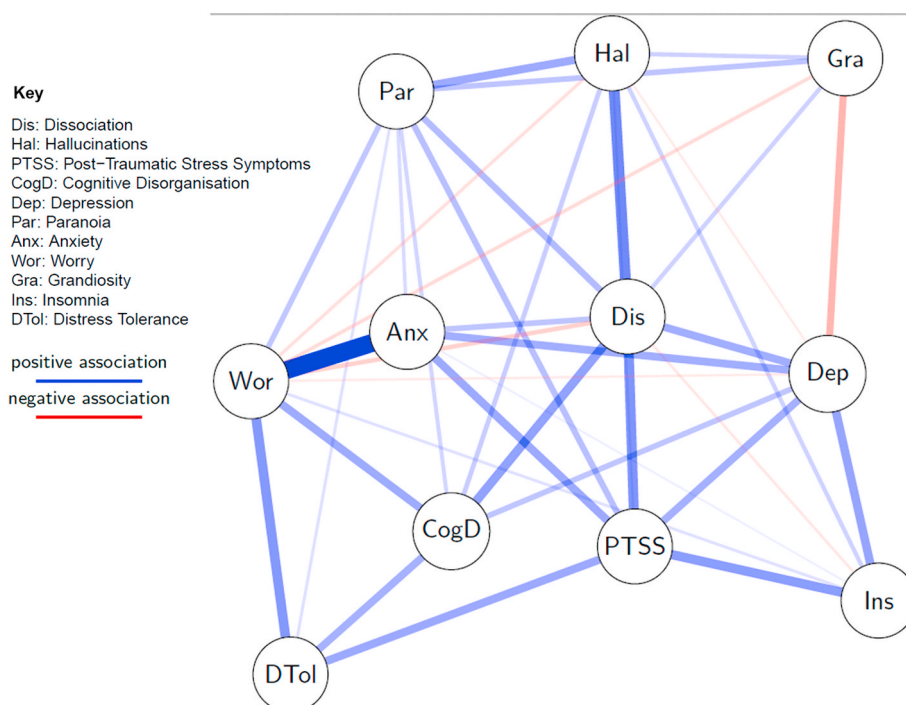


Fig. 1. Undirected network graph showing relationships between dissociation, psychotic-like experiences, and other presentations measured in the online survey. Red lines show negative relationships. Blue lines show positive relationships. Greater thickness and colour strength of edges indicates greater edge weight.

Table 2

Summarising the average causal effects between dissociation and all other variables.

Causal effects:	Pathway present (direct or indirect) % (2 sf)	Causal effect	90% CI	Direct edge present %	Direct causal effect	90% CI
Variable to dissociation (i.e. variable causing dissociation)						
Anxiety	48.85	0.53	0.27–0.64	100	0.43	0.21–0.63
Hallucinations	29.75	0.56	0.37–0.66	100	0.48	0.32–0.66
Depression	27.51	0.51	0.26–0.63	100	0.43	0.24–0.63
Post-traumatic Stress	13.81	0.58	0.40–0.72	100	0.50	0.39–0.70
Worry	13.45	0.32	0.02–0.47	35.51	0.12	0.00–0.47
Insomnia	7.39	0.27	0.02–0.45	22.43	0.03	–0.01–0.22
Grandiosity	6.51	0.18	0.13–0.21	99.69	0.16	0.06–0.21
Paranoia	2.34	0.44	0.20–0.65	100	0.32	0.20–0.59
Distress Tolerance	1.52	–0.26	–0.51–0.07	100	–0.09	–0.23–0.06
Cognitive Disorganization	0.26	0.53	0.34–0.67	100	0.30	0.21–0.49
Dissociation to variable (i.e. dissociation causing variable)						
Anxiety	51.15	0.51	0.20–0.63	100	0.42	0.17–0.62
Hallucinations	70.25	0.53	0.44–0.58	100	0.50	0.41–0.58
Depression	72.49	0.46	0.24–0.61	100	0.35	0.23–0.61
Post-traumatic Stress	86.19	0.51	0.35–0.71	100	0.33	0.29–0.55
Worry	82.76	0.21	0.01–0.46	4.66	<0.01	0.00–0.00
Insomnia	90.13	0.23	0.06–0.44	4.30	<0.01	0.00–0.00
Grandiosity	93.49	0.19	0.06–0.20	100	0.16	0.13–0.20
Paranoia	97.66	0.46	0.29–0.65	100	0.21	0.17–0.25
Distress Tolerance	98.48	–0.30	–0.50–0.09	19.48	–0.01	–0.07–0.00
Cognitive Disorganization	99.74	0.44	0.31–0.61	100	0.25	0.22–0.28
Key:						
'Pathway present'	The proportion of sampled DAGs which found this pathway.					
'Causal effect'	Average total causal effect when that pathway was present.					
'Direct edge present'	The proportion of DAGs that found direct pathways of those where some pathway was found to be present.					
'Direct causal effect'	Average total causal effect of the direct pathways.					
CI	Credible interval.					

Table 3).

3.2.4. Graphical representation

Fig. 2 summarises the results of Table 2. Edges are shown when the relationship between the variables was present in over 50.00% of the 50,000 sampled DAGs. Where the edges are directed (blue, with

arrowheads), the indicated direction of influence was present in over 90.00% of the DAGs where the edge was present. Therefore, black edges without arrowheads show a relationship where the direction is more ambiguous, and edges with arrowheads indicate a more probable direction (in the direction shown by the arrowhead).

Table 3

Summarising the indirect pathways between dissociation and worry, insomnia, and distress tolerance and their causal effects.

	Dissociation to Worry: 82.76% of sampled DAGs		Dissociation to Insomnia: 90.13% of sampled DAGs		Dissociation to Distress Tolerance: 98.48% of sampled DAGs	
	Pathway present (% of 82.76%)	Causal effect	Pathway present (% of 90.13%)	Causal effect	Pathway present (% of 98.48%)	Causal effect
Direct pathway	4.66	0.0058	4.30	0.0014	19.48	−0.011
Indirect pathway via:						
Anxiety	50.12	0.19	47.44	0.075	49.3	−0.083
Hallucinations	60.94	0.0083	62.58	0.052	69.73	−0.027
Depression	62.72	0.026	64.15	0.107	70.76	−0.036
PTSS	12.22	0.014	12.75	0.033	87.20	0.141
Worry	<i>Direct pathway</i>		10.37	0.0038	83.36	−0.064
Insomnia	85.25	0.019	<i>Direct pathway</i>		88.23	−0.015
Grandiosity	4.30	<0.001	4.79	<0.001	7.26	–
Paranoia	0.63	0.0012	1.75	<0.001	91.88	−0.036
Distress Tolerance	0.53	<0.001	0.53	<0.001	<i>Direct pathway</i>	
Cognitive Disorganization	–	–	0.13	–	96.19	−0.090

3.3. Comparison of networks

Both networks indicate that dissociation is highly connected to all the other mental health variables, with the exception of distress tolerance. The absence of an edge between dissociation and distress tolerance in the undirected network is supported by the DAGs analysis, where very few direct pathways between the two were found in the 50,000 sampled DAGs.

In terms of the strength of the direct relationships with dissociation, hallucinations and PTSS have the highest edge-weights with dissociation in the undirected network and the strongest direct causal effects in the DAGs analysis. Therefore, both networks find that these variables have robust relationships with dissociation.

For other relationships, the two network models did not yield identical results. For example, whilst the direct causal effects for depression (0.43 influence on dissociation and 0.35 influence from dissociation) and anxiety (0.43 and 0.42) appear similar to those for PTSS (0.50 and

0.33) and hallucinations (0.48 and 0.50) in the DAGs analysis, their edge-weights with dissociation in the undirected analysis do not support this. Anxiety in particular has a significantly lower edge-weight (0.138; CI: 0.112–0.165) than that for depression (0.192; CI: 0.164–0.219), which is in turn significantly lower than those for hallucinations (0.273; CI: 0.247–0.298) and PTSS (0.249; CI: 0.195–0.246) (which were not statistically significantly different). Indirect pathways between these variables may have influenced the results in the undirected network, since anxiety and depression are likely to be highly associated.

Similarly, at first glance, the relationships between dissociation and worry and dissociation and insomnia appear to differ between models. The undirected network model shows a weak negative relationship between dissociation and these two variables (worry: −0.107, CI: 0.135 to −0.0797; insomnia: −0.0574, CI: 0.0913 to −0.0236), whilst the DAGs analysis found small positive effects. However, both models agree that the strength of the direct relationships is low, perhaps too weak to

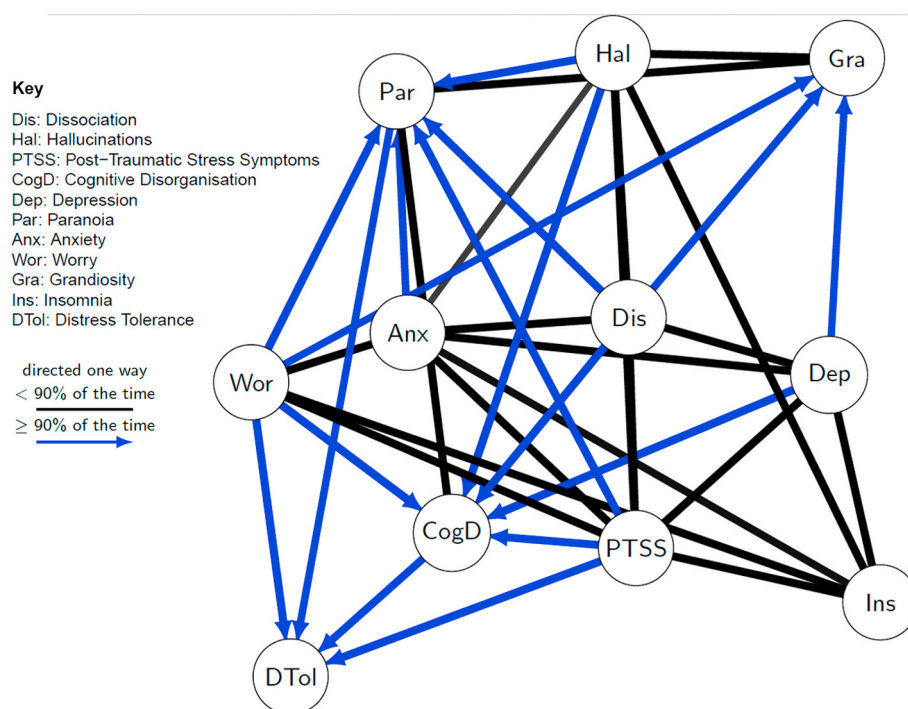


Fig. 2. Mixed graph (i.e. with both directed and undirected edges) showing relationships between dissociation, psychotic-like experiences, and other presentations measured in the online survey. Undirected lines (black, no arrows) show relationships that were present in over 50.00% of the 50,000 sampled DAGs. Blue lines with arrowheads show relationships (and the probable direction of causation) where these were present in over 90.00% of the 50,000 sampled DAGs.

estimate reliably. The DAGs analysis result is influenced by the indirect pathways from dissociation to both variables, which appear robust (i.e. they were found in more than 50% of sampled DAGs, and the indirect effects of dissociation on insomnia exceeds the 90% threshold for drawing tentative conclusions regarding direction of influence).

4. Discussion

Dissociation is a relatively neglected area of psychological research and treatment, requiring ‘innovative thinking and research’ (p.171; Šar, 2014). Here, we use state-of-the-art network analysis methods to explore the position of dissociation in the wider constellation of mental health presentations and generate hypotheses for future research. Both networks suggest dissociation is highly connected with other mental health conditions, including post-traumatic stress symptoms (PTSS), anxiety and depression. Further, dissociation is likely to influence paranoia, grandiosity, and cognitive disorganization. This is consistent with existing models of delusions (Maher and Ross, 1984; Garety et al., 2001; Freeman, 2016), and a recent meta-analysis of the relationships between dissociation and psychotic symptoms (Longden et al., 2020).

We wish to highlight some results of particular interest. First, robust relationships between hallucinations and dissociation and between PTSS and dissociation featured in both networks, but in both cases, the direction of influence was unclear. This may indicate that these constructs are interconnected with dissociation either by sharing a common cause not represented in the networks, or through a reciprocal relationship (or both of these). For example, whilst dissociation is often considered a post-traumatic symptom (Loewenstein, 2018), peri-traumatic dissociation has been found to predict later PTSD (Ozer et al., 2003), indicating a more complex relationship. Alternatively, high conceptual overlap may also produce this result. Indeed, of relevance to the result for hallucinations, Moskowitz and Corstens (2008) suggest that auditory hallucinations are a form of dissociation.

Second, the direct relationships from worry to dissociation, and from insomnia to dissociation found in previous experimental manipulation studies (worry: Freeman et al., 2013; insomnia: van Heugten-van der Kloet et al., 2015) were not replicated in this study. Rather, the DAGs analysis was unable to find a clear direction of influence between worry and dissociation, and indicated that there was a high probability of dissociation indirectly influencing insomnia. Further, the undirected network found weak negative relationships between these variables and dissociation. The discrepancy between networks and the contrast with existing literature may be due to several factors: the direct relationships being too weak to be estimated reliably, the influence of other variables within the indirect pathways, and the limitations of these methods for exploring reciprocal relationships. Indeed, for worry, the relationship with dissociation was found to be mediated by anxiety in the DAGs analysis, and Freeman et al. (2013) did find increased anxiety ratings in their worry induction condition. Regarding the result for insomnia, Lynn et al. (2019) suggest that mediation of the relationship between sleep and dissociation by other variables is an important consideration. One such consideration could be negative affect, since Reeve et al. (2018) highlight the mediating role of this in the relationship between insomnia and psychotic symptoms.

Third, the results for dissociation and cognitive disorganization are important conceptually. A robust relationship between the two was found in both networks, with high probability that dissociation influences cognitive disorganization. This suggests that these are distinct concepts and that confusion, loosening of associations, thought disruption, and other hallmarks of cognitive disorganization are not analogous to dissociation, but may result from it.

Finally, analysis strongly supported the interpretation that distress tolerance is indirectly related to dissociation, most likely as a downstream effect. This echoes anecdotal reports that dissociation sometimes helps individuals to better tolerate distress when under extreme stress. However, it does not support the theoretical position that dissociation is

selected as a coping strategy as a result of a person's low distress tolerance. Interestingly, a very large proportion of indirect pathways from dissociation to distress tolerance included paranoia and cognitive disorganization. This suggests that the subjective experiences of threat and thought disruption may be particularly likely to overwhelm people's capacity to tolerate distress. Taken together with the results indicating that dissociation influences paranoia, grandiosity and cognitive disorganization, this study implies an important role for dissociation in the symptomatology and lived experience of psychosis.

A limitation of the study is its sampling method: recruitment via Facebook attracted a predominately White female sample who engage with social media and are willing to participate in online research. This may be unrepresentative of the wider population. Further, these findings require replication in a clinical group to test the assumption that sub-clinical levels of the variables interact in a manner analogous to clinically significant levels.

As previously discussed, there are multiple limitations inherent in the DAGs methodology. Acyclicity is a fundamental assumption of the analysis, therefore DAGs cannot estimate reciprocal relationships and feedback loops which are likely to be important when considering psychological variables. DAGs based on cross-sectional data assume all relevant variables are included and cannot contain information about longitudinal effects between variables. These limitations, and the problems inherent in assuming that mathematical causality reflects real-world causal structure, lead some to argue DAGs are suitable only for describing networks where the underlying causal structure is already known. However, we agree with Robinaugh et al. (2019) that they can ‘provide valuable but incomplete information about the relationships between symptoms [nodes]’ (p.6) and that the resulting ‘interesting causal conjectures’ (p.83; Dawid, 2010) may still be valuable – particularly in a field such as dissociation. Furthermore, the similarities between the undirected and DAG networks and the parsimony between our results and the existing literature are heartening and suggest that the ‘interesting causal conjectures’ presented here warrant further exploration with experimental designs. In a field where the underlying causal structure is very much unknown, the value of network analyses is in generating ideas which we hope will invigorate professional interest. This study highlights that dissociation may well have a prominent position in the broad network of psychological disorders, and psychosis in particular, and hence merits greater attention.

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CRediT authorship contribution statement

Emma Černis: Conceptualization, Data curation, Methodology, Software, Formal analysis, Investigation, Writing - original draft, Project administration, Funding acquisition. **Robin Evans:** Software, Formal analysis, Software, Formal analysis, Validation, Visualization. **Anke Ehlers:** Conceptualization, Writing - review & editing, Supervision, Methodology. **Daniel Freeman:** Conceptualization, Writing - review & editing, Supervision, Methodology.

Declaration of competing interest

The authors declare no conflicts of interest.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.jpsychires.2020.08.023>.

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