A thesis submitted in partial fulfilment of the requirements of the degree of Doctor of Clinical Psychology (DClinPsych)

Chloe Hiles

Oxford Institute of Clinical Psychology Training and Research

Green Templeton College

University of Oxford

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The thesis I am submitting is entirely my own work except where otherwise indicated.

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The Link Between Attachment Style and Affective Disorders from A Social Cognitive Perspective: A Systematic Review of Adult Studies

Introduction: Uncertainty remains around the mechanisms influencing the role of attachment style on mental health across the lifespan. Emerging socio-cognitive neuroscientific research proposes a functional neuroanatomical model (NAMA) to describe systems responsible for social cognition. Cross-sectional findings in non-clinical samples suggest activation of these systems are associated with specific attachment styles. Disruption in social cognitive processes is associated with psychological distress, warranting a review of this model in the context of mental health outcomes. ***Method:*** This report systematically reviewed twenty-three studies examining the association between attachment patterns, social cognition, and affective disorder symptomology in adults. Findings are summarised using a narrative synthesis approach. ***Results***: Avoidant and anxious attachment styles were associated with social cognitive impairment including mentalisation, emotional regulation and empathy. These impairments were associated with affective disorder symptomology, with several papers showing bidirectional relationships between attachment style, social cognitive processes, and mental health outcomes. Quality of studies were limited by reliance on cross-sectional mediation analyses and correlational design. ***Discussion:*** Findings overall align to the NAMA model, although further research to draw causal inferences is necessary. This review brings together attachment, social cognition, and mental health, with an agenda to advocate for mechanism-targeted psychological treatment.

Keywords*:* Attachment, Social Cognition, Affective Disorder

Service Improvement Project

Improving the Initial Assessment Process in the Oxford Health Learning Disability Service

Introduction: In 2019, an investigation of service users' experiences of the Oxford Learning Disability (LD) team revealed dissatisfaction with the initial assessment. This project aimed to improve initial assessments by introducing resources developed collaboratively with service users. ***Method:*** Resources were piloted over four months. Initial assessment experiences were evaluated by administering questionnaires to twenty clinicians, ten service users and four carers. Qualitative data from clinicians' pre-pilot and post-pilot questionnaires were thematically analysed; service users and carers responses contributed as complementary information to the themes. ***Results:*** Clinician pre-pilot questionnaires produced four themes: 'Is this really necessary? A lot of work for little reward'; 'Not very LD-friendly'; 'Value in a thorough assessment'; 'A need for a streamlined, inclusive approach'. Post-pilot questionnaires produced 3 themes: 'Making it LD-friendly'; 'Time saving'; 'One size does not fit all'. Service users and carers data aligned with these themes. ***Discussion:*** Recommendations for improvement and implications are reported.

Keywords: Learning Disability, Accessibility, Initial Assessment, Communication Aids

Theory-Driven Research Project

The Role of Social Anxiety, Appearance Dissatisfaction and Facial Expressivity Suppression on Social Interactions in Individuals with Facial Palsy

Introduction: This study aimed to improve understanding of social anxiety, appearance satisfaction and facial expressivity suppression in individuals with facial palsy compared to the general population, then determine whether these factors predict quality of self-evaluated social interactions in individuals with facial palsy. Role of self-focus of attention in facial expressivity suppression was additionally explored.

Design: This study employed a cross-sectional online survey and experimental task.

Participants: Eighty-seven individuals with facial palsy and eighty-five individuals without facial palsy (control group) participated. ***Measures:*** Social Phobia Inventory, Body-Esteem Scale for Adolescents and Adults – Appearance subset, Visual Analogue Scales assessing self-evaluation of new social interactions and facial expressivity.

Secondary Measures: Facial expressivity in video task (OpenFace software). ***Results:*** Appearance dissatisfaction and facial expressivity suppression were significantly greater in individuals with facial palsy compared to the control group. Social anxiety and facial expressivity suppression predicted the quality of self-evaluated social interactions in individuals with facial palsy. Further research is needed to determine whether self-focus of attention influences facial expressivity. ***Discussion:*** Findings highlight the challenges individuals with facial palsy may face in social situations and recommend tailoring psychological interventions for individuals with facial palsy that experience social anxiety and appearance dissatisfaction. Areas for future research are discussed.

***Keywords**:* Facial Palsy, Social Anxiety, Facial Expressivity, Appearance Satisfaction, Social Interaction

Systematic Literature Review

The Link Between Attachment Style and Affective Disorders from A Social Cognitive Perspective: A Systematic Review of Adult Studies

Chloe Hiles

Oxford Institute of Clinical Psychology Training and Research, Division of Medical Sciences, University of Oxford, Oxford, United Kingdom

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Internal Supervisor: Dr Fin Williams, Clinical Tutor, Consultant Clinical Psychologist, The Oxford Institute of Clinical Psychology Training and Research.

Proposed Journal: *Behaviour Research and Therapy*. This journal was chosen as it is a peer-reviewed journal which welcomes systemic reviews, with a focus on understanding mechanisms contributing to psychopathology.

Abstract

Introduction: Uncertainty remains around the mechanisms influencing the role of attachment style on mental health across the lifespan. Emerging socio-cognitive neuroscientific research proposes a functional neuroanatomical model (NAMA) to describe systems responsible for social cognition. Cross-sectional findings in non-clinical samples suggest activation of these systems are associated with specific attachment styles. Disruption in social cognitive processes is associated with psychological distress, warranting a review of this model in the context of mental health outcomes. ***Method:*** This report systematically reviewed twenty-three studies examining the association between attachment patterns, social cognition, and affective disorder symptomology in adults. Findings are summarised using a narrative synthesis approach. ***Results***: Avoidant and anxious attachment styles were associated with social cognitive impairment including mentalisation, emotional regulation and empathy. These impairments were associated with affective disorder symptomology, with several papers showing bidirectional relationships between attachment style, social cognitive processes, and mental health outcomes. Quality of studies were limited by reliance on cross-sectional mediation analyses and correlational design. ***Discussion:*** Findings overall align to the NAMA model, although further research to draw causal inferences is necessary. This review brings together attachment, social cognition, and mental health, with an agenda to advocate for mechanism-targeted psychological treatment.

Keywords*:* Attachment, Social Cognition, Affective Disorder

Introduction

Attachment Style and Mental Health

Attachment styles are developed through early experiences with primary caregivers. This critical process helps infants maintain proximity to caregivers, thereby ensuring survival (Ainsworth & Bowlby, 1991; Bowlby, 1969). Referred to as ‘internal working models’, early attachments set up future expectations regarding self and others, continuing to impact behaviours into adulthood (Shaver & Mikulincer, 2007; Pietromonaco & Barrett, 2000). Secure attachment develops through sensitive, responsive caregivers; insecure attachment is formed from insensitive or inconsistently sensitive caregivers. Infants form expectations regarding the emotional availability of others and learn adaptive strategies; either down-regulating their demands for consistently unavailable caregivers (avoidant attachment), or up-regulating their demands where caregivers are inconsistently available (anxious attachment) (Shaver & Mikulincer, 2007). However, challenges arise later in life when the same behavioural strategies designed for managing rejecting or inconsistent caregivers are applied to other relationships and become maladaptive (Mullen, 2019), driven by avoidance of intimacy or anxiety of abandonment (Brennan et al., 1998).

Attachment theory has garnered great interest from researchers and clinicians in understanding behavioural and emotional disturbances across the lifespan. Insecure attachment style is seen as a contributing factor to poorer mental health outcomes (Colonnesi et al., 2011) and impacts negatively on psychological interventions (Levy et al., 2018). Affective disorders (AD), encompassing mood and anxiety disorders, are a global leading cause of disability (Abbafati et al., 2020). Therefore, understanding how attachment influences AD is critical (Insel et al., 2010). Longitudinal studies report associations between infants’ caregiving experiences and their adult attachment styles

(Chopik et al., 2014; Dinero et al., 2008; Fraley et al., 2013; Salo et al., 2011; Zayas et al., 2011; Fraley & Roisman, 2019). Despite the breadth of literature, there continues to be uncertainty around the mechanisms that influence the role of adult attachment style on mental health across the lifespan (Long et al., 2020). Greater understanding would lead to further development of effective interventions which prevent and treat psychological distress associated with attachment insecurity (Holmes et al., 2018).

Social Cognition

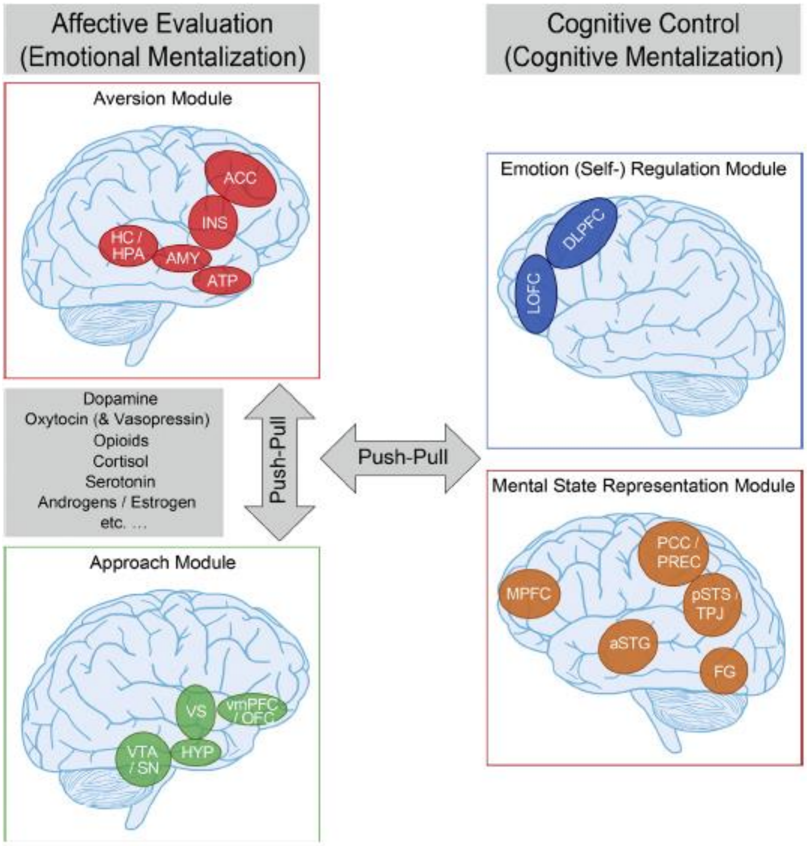
Over the last few decades, the understanding of human social behaviour from a socio-cognitive neuroscientific perspective has shown promising development, with discovery of neural circuits that constitute the 'social brain' (Lieberman, 2007) and investigation into neurobiology of attachment (Feldman, 2017). Social cognition (SC) refers to cognitive processes involved in social behaviour (Arioli et al., 2018). Covering a broad area, a review of core SC processes categorises them into the following: a) understanding others e.g., empathy, theory of mind, b) understanding oneself e.g., insight/self-reflection, c) controlling oneself e.g., emotion regulation and d) processes occurring between self and others e.g., social decision making (Lieberman, 2007). Impairments in these processes are associated with poorer social outcomes and neuropsychiatric conditions (Fares-Otero et al., 2023).

Emerging research has established neural underpinnings of social and affective interaction and how they are associated with attachment style. A theoretical review (Vrtička & Vuilleumier, 2012) proposed a neuro-anatomical model of human attachment (NAMA) to outline associations between differing attachment styles and social information and interaction processes. (Figure 1). NAMA suggests the involvement of two systems; the first system involves automatic affective appraisals (emotional mentalisation) which is responsible for encoding social stimuli (e.g., facial expression) as safety versus threat. This leads to approach versus aversion tendencies in social contexts, associated with neural underpinnings in limbic cortico-subcortical areas (amygdala, striatum, insula, hippocampus). The second system is responsible for controlled social processing and regulation (cognitive mentalisation), operating in a more conscious and voluntary mode, and involved in representing the mental states of others (theory of mind/mentalising) and regulating one's own behaviour, thoughts, and emotions. The system is associated with neural underpinnings in the frontal-temporal brain areas (medial pre-frontal cortex, posterior cingulate cortex, superior temporal sulcus) (Vrtička & Vuilleumier, 2012).

These systems have a reciprocal dynamic balance between one another, with evidence suggesting this equilibrium is influenced by stress factors (Mayes, 2006). Highly stressful or novel situations shifts activation from cognitive mentalisation to emotional mentalisation (Fonagy & Luyten, 2009). Although adaptive for quickly detecting danger in threatening situations, this may be maladaptive in social settings where there is no threat and cognitive mentalisation is needed for effective social interaction (Dunbar, 2009). Therefore, increased activation of the emotional mentalisation system may be associated with poorer social outcomes (Vrtička & Vuilleumier, 2012).

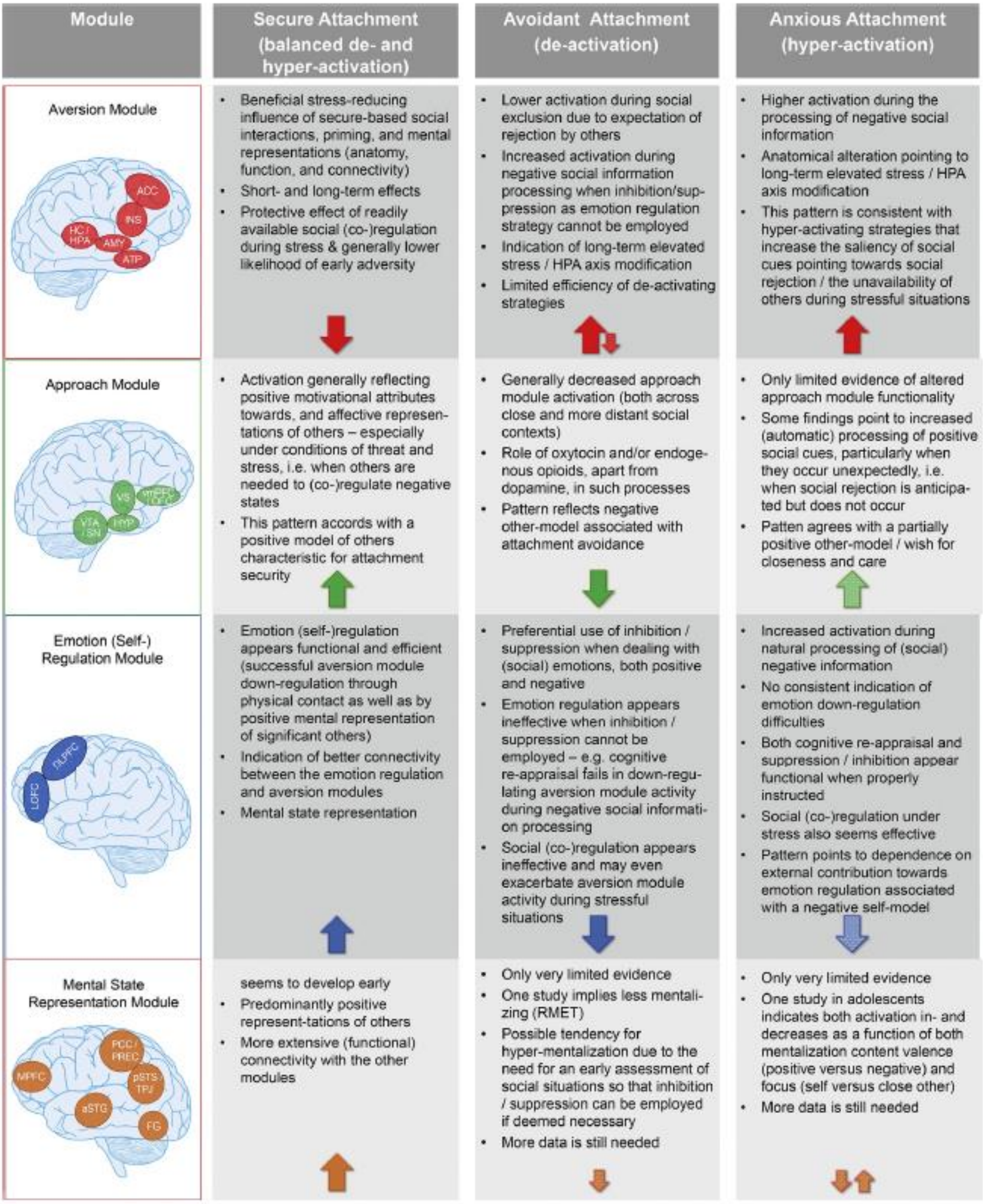
Figure 1

Functional Neuro-Anatomical Model of Human Attachment (NAMA) (reproduced from Vrtička & Vuilleumier, (2012), open-access article).



A recent review (Long et al., 2020) provided evidence for NAMA from social neuroscientific investigations, postulating that inter-individual differences in attachment style is associated with SC processes in non-clinical populations (Figure 2). Findings suggest associations between attachment style and brain activity; emotional mentalisation is considered hypoactive in avoidantly insecure individuals and hyperactive in anxiously insecure individuals (Dewall et al., 2012). Anxious attachment style is associated with enhanced emotional mentalisation responses to social information and hypervigilant to threat, mirroring increased attachment needs (Shaver & Mikulincer, 2007). Secure attachment style is associated with constructive, antecedent-focused emotion regulation (such as cognitive re-appraisal) leading to low and stable emotional responses in stressful situations. Insecurely attached individuals show an association with reduced activation of the cognitive mentalisation system, including difficulties in emotion regulation, correlating with heightened emotional distress and poor outcomes in stressful social situations (Long et al., 2020).

Figure 2. *Summary of associations between module functions and attachment styles, from social neuroscientific data (reproduced from Long et al., (2020), open-access article).*



Module	Secure Attachment (balanced de- and hyper-activation)	Avoidant Attachment (de-activation)	Anxious Attachment (hyper-activation)
Aversion Module	• Beneficial stress-reducing influence of secure-based social interactions, priming, and mental representations (anatomy, function, and connectivity) • Short- and long-term effects • Protective effect of readily available social (co-)regulation during stress & generally lower likelihood of early adversity ↓	• Lower activation during social exclusion due to expectation of rejection by others • Increased activation during negative social information processing when inhibition/suppression as emotion regulation strategy cannot be employed • Indication of long-term elevated stress / HPA axis modification • Limited efficiency of de-activating strategies ↑↓	• Higher activation during the processing of negative social information • Anatomical alteration pointing to long-term elevated stress / HPA axis modification • This pattern is consistent with hyper-activating strategies that increase the saliency of social cues pointing towards social rejection / the unavailability of others during stressful situations ↑
Approach Module	• Activation generally reflecting positive motivational attributes towards, and affective representations of others – especially under conditions of threat and stress, i.e. when others are needed to (co-)regulate negative states • This pattern accords with a positive model of others characteristic for attachment security ↑	• Generally decreased approach module activation (both across close and more distant social contexts) • Role of oxytocin and/or endogenous opioids, apart from dopamine, in such processes • Pattern reflects negative other-model associated with attachment avoidance ↓	• Only limited evidence of altered approach module functionality • Some findings point to increased (automatic) processing of positive social cues, particularly when they occur unexpectedly, i.e. when social rejection is anticipated but does not occur • Patten agrees with a partially positive other-model / wish for closeness and care ↑
Emotion (Self-) Regulation Module	• Emotion (self-)regulation appears functional and efficient (successful aversion module down-regulation through physical contact as well as by positive mental representation of significant others) • Indication of better connectivity between the emotion regulation and aversion modules • Mental state representation ↑	• Preferential use of inhibition / suppression when dealing with (social) emotions, both positive and negative • Emotion regulation appears ineffective when inhibition / suppression cannot be employed – e.g. cognitive re-appraisal fails in down-regulating aversion module activity during negative social information processing • Social (co-)regulation appears ineffective and may even exacerbate aversion module activity during stressful situations ↓	• Increased activation during natural processing of (social) negative information • No consistent indication of emotion down-regulation difficulties • Both cognitive re-appraisal and suppression / inhibition appear functional when properly instructed • Social (co-)regulation under stress also seems effective • Pattern points to dependence on external contribution towards emotion regulation associated with a negative self-model ↓
Mental State Representation Module	seems to develop early • Predominantly positive represent-tations of others • More extensive (functional) connectivity with the other modules ↑	• Only very limited evidence • One study implies less mentalizing (RMET) • Possible tendency for hyper-mentalization due to the need for an early assessment of social situations so that inhibition / suppression can be employed if deemed necessary • More data is still needed ↓	• Only very limited evidence • One study in adolescents indicates both activation in- and decreases as a function of both mentalization content valence (positive versus negative) and focus (self versus close other) • More data is still needed ↓↑

Bringing together Attachment, Social Cognition and Affective Disorders

NAMA postulates neural underpinnings of human social behaviour are associated with different attachment styles, social and emotional interactions. A need for understanding how these processes relate to mental health outcomes is warranted (Long et al., 2020). Although based on non-clinical populations, NAMA provides a useful basis in conveying how attachment style is associated with neural network differences in individuals experiencing psychological distress (Galynker et al., 2012; Nolte et al., 2011). Insecure attachment style is viewed as a precursor of psychopathology, yet the detailed processes of how insecure attachment style leads to psychopathology remain to be elucidated (Holmes et al., 2018). Research has potential implications for clinical interventions; understanding the influence of attachment style in AD has the potential to inform mechanism-targeted treatment (Murgatroyd & Spengler, 2011). Given recent acceleration of research in this area, two systematic reviews have explored associations between adverse childhood experiences, SC and mental health outcomes (Rokita et al., 2018; Fares-Otero et al., 2023). However, attachment style was not prioritised, and mental health disorders were more generalised, therefore a synthesis of research investigating associations with attachment, SC and AD is lacking. Additionally, synthesising research findings in relation to the NAMA model (Long et al., 2020) would be helpful in further understanding whether emotional and behavioural presentations associated with NAMA systems do relate to different attachment styles as proposed by the model, and whether these are associated with affective disorder symptomology. Synthesising the current literature available will help identify gaps for future research

Review Questions

This review aims to narratively summarise if SC processes act as a linking mechanism between adult attachment and AD symptomology, and how findings map on to the NAMA model (Long et al., 2020). The review addresses the following research question: Is attachment style associated with SC in the context of AD symptoms in adulthood?

Method

Inclusion/Exclusion Criteria

Papers were included if they met the following criteria:

- Empirical studies using quantitative analysis.
- Published in peer-reviewed journals.
- Use of validated measures for adult attachment and SC.
- Recruited participants aged 18 or above.
- Measuring and reporting on attachment, SC, and AD (clinical diagnosis or symptomology using valid AD measure) as main interest.

Papers were excluded if they were not written in English, were a theoretical or review piece or book chapter.

Search Strategy

The review protocol was registered in PROSPERO (registration number: CRD42022350228). Study selection process adhered to PRISMA guidelines (Figure 3; Moher et al., 2016) with the following databases searched: Embase, PsycINFO, CINAHL, MEDLINE, Scopus, and PubMed. Search terms concepts were attachment, SC, and AD (see Appendix 1.A for specific search terms). In the search process, clinical and non-clinical studies were included and there were no restrictions imposed including publication date.

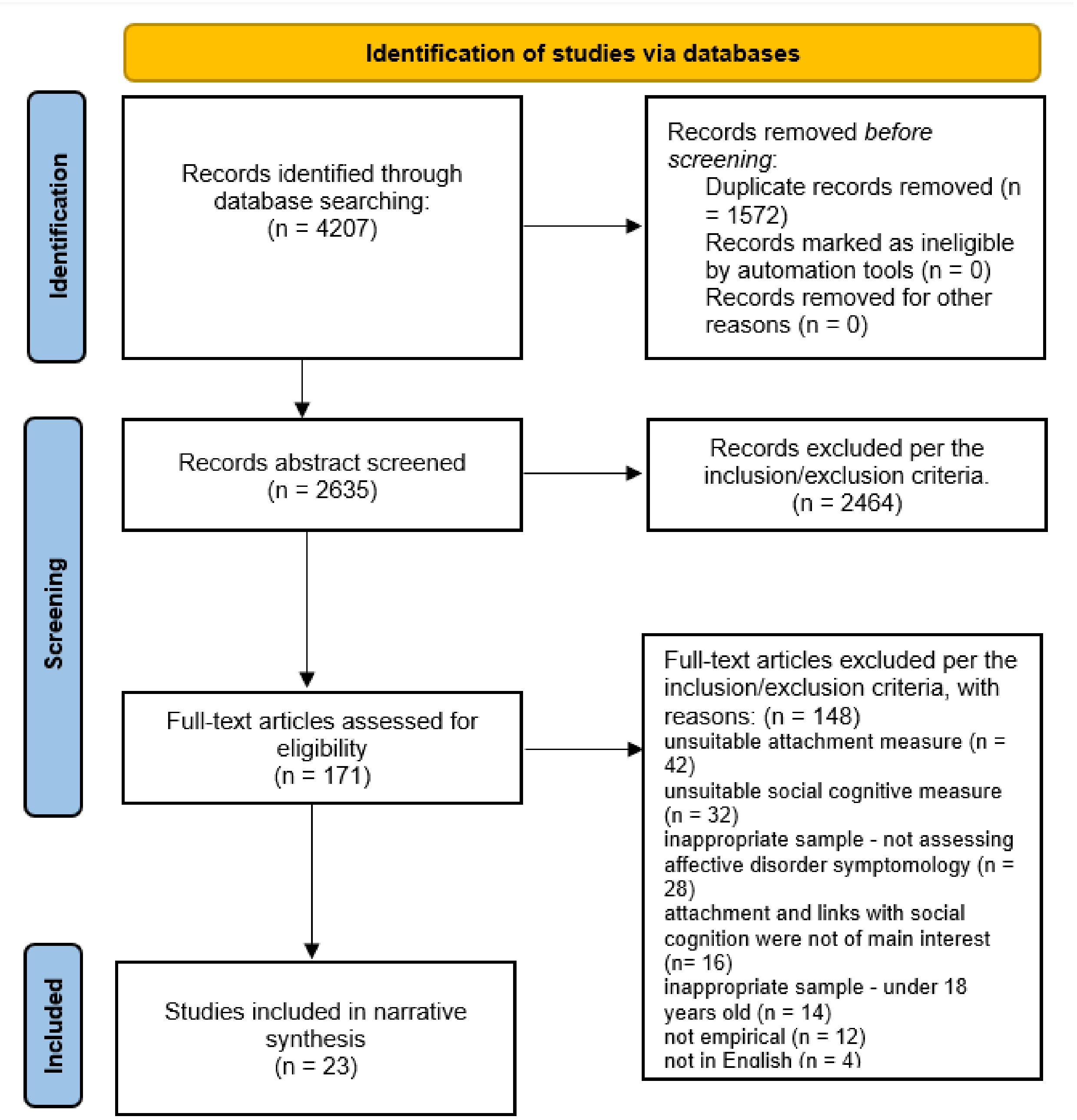
Searches were performed on 5th December 2022. Searches were re-run on 12th April 2024, with three additional papers found. Review papers were hand-searched to identify relevant studies. Initial screening comprised of reviewing all paper titles and abstracts; papers were excluded if they did not meet the inclusion criteria. Following abstract screening, full-text screening was completed. A second rater screened 20% of papers in the initial screening stage, then 25% of papers in the full-text screening stage. Inter-rater reliabilities achieved good agreement: initial screening: Cohen's kappa = .85; full-text screening: Cohen's kappa = .87 (Altman, 1990).

Data Synthesis

The following information was extracted from studies: demographics (age, sex, ethnicity), country the study was conducted in, sample size, study design and measures of attachment, SC and AD. As all papers were of cross-sectional design, quality appraisal of the papers was performed using the National Institute of Health Study Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies (Appendix 1.B) (National Institutes of Health, 2014). The measure consists of 14 questions; quality of paper is rated as poor, fair, or good. Inter-rater reliabilities for a subset of studies for data extraction and quality appraisal showed excellent agreement: data extraction (50% of sample): Cohen's kappa = .99; quality assessment (30% of sample): Cohen's kappa = .97 (Altman, 1990). Studies were heterogenous in nature due to varied SC processes and outcome measures; therefore, a meta-analysis was considered inappropriate. Instead, a narrative synthesis (Popay et al., 2007) highlights the different SC processes and their relationship to attachment style and AD symptomology.

Figure 3

PRISMA Flowchart for Study Selection.



Results

To organise the findings, study design characteristics and quality appraisal of studies are discussed (depicted in Table 1 and 2 respectively). Following this, associations between adult attachment style, SC processes, and AD symptomology are explored.

Study Design Characteristics

Twenty-three studies met inclusion criteria, published between 2009 to 2023, with a total of 5959 participants. Sample sizes ranged from 36 to 791, most studies used over 100 participants (16 studies; 70%). The mean participant age ranged from 19.71 to 49.85 years; three papers did not report mean, only age range. Most studies reported sex ratios (female vs male), overall, more females were recruited than males. Most participants identified as white or Caucasian, although ethnicity data was rarely reported (17 studies, 74%). Studies were conducted across the world although predominantly in high-income countries. All studies were correlational designs. Eight studies recruited clinical samples, four of which compared the sample to a non-clinical control group. The remaining fifteen studies recruited non-clinical samples, the majority of which were university students (10 studies; 66%).

Measures of Attachment Style

A variety of adult attachment measures were used. Most studies used self-report measures, aside from one which used the Adult Attachment Projective (AAP) interview (George & West, 2001), a measure that assesses adult attachment style by analysing individuals' responses to a set of attachment-related drawings. Eleven studies used the Experience in Close Relationship questionnaire (ECR; Brennan et al., 1998) or revised variants (Fraley et al., 2000; Wei et al., 2007; Ehrenthal et al., 2021). In this measure, attachment is examined in two dimensions: anxiety and avoidance. ECR is a dimensional scale, allowing regression and correlation analysis (Brennan et al., 1998). The measure distinguishes between four categories of romantic adult attachment: secure, fearful, worried, and disengaged, resulting from possible combinations of anxiety and avoidance dimensions. Other dimensional self-report measures include the Relationship Scale Questionnaire (RSQ; Griffin & Bartholomew, 1994) and the Attachment Style Questionnaire (ASQ; Feeney et al., 1994).

Other self-report measures assessed attachment style in categories of secure and insecure, such as the Relationship Questionnaire (RQ; Bartholomew & Horowitz, 1991), the Adult Attachment Scale (AAS; Hazan & Shaver, 1987) and its variant (Collins & Read, 1990) which measures attachment style in social relationships in general, with subscales for anxious and avoidant attachment. Anxious attachment is defined as high scores in need for approval, preoccupation with relationships and low confidence; avoidant attachment is defined as discomfort with intimacy and relationships; low levels of anxious and avoidant attachment indicate secure attachment (Hazan & Shaver, 1987). The validity and reliability of these attachment measures are reviewed elsewhere (Ravitz et al., 2010).

Measures of Social Cognition

SC encompasses a broad range of information process skills related to thinking about ourselves, others, and our social interactions (Morán-Kneer et al., 2022). For explanatory purposes, SC processes were categorised into four main domains, based on outcome measures used and categorisations from recent SC research (Arioli et al., 2018; Fares-Otero et al., 2023; Lieberman, 2007). These were: 1) emotion recognition (perceptual processing of social information e.g., facial expressions), 2) social understanding (understanding and sharing others cognitive/affective states e.g., mentalisation, theory of mind, empathy), 3) emotion regulation (strategies used to manage emotional responses e.g., rumination and suppression) and 4) social decision making (based on self and others' goals e.g., reciprocal giving).

Most papers used self-report questionnaires; for instance, measures assessing emotion regulation included Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2008), Emotion Regulation Questionnaire (ERQ; Gross & John, 2003), Cognitive Emotion Regulation Scale (CERS; Garnefski & Kraaij, 2006), Emotion Expressivity Scale (EES; Kring et al., 1994). The DERS assesses six clinically relevant difficulties in emotion regulation in response to distress: nonacceptance of negative emotions, difficulties engaging in goal-directed behaviour, difficulties refraining from impulsive behaviour, lack of awareness of emotional responses, believing one has limited access to effective emotion regulation strategies, and lacking clarity about the emotions one is experiencing. The ERQ measures cognitive reappraisal and suppression. The CERS assesses the following sub-scales for how someone thinks after a negative life event: self-blame, blaming others, rumination, catastrophising, putting into perspective, positive refocusing, positive reappraisal, acceptance, and planning. EES measures the extent to which people outwardly display their emotions.

Empathy was assessed using the Interpersonal Reactivity Index (IRI; Davis, 1983) and the Basic Empathy Scale (BES; Jolliffe & Farrington, 2006). The IRI features four sub-scales: perspective taking, fantasy, empathic concern, and personal distress. The BES assesses both cognitive empathy (understanding others' emotions) and emotional empathy (experiencing others' emotions) (Jolliffe & Farrington, 2006). Self-report measures for mentalisation included the Certainty About Mental States Questionnaire (CAMSQ; Müller et al., 2023) which assesses mentalising concerning both oneself and others.

Seven papers assessed SC using experimental tasks. This included using a Trust Game to assess for reciprocal and trust-giving interactions (Sripada et al., 2009) and Mental Scale Task (Beaulieu-Pelletier et al., 2013) to measure mentalisation. Theory of mind was assessed using the Animated Triangles Task (Abell et al., 2000), Reading Mind in the Eyes Test (adapted from Baron-Cohen et al., 2001), and the Hinting Task (Gil et al., 2012). Facial and prosodic emotion recognition ability was measured using functional neuroimaging during a face stimuli task, the Diagnostic Analysis of Nonverbal Accuracy-2 task (DANVA-2-TW; Tseng et al., 2013) and a Detection Task (Grier, 1971). Respective papers report good validity and reliability for these measures.

Measures of Affective Disorder

Studies recruiting from clinical populations ranged from diagnoses of post-traumatic stress disorder (PTSD) (3), depression (3), bipolar disorder (1), and social anxiety disorder (SAD) (1). In non-clinical studies, symptoms of the following AD were assessed using self-report measures (Table 1): depression, anxiety, post-natal depression (PND), social anxiety, and PTSD. Respective papers report good psychometric properties for these measures.

Table 1

Study Design Characteristics.

Authors and year	**N**	**Age (mean, SD)**	**Sex (f/m/other or not disclosed)**	**Study design**	**Sample Type**	**Country**	**Ethnicity**	**Attachment measure**	**Social Cognitive Process (measure)**	**Affective Disorder (measure)**
Anderl et al., 2018	127	21 (NR)	81/46	Correlational	University students	Germany	NR	ASQ	Reciprocal and Trust Giving (Trust Game)	Social Anxiety (SIAS)
Benoit et al., 2009	36	33 (9.28)	26/10	Correlational	Trauma centre patients	USA	NR	AAP	Emotion Regulation (EES)	PTSD (IES-R)
Brandão et al., 2022	234	35.61 (0.93)	178/56	Correlational	Community sample	Portugal	NR	ECR-RS	Emotion Regulation (ERQ)	Depression and anxiety (DASS-21)
Burnette et al., 2009	221	NR	141/80	Correlational	University students	USA	4.6% African American, 0.9% Asian American, 87.2% Caucasian 4.1% Hispanic, and 3.2% other	ECR-R	Empathy (IRI)	Depression (CES-D)
Colonnello et al., 2022	267	20.52 (2.48)	151/116	Correlational	University students	Italy	100% Caucasian	ASQ	Emotion Regulation (DERS)	Depression (ZSDS)
Donges et al., 2012	109	35.5 (109)	58/51	Correlational	Community sample	Germany	NR	RSQ	Emotion Recognition (Detection Neuroimaging Task)	Anxiety (STAI) and Depression (BDI)
Huang et al., 2019	96	20.73 (2.38)	58/38	Correlational	University students	Taiwan	NR	R-AAS	Emotion Recognition	Depression (BDI)

									(Nonverbal Accuracy Task)	
Jansen et al., 2023	460	25.96 (7.91)	299/44/1 124 NR	Correlational	Social Work University students	Germany	NR	RQ-2 & ECR-RD8	Mentalisation (CAMSQ)	Depression (PHQ-9) and Anxiety (GAD-7)
Karatzias et al., 2018	171	49.85 (12.72)	85/86	Correlational	Patients from National Centre for Mental Health	UK	94.2% Caucasian, 2.3% Mixed, 2.3% Asian, 1.2% other	ECR-S	Emotion Regulation (ERQ)	PTSD (ITQ)
Koelkebeck et al., 2017	78	40.3 (NR)	44/34	Correlational	In-patients with major depressive disorder & control group	Germany	NR	AAS	TOM & Empathy (Animated Triangles Task & IRI)	Major depression (HDRS) Anxiety (STAI)
Küçükparlak et al., 2021	97	NR	43/54	Correlational	In-patients with diagnosis of SAD	Turkey	NR	ECR	TOM (RMET)	Social anxiety (LSAS), depression (BDI) & anxiety (STAI)
Lilly & Hong, 2013	404	19.77 (3.61) 29.57 (9.95)	174/116 114/0	Correlational	University students (n=290) & intimate partner violence survivors (n=114)	USA	Students: European American (64.5%) African American (5.5%), Hispanic (5.5%), Asian (4.5%), Biracial (5.5%), Other (6.6%). IPV Survivors: African American (60.2%), European American (26.5%) Biracial (8.8%), Hispanic (2.7%), Other (1.8%)	ECR-R	Emotion Regulation (DERS)	PTSD (PDS) Depression (SCL-90)

Marganska et al., 2013	284	20.5 (4.8)	230/54	Correlational	University students	USA	White (35%), Asian (26%), Hispanic (18%), Black (14%), and other (7%) .	RSQ	Emotion Regulation (DERS)	Depression (BDI) and Anxiety (GAD-7)
Messina et al., 2023	630	41.1 (13.86)	496/134	Correlational	Community sample	Italy	NR	ECR	Emotion Regulation (IERQ & DIRE)	Depression (SCL-90)
Morán-Kneer et al., 2022	76	49.5 (NR)	50/26	Correlational	Patients recruited from Mood Disorder Unit	Chile	NR	ECR	TOM (Hinting Task)	Depression (HDRS)
Ozsoy & Ozkan, 2021	154	38.65 (11.03)	102/52	Correlational	Patients recruited from psychiatry clinic & control group	Turkey	NR	AAQ	Empathy (BES)	Depression (HDRS) and Anxiety (HARS)
Read et al., 2018	253	33.12 (11.56)	202/47/4	Correlational	University students	Australia	NR	ECR-R	Emotion Regulation (ERQ)	Social anxiety (IIS-D)
Stefanović Stanojević et al., 2020	791	39 (NR)	791/0	Correlational	Community sample	Serbia	NR	RQ	Mentalisation (MENTS)	Social Anxiety (SSA) & Depression (PHQ-9)
Świtalska & Webner, 2021	68	27.4 (NR)	68/0	Correlational	New mothers from community and support groups for post-natal depression	Poland	NR	ECR	Mentalisation (MST)	Postnatal depression (EPDS)
Turton et al., 2022	65	20 (NR)	NR	Correlational	Patients recruited from NHS sites	UK	White British (83.1%), White other (6.2%), Asian (4.5%), Mixed White and Black Caribbean (3.1%), Other (3.1%)	ECR-R	Emotion Regulation (DERS)	Depression (PHQ-9)

Vahedi et al., 2016	285	NR	182/103	Correlational	University students	Iran	NR	R-AAS	Emotion Regulation (CERQ)	Depression and anxiety (DASS-21)
Yan et al., 2022	464	19.71 (1.32)	286/178	Correlational	University students	China	NR	ECR-RS	Empathy (IRI)	Depression (CES-D)
Ye et al., 2023	589	20.42 (1.58)	430/159	Correlational	University students	China	NR	ASQ	Emotion Regulation (CIRQ)	Depression (BDI)

Note. NR = not reported; AAP = Adult Attachment Projective interview (George & West, 2001), ECR= Experience in Close Relationship questionnaire (Brennan et al., 1998) ECR-R/RS/RD8/S = revised variants of ECR (Fraley et al., 2000; Wei et al., 2007; Ehrenthal et al., 2021), RSQ = Relationship Scale Questionnaire (Griffin & Bartholomew, 1994), RW-8 = Relationship Questionnaire (Bartholomew & Horowitz, 1991), ASQ = Attachment Style Questionnaire (Feeney et al., 1994). DERS = Difficulties in Emotion Regulation Scale (Gratz & Roemer, 2008), ERS = Emotion Regulation Questionnaire (Gross & John, 2003), CERS = Cognitive Emotion Regulation Scale (Garnefski & Kraaij, 2006), IERQ = Interpersonal Emotion Regulation Questionnaire (Hofmann et al., 2016), DIRE = Difficulties in Interpersonal Emotion Regulation (Dixon-Gordon et al., 2018), EES = Emotion Expressivity Scale (Kring et al., 1994), IRI = Interpersonal Reactivity Index (Davis, 1983) BES = Basic Empathy Scale (Jolliffe & Farrington, 2006), MST = Mental Scale Task (Beaulieu-Pelletier et al., 2013), RMET = Reading Mind in the Eyes Test (Baron-Cohen et al., 2001), CAMSQ = Certainty About Mental States Questionnaire (Müller et al., 2023); MentS = Self – Report Measure for the Assessment of Mentalizing Capacity (Dimitrijević et al., 2018), SIAS = Social Interaction Anxiety Scale (Mattick & Clarke, 1998), IES-R = Impact of Events Scale – Revised (Weiss, 1997), DASS-21 = Depression, Anxiety and Stress Scale (Lovibond & Lovibond, 1995), CES-D = Centre for Epidemiological Studies Depression (Radloff, 1977), ZSDS – Zung Self-Report Depression Scale (Zung, 1965), STAI = State-Trait Anxiety Inventory (Spielberger, 2022), BDI = Beck Depression Inventory (Beck et al., 1961), ITQ = International Trauma Questionnaire (Cloitre et al., 2018), HDRS = Hamilton Depression Rating Scale (Hamilton, 1960), LSAD = Liebowitz Social Anxiety Scale (Heimberg et al., 1999); PDS = Post-traumatic Diagnostic Scale (Foa et al., 1997), SCL-90 = Symptom CheckList 90 (Derogatis et al., 1973), GAD-7 = Generalised Anxiety Disorder Assessment – 7 (Spitzer et al., 2006), HARS = Hamilton Anxiety Rating Scale (Hamilton, 1959), ISS – D = The Inventory of Interpersonal Situations (Van Dam-Beggen & Kraaimaat, 1999), SSA = Scale of Social Anxiety (Tovilovic, 2004), EPDS = Edinburgh Postnatal Depression Scale (Adli, 2022).

Appraisal of Studies

Most studies were deemed of fair quality (Table 2) as correlational designs and cross-sectional mediation analyses meant causal inferences could not be established. Two papers repeated AD measures (4 and 12 weeks later) to measure symptom persistence but did not reassess attachment (Benoit et al., 2009; Huang et al., 2019). In general, research aims and populations were defined across studies. Only five studies included the use of a control group or split participants into two groups depending on AD measure score (Anderl et al., 2018; Koelkebeck et al., 2017; Lilly & Hong, 2013; Ozsoy & Ozkan, 2021; Świtalska & Webner, 2021). Sample sizes varied, however only one paper adequately justified sample size. Confounding variables of age, gender and education ability were considered in some papers; however, this was inconsistent across studies.

Table 2

Quality Appraisal of Studies.

Authors and year	1. Question clear	2. Population defined	3. Eligibility 50%	4. Inclusion & exclusion	5. Sample size	6. Exposure before outcome	7. Timeframe	8. Exposure levels	9. Exposure valid & reliable	10. Exposure over time	11. Outcome valid & reliable	12. Blinding	13. Lost to follow-up	14. Confound	Overall quality rating
Anderl et al., 2018	yes	yes	no	yes	no	no	no	yes	yes	no	yes	NA	NA	no	6/12: fair
Benoit et al., 2009	yes	yes	yes	yes	no	no	yes	yes	yes	no	yes	NA	no	yes	9/13: fair
Brandão et al., 2022	yes	yes	NR	NR	no	no	no	yes	yes	no	yes	NA	NA	no	5/12: poor
Burnette et al., 2009	yes	yes	NR	NR	no	no	no	yes	yes	no	yes	NA	NA	no	5/12: poor
Colonnello et al., 2022	yes	yes	yes	NR	no	no	no	yes	yes	no	yes	NA	NA	yes	7/12: fair
Donges et al., 2012	yes	yes	NR	yes	no	no	no	yes	yes	no	yes	NA	NA	no	6/12: fair
Huang et al., 2019	yes	yes	yes	NR	no	yes	yes	yes	yes	yes	yes	NA	no	no	9/13: fair
Jansen et al., 2023	yes	yes	no	NR	no	no	no	yes	yes	no	yes	NA	NA	yes	6/12: fair
Karatzias et al., 2018	yes	yes	NR	yes	no	no	no	yes	yes	no	yes	NA	NA	yes	7/12: fair
Koelkebeck et al., 2017	yes	yes	yes	yes	yes	no	no	yes	yes	no	yes	NR	NA	yes	9/13: fair

Küçükparlak et al., 2021	yes	yes	yes	yes	no	no	no	yes	yes	no	yes	NA	NA	no	7/12: fair
Lilly & Hong, 2013	yes	yes	NR	yes	no	no	no	yes	yes	no	yes	NA	NA	no	6/12: fair
Marganska et al., 2013	yes	yes	NR	NR	no	no	no	yes	yes	no	yes	NA	NA	yes	6/12: fair
Messina et al., 2023	yes	yes	NR	NR	no	no	no	yes	yes	no	yes	NA	NA	yes	7/12: fair
Morán-Kneer et al., 2022	yes	yes	NR	yes	no	no	no	yes	yes	no	yes	NA	NA	yes	7/12: fair
Ozsoy & Ozkan, 2021	yes	yes	NR	yes	no	no	no	yes	yes	no	yes	NR	NA	yes	7/13: fair
Read et al., 2018	yes	yes	NR	yes	no	no	no	yes	yes	no	yes	NA	NA	no	6/12: fair
Stefanović Stanojević et al., 2020	yes	yes	yes	NR	no	no	no	yes	yes	no	yes	NA	NA	no	6/12: fair
Świtalska & Webner, 2021	yes	no	yes	NR	no	no	no	yes	yes	no	yes	NA	NA	yes	6/12: fair
Turton et al., 2022	yes	yes	NR	yes	no	no	no	yes	yes	no	yes	NA	NA	yes	7/12: fair
Vahedi et al., 2016	yes	yes	NR	yes	no	no	no	yes	yes	no	yes	NA	NA	no	6/12: fair
Yan et al., 2022	yes	yes	NR	yes	no	no	no	yes	yes	no	yes	NA	NA	no	6/12: fair

Ye et al., 2023	yes	yes	NR	NR	no	yes	yes	yes	yes	no	yes	NA	yes	yes	9/13: fair

Note. Quality ratings are good, fair, or poor. 1. Was the research question or objective in this paper clearly stated? 2. Was the study population clearly specified and defined? 3. Was the participation rate of eligible persons at least 50%?; 4. Were all the subjects selected or recruited from the same or similar populations (including the same time period)? Were inclusion and exclusion criteria for being in the study prespecified and applied uniformly to all participants? 5. Was a sample size justification, power description, or variance and effect estimates provided?; 6. For the analyses in this paper, were the exposure(s) of interest measured prior to the outcome(s) being measured?; 7. Was the timeframe sufficient so that one could reasonably expect to see an association between exposure and outcome if it existed?; 8. For exposures that can vary in amount or level, did the study examine different levels of the exposure as related to the outcome (e.g., categories of exposure, or exposure measured as continuous variable)?; 9. Were the exposure measures (independent variables) clearly defined, valid, reliable, and implemented consistently across all study participants?; 10. Was the exposure(s) assessed more than once over time?; 11. Were the outcome measures (dependent variables) clearly defined, valid, reliable, and implemented consistently across all study participants?; 12. Were the outcome assessors blinded to the exposure status of participants?; 13. Was loss to follow-up after baseline 20% or less?; 14. Were key potential confounding variables measured and adjusted statistically for their impact on the relationship between exposure(s) and outcome(s)?; NA, not applicable; NR, not reported. National Institutes of Health, (2014).

Is attachment style associated with SC in the context of AD in adulthood?

Insecure attachment and SC mechanisms were associated with several AD symptoms: depression, anxiety, social anxiety, bipolar disorder, PTSD and PND. Cross-sectional mediation models from multiple papers show bi-directional relationships between SC processes, insecure attachment and AD symptomology (Benoit et al., 2009; Brandão et al., 2022; Burnette et al., 2009; Colonnello et al., 2022; Marganska et al., 2013; Read et al., 2018; Stefanović Stanojević et al., 2020; Vahedi et al., 2016; Yan et al., 2022; Jansen et al., 2023; Ye et al., 2023). Mechanisms that appear to be associated with the relationship between attachment style and these AD are summarised below.

1) Emotion Recognition

Insecurely attached individuals showed reduced emotion recognition ability compared to securely attached individuals, associated with depression and anxiety (Huang et al., 2019; Donges et al., 2012). Anxious attachment was associated with poorer accuracy of recognising sad and fearful facial emotions (Huang et al., 2019); possibly anxiously attached characteristics of seeking connection, whilst fearing unavailability from others, makes it more difficult to interpret others' emotions. Furthermore, anxiously attached adults showed greater responsiveness in brain areas involved in perception of facial emotion and mimicry (Donges et al., 2012). This study used functional magnetic resonance imaging to measure automatic brain reactivity to approach-related facial emotions, masked by neutral faces. Despite increased brain activation, anxiously attached individuals did not perform better on the facial expression detection task. Instead, high attachment anxiety was related to more negative evaluations of neutral masked faces. Findings suggest anxiously attached individuals are highly motivated to achieve intimacy and approval in relationships, whilst being suspicious of others availability, explaining the dedication of resources to perceiving and evaluating approach-related signals (e.g., facial expressions). However, tendency to negatively interpret neutral facial expressions may be counter-productive in achieving their desired social outcomes.

Anxiously attached adults showed higher levels of depression and anxiety symptoms, correlated with biases in emotion recognition (Donges et al., 2012). However, emotion recognition was not associated with the relationship between attachment anxiety and depression persistence in Huang et al.'s study (2019), despite high anxious attachment associated with reduced emotion recognition. Instead, reduced fearful emotion prosodic recognition was associated with avoidant attachment and depression persistence. Avoidant attachment predicted an increase of depressive symptoms over a four-week interval in individuals with low fearful emotion recognition only. Biases in emotion recognition are thought to impair communication ability, contributing to depression (Huang et al., 2019). Discrepancies in moderating relationships may be due to different emotion recognition tasks and population demographics between the studies (cultural differences between Taiwan and Germany).

2) Social Understanding

Theory of Mind (TOM)

Insecurely attached individuals with SAD and major depression showed reduced TOM ability (Koelkebeck et al., 2017; Küçükparlak et al., 2021). Female patients with major depressive disorder performed significantly worse in TOM tasks compared to controls (Koelkebeck et al., 2017). Only a TOM performance difference between female controls and female MDD patients was prevalent, suggesting a gender-specific impact. These performance differences appeared to be associated with attachment styles; TOM deficits were observed in females with insecure attachment styles, particularly the anxious dimension, compared to secure attachment styles. The clinical group showed higher rates of insecure, particularly anxious, attachment styles. Similarly, Küçükparlak et al. (2021) found individuals with anxious and avoidant attachment styles performed worse on a TOM task than those with secure attachment style. Impaired TOM and insecure attachment were more prevalent in SAD patients compared to controls. Both insecure attachment styles and reduced TOM scores were associated with higher social anxiety scores (Küçükparlak et al., 2021). Conversely, another paper which recruited participants with bipolar disorder showed higher anxious attachment scores were associated with improved performance on a TOM task (Morán-Kneer et al. 2022).

Mentalisation

Reduced mentalising was associated with insecure attachment in individuals with PND, anxiety and depressive symptoms (Stefanović Stanojević et al., 2020; Świtalska & Webner, 2021, Jansen et al., 2023). Females with PND were more likely to have insecure attachment styles and showed reduced mentalising in the Mental Scale task than females without PND (Świtalska & Webner, 2021). The ability to be reflexive was reduced in women with PND. Since a mentalising style based on reflexivity enables individuals to process emotions and respond to a child's emotions, possibly this protects against depression (Świtalska & Webner, 2021). Findings from a serial multiple mediation model suggest anxious attachment style was indirectly associated with depression through associations with reduced self-related mentalisation, increased social anxiety and rumination. (Stefanović Stanojević et al., 2020). Additionally, social work students with insecure attachment styles showed impaired mentalising skills (Jansen et al., 2023). Hyper-mentalising (greater certainty of others mental states than one's own) was associated with insecure attachment and depression and anxiety symptoms. When differentiating between anxious and avoidant attachment style, anxiously attached showed hyper-mentalising of others mental states and hypo-mentalising of their own which was associated with poorer mental health outcomes, whereas for avoidantly attached, only reduced mentalising of their own mental state (hypo-mentalising) correlated with depression and anxiety symptoms.

Empathy

Reduced empathy was associated with insecure attachment style and depression (Burnette et al., 2009; Ozsoy & Ozkan, 2021; Yan et al., 2022). Reduced empathy was associated with avoidant attachment (Burnette et al. 2009). Facets of empathy are differentiated in anxious and avoidant attachment; Ozsoy & Ozkan (2021) found avoidant attachment was negatively associated with cognitive empathy; anxious attachment was positively associated with emotional empathy in participants with major depressive disorder. Participants with major depression or bipolar disorder had significantly lower cognitive empathy compared to control participants. As severity of depression increased, cognitive empathy score decreased. Moreover, Yan et al., (2022) showed avoidant attachment and depressive symptoms were associated with low empathic concern, whereas anxious attachment and depressive symptoms were associated with increased personal distress. This is further supported by research on undergraduate students which showed low empathising ability, associated with avoidant attachment and depressive symptoms (Burnette et al., 2009). As Huang et al.'s research (2019) demonstrated attachment avoidance negatively correlates to emotion recognition, possibly individuals may be less likely to recognise others' distress. Overall, findings suggest associations between avoidant attachment, reduced empathy, and depressive symptoms.

3) Emotion Regulation

Insecurely attached individuals were more likely to rely on maladaptive emotion regulation strategies compared to securely attached individuals; these maladaptive strategies were associated with greater PTSD, depression, anxiety, and social anxiety symptoms. (Karatzias et al., 2018; Read et al., 2018; Lilly & Hong, 2013; Brandão et al., 2022; Burnette et al., 2009; Colonnello et al., 2022; Marganska et al., 2013; Vahedi et al., 2016; Messina et al., 2023; Ye et al., 2023). Depending on the measure, some papers looked at overall emotion dysregulation, while others assessed individual strategies. Use of strategies differed between avoidant and anxious attachment.

Anxious attachment was associated with increased use of rumination, blame and catastrophising in Chinese undergraduate students (Ye et al., 2023). A sequential chain mediation analysis showed an indirect relationship from adverse child experiences (ACEs) to insecure attachment styles, to emotion dysregulation strategies, to depression. There was no direct relationship between ACE and depression, highlighting attachment and emotion regulation associations. In Iranian university students, Vahedi et al., (2016) showed reduced cognitive emotion regulation was associated with both avoidant and anxious attachment styles and depression and anxiety symptoms. In a community sample, interpersonal emotion regulation strategies such as venting and reassurance seeking correlated with depression; strategies were positively correlated with attachment anxiety and negatively correlated with attachment avoidance (Messina et al., 2023).

Emotional suppression was associated with high levels of avoidant attachment, but not anxious attachment, in a Portuguese community sample (Brandão et al., 2022). In an American community, depression was associated with excessive rumination in anxiously attached individuals, and reduced empathy in avoidantly attached individuals (Burnette et al., 2009). This suggests highly anxiously attached individuals may not employ adaptive emotion regulation strategies, preventing individuals from modifying negative thoughts following perceived threatening situations. In research that divided participants into high social anxiety or low social anxiety (Read et al., 2018), cognitive reappraisal was associated withanxious attachment and social anxiety. Findings suggest anxiously attached individuals may exhibit difficulties modifying negative thoughts in social situations interpreted as threatening, increasing social anxiety (Read et al., 2018).

Three papers examined emotion dysregulation in PTSD samples. Benoit et al., (2009) found insecurely attached individuals were more likely to develop PTSD compared to securely attached participants. Increased emotion-focused coping (over-attending to the emotional experience) was associated with the insecure attachment style and PTSD. However, no comparisons were made between anxious and avoidant attachment style. When comparing complex PTSD (CPTSD) to PTSD, Karatzias et al., (2018) found patients with CPTSD were more likely to be anxiously attached and use increased expressive suppression and decreased cognitive reappraisal compared to patients with PTSD. Emotion regulation difficulties were associated with greater PTSD and depression symptoms in intimate partner violence (IPV) survivors (Lilly & Hong, 2013). Anxious attachment strongly correlated with emotion dysregulation. However, avoidant attachment was not significantly related to any of the mental health outcomes for IPV survivors. Authors note this may be related to a ceiling effect, with high scores for anxious attachment in IPV survivors.

In patients with depression, anxious and avoidant attachment styles were associated with difficulties engaging in goal-directed behaviour, impulsivity, and perceived limited access to emotion regulation strategies (Turton et al., 2022). However, only anxious attachment was significantly associated with emotion dysregulation in a mediation model. Undergraduates' increased perception of being unable to successfully regulate their own emotions was associated with insecure attachment and both depression and anxiety symptoms (Marganska et al., 2013). Additionally, emotion dysregulation was associated with the relationship between anxious attachment style and depression in medical students through reduced perceived ability to generate strategies (Colonnello et al., 2022). Individuals' perception of being unable to manage their emotions is associated with depression and anxiety.

4) Social Decision Making

Reduced reciprocal giving was associated with insecure attachment style and social anxiety (Anderl et al., 2018). In individuals with high levels of social anxiety, reciprocal giving was significantly reduced in individuals with an anxious attachment style compared to other attachment styles. In individuals with low social anxiety, reciprocal giving was reduced in individuals with avoidant attachment style compared to other attachment styles. These findings suggest insecure attachment correlates to maladaptive interpersonal behavioural styles, such as reduced reciprocity in social settings.

Discussion

This paper reviewed literature that explores the relationship between insecure attachment style, SC, and AD in adults, to provide potential theoretical and clinical implications. Eligible studies spanned across a variety of AD and SC mechanisms, offering a broad outlook of how attachment style and SC is linked to AD symptomology. Below is an overview of key findings, considering methodological issues, whilst bridging the link between attachment style, SC, and mental health outcomes. Table 3 summarises relevant findings and relates these to NAMA.

Overview of Findings

Impairments in SC mechanisms appear prevalent in insecurely attached adults with greater AD symptomology, with evidence suggesting they are associated with attachment and AD. Adults with diagnoses of AD, and community samples with high scores on AD measures, showed increased impairments in these SC processes. There were slight discrepancies in findings, for instance not all papers found SC to be significantly associated with attachment and AD (Huang et al., 2019); another paper found improved TOM ability associated with insecure attachment (Morán-Kneer et al., 2022). However, overall findings suggest bi-directional relationships exist between attachment, SC, and AD.

Table 3

Findings Overview in Relation to NAMA.

Study (Grouped by SC Process)	Summary of Relevant Findings
1) Emotion Recognition	
Donges et al., 2012	- Anxiously attached adults showed greater responsiveness in brain areas involved in facial emotion and mimicry perception. - Anxiously attached individuals did not perform better on a facial expression detection task. - High attachment anxiety was related to more negative evaluations of neutral masked faces. - Anxiously attached adults showed higher levels of depression and anxiety symptoms.
Huang et al., 2019	- Anxious attachment is associated with poorer accuracy of recognising sad and fearful facial emotions. - Emotion recognition did not moderate the relationship between attachment anxiety and depression persistence. - Fearful emotion prosodic recognition negatively moderated avoidant attachment and depression persistence. - Avoidant attachment predicted an increase of depressive symptoms over a four-week interval in individuals with low fearful emotion recognition.
Mapping Findings to NAMA (Long et al., 2020; Vrtička & Vuilleumier, 2012)	Attachment style is associated with differential balances between approach (promotes social interactions) and aversion (threat-sensitive) modules for processing social information. Anxious attachment is associated with enhanced activation to brain areas associated with social aversion, possibly explaining the tendency for anxiously attached individuals to rate neutral expressions as negative. However, enhanced responsiveness does not seem to improve accuracy of detecting facial expressions in anxiously attached individuals. Avoidant attachment is associated with decreased activation of approach module, possibly reducing reward from social interactions, this may account for increased vulnerability to depression symptoms. Reduced accuracy of fearful emotion recognition in avoidantly attached individuals aligns to deactivation of aversion module. Although a deactivated aversion module is associated with avoidantly attached individuals, NAMA suggests this module may be associated with increased activation when the individual is unable to emotionally self-regulate (e.g., unable to suppress during intense emotional interaction); increased activation of aversion module in both avoidant and anxiously attached individuals may increase sense of threat in social situations, increasing vulnerability to depression and anxiety.
2) Social Understanding	
Theory of Mind (TOM)	
Koelkebeck et al., 2017	- Female patients with major depressive disorder performed significantly worse in TOM tasks compared to female controls. - Performance differences appeared to be driven by attachment styles. - TOM deficits were observed in females with insecure attachment styles, particularly anxiously attached, compared to secure attachment styles. - The clinical group showed higher rates of insecure, particularly anxious, attachment styles.

Küçükparlak et al., 2021	- Individuals with anxious and avoidant attachment styles performed worse on the TOM task than those with secure attachment style. - Impaired TOM and insecure attachment were more prevalent in patients with social anxiety compared to controls - Avoidant and anxious attachment styles and reduced TOM scores were associated with higher social anxiety scores.
Morán-Kneer et al., 2022	- Anxiously attached individuals with bipolar disorder showed better performance in this TOM task. - Patients with insecure attachment presented with the highest number of psychiatric hospitalisations.
Mentalisation	
Jansen et al., 2023	- Social work students with insecure attachment styles showed impaired mentalising skills. - Hyper-mentalising (higher certainty about mental states of others than own) and mentalising abilitywas associated with insecure attachment and depression and anxiety symptoms - Anxiously attached individuals showed greater hyper-mentalising of others mental states and hypo-mentalising of their own which positively correlated with depression and anxiety symptoms. - Avoidantly attached individuals showed reduced mentalising of their own mental state (hypo-mentalising) which positively correlated with depression and anxiety symptoms.
Stefanović Stanojević et al., 2020	- Anxious attachment style is associated with increased depressive symptoms among women. - This relationship is associated with the ability to mentalise own state of mind, social anxiety, and rumination.
Świtalska & Webner, 2021	- Females with post-natal depression (PND) showed greater prevalence of insecure attachment styles. - Females with PND showed reduced mentalising in the Mental Scale task than females without PND.
Empathy	
Burnette et al., 2009	- An association of reduced empathy was found in avoidantly attached individuals. - Reduced empathy was associated with increased depressive symptoms.
Ozsoy & Ozkan, 2021	- Facets of empathy appear differentiated in anxious and avoidant attachment. - Avoidant attachment was negatively associated with cognitive empathy; anxious attachment was positively associated with emotional empathy in participants with major depressive disorder. - Participants with major depression or bipolar disorder displayed significantly lower cognitive empathy compared to control participants. - As severity of depression increased, cognitive empathy score decreased.
Yan et al., 2022	- Avoidance and depressive symptoms were associated with low empathic concern - Attachment anxiety and depressive symptoms were associated with increased personal distress.
Mapping Findings to NAMA (Long et al., 2020; Vrtička & Vuilleumier, 2012)	In addition to balancing the approach versus aversion modules, attachment style is associated with disrupting the balance between two aspects of social processing (emotional versus cognitive mentalisation). Emotional mentalisation involves automatic processing of social interactions (e.g., expressions) and neurocognitive mechanisms (e.g., empathising). Avoidant attachment shows deactivation of approach module in emotion

	mentalisation system, possibly linking to reduced empathising ability, as evidenced in review papers. Within the cognitive mentalisation system, processes are involved in representation of mental state of others (e.g., TOM/mentalising/cognitive empathy). In avoidantly attached individuals, mental state representation network is deactivated, possibly accounting forreduced TOM, mentalising and cognitive empathising ability. However, in anxiously attached individuals, although decreased abilities in these domains are also present, as evidenced in papers, NAMA suggests possibly increased activation of mental state representation may be an adaptive way of managing social information by increasing hypervigilance to others mental states, associated with increased TOM/mentalising ability (Morán-Kneer et al., 2022). NAMA states further evidence is needed to establish if attachment style modulates mental representation module, aligning to the mixed findings above.
3) Emotion Regulation	
Brandão et al., 2022	- Avoidant attachment was associated with emotional suppression. - Higher levels of attachment avoidance and emotion suppression was associated with increased depression levels.
Benoit et al., 2009	- Insecurely attached individuals were more likely to develop PTSD after experiencing a traumatic event, compared to securely attached participants. - Emotion-focused coping (over-attending to the emotional experience) was negatively associated with the relationship between insecure attachment style and PTSD.
Burnette et al., 2009	- Insecure attachment and reduced forgiveness is associated with depression. - This relationship was associated with excessive rumination in anxiously attached individuals, and reduced empathy in avoidantly attached individuals.
Colonnello et al., 2022	- Emotion dysregulation was associated with the relationship between anxious attachment style and depression in medical students. - The most significant emotion dysregulation construct was the reduced perceived ability to generate emotion regulation strategies.
Karatzias et al., 2018	- Patients with Complex PTSD were more likely to be anxiously attached and use increased expressive suppression and decreased cognitive reappraisal compared to patients with PTSD. - Anxious attachment style and emotional suppression was associated with increased Complex PTSD symptoms.
Lilly & Hong, 2013	- Emotion regulation difficulties were associated with PTSD and depression symptoms in intimate partner violence (IPV) survivors. - Greater PTSD symptoms were associated with greater emotion regulation difficulties in undergraduates, and greater emotion regulation difficulties and greater anxious attachment in IPV survivors. - In both IPV survivors and undergraduates, greater anxious attachment, greater emotion regulation difficulties, and more negative assumptions about the world each predicted variance in depressive symptoms.
Marganska et al., 2013	- Perceived inability to generate effective emotion regulation strategies was associated with insecure attachment and both depression and anxiety symptoms. - Nonacceptance of negative emotions and inability to control impulsive behaviours were related to insecure attachment styles and anxiety symptoms.

	- Avoidant attachment was associated with only depression, whereas anxious attachment was associated with depression and anxiety.
Messina et al., 2023	- Interpersonal emotion regulation (IER) strategies such as venting and reassurance seeking was associated with depression. - These strategies were positively correlated with attachment anxiety and negatively correlated with attachment avoidance. - Attachment insecurity was associated with depression andIER difficulties.
Read et al., 2018	- Attachment anxiety and attachment avoidance are associated with social anxiety symptomology. - Reappraisal was associated with the relationship between attachment anxiety and social anxiety. - The relationship between attachment avoidance and social anxiety was not associated with reappraisal and suppression.
Turton et al., 2022	- Both anxious and avoidant attachment styles, and depression, were associated with difficulties engaging in goal-directed behaviour, impulsivity, and perceived limited access to emotion regulation strategies. - Anxious attachment was associated with emotion dysregulation in clinically depressed participants in a cross-sectional mediation model.
Vahedi et al., 2016	- Avoidant and anxiously attached individuals showed increased use of emotion dysregulation. - Reduced cognitive emotion regulation was associated with the relationship between insecure attachment styles and depression and anxiety symptoms.
Ye et al., 2023	- Anxious attachment was associated with emotion dysregulation greater than avoidant attachment. - There was an indirect relationship from adverse child experiences (ACEs) to insecure attachment styles, to emotion dysregulation strategies, to depression.
Mapping Findings to NAMA (Long et al., 2020; Vrtička & Vuilleumier, 2012)	Emotion regulation module within cognitive mentalisation system hypothesises reduced activation in avoidantly and anxiously attached individuals. In avoidant attachment, this presents as increased use of suppression/inhibition for managing positive and negative emotions, and reduced use of cognitive re-appraisal, as evidenced in review papers. In anxious attachment, this presents as dependence on other responses to regulate emotions versus self-regulation strategies, possibly accounting for results that suggest anxiously attached individuals show perceived reduced ability to emotionally regulate and poorer mental health outcomes, as evidenced in review papers. Overall, evidence aligns to NAMA stance that insecure attachment is associated with altered or less efficient emotional regulation strategies.
4) Social Decision Making	
Anderl et al., 2018	- Reciprocal giving was significantly decreased among higher socially anxious individuals. - Reciprocal giving and social anxiety were both significantly associated with attachment style. - In higher socially anxious individuals, individuals with anxious attachment style showed significantly reduced reciprocal giving.
Mapping Findings to NAMA	Insecure attachment shows reduced activation of the cognitive mentalisation module. This system is considered responsible for regulating behaviour in social situations through emotion regulation and mental representation of others, suggesting insecure attachment style may be associated with

(Long et al., 2020; Vrtička & Vuilleumier, 2012)	impaired social decision making. This is supported by findings of this paper which suggests reduced social decision making is associated with anxious attachment style. Findings suggest impaired social cognition may be associated with greater risk of poorer mental health outcomes; impaired social decision making is associated with increased social anxiety.

Theoretical Implications

The NAMA model stipulates that individual differences in attachment style may disrupt the balance between cognitive and emotional mentalisation, and approach versus aversion modules within the emotional mentalisation system (Long et al., 2020). NAMA proposes that avoidant attachment will show decreased approach and aversion activation, emotion regulation and mental state representation. Findings from the papers reviewed show that avoidantly attached individuals showed increased use of emotional suppression (Brandão et al., 2022; Read et al., 2018) and reduced emotion regulation (Marganska et al., 2013; Read et al., 2018; Vahedi et al., 2016; Messina et al., 2023). The tendency for avoidant individuals to have difficulty in turning to others to regulate distress appears to deactivate the attachment system (Shaver & Mikulincer, 2007). Papers also showed evidence that mental state representation system is impaired in avoidantly attached individuals, with reduced mentalisation, empathy and TOM ability (Koelkebeck et al., 2017; Küçükparlak et al., 2021; Świtalska & Webner, 2021; Jansen et al., 2023; Ozsoy & Ozkan, 2021).

For anxious attachment, NAMA postulates that individuals will show higher activation of aversion module during social interactions, increasing sensitivity to social cues pointing towards rejection/unavailability from others. Although findings showed decreased emotion recognition accuracy (Huang et al., 2019), greater responsivity to positive approach-related facial expression in brain areas involved in emotion processing was evident, whilst showing increased tendency to evaluate neutral masked faces as more negative (Donges et al., 2012). NAMA suggests emotion regulation and mental state representation are deactivated in anxiously attached individuals. Findings showed an association between anxious attachment and reduced emotion regulation (Lilly & Hong, 2013; Burnette et al., 2009; Karatzias et al., 2018; Colonnello et al., 2022). In line with mixed evidence reported from Long et al., (2020), some papers reported impaired mentalising, TOM and empathy (Koelkebeck et al., 2017; Stefanović Stanojević et al., 2020), whereas others found increased TOM ability and empathy ability (Morán-Kneer et al., 2022; Ozsoy & Ozkan, 2021).

Overall, research shows inter-individual differences in adult attachment style are associated with differential emotional and behavioural presentations attributed to SC. These findings align to NAMA's predictions of which behavioural and emotional presentations are associated with each attachment style, postulated to be due to differential recruitment of cognitive and emotional mentalisation systems described in NAMA. Although further research to establish causal evidence is required, mapping review findings onto NAMA provides a tentative hypothesis of how attachment patterns may relate to SC processes. Furthermore, SC impairments were associated with greater AD symptomology across papers. Findings advocate for greater employment of neuroscientific research in the attachment and mental health field, to determine causal evidence for NAMA.

Clinical Implications

By identifying SC as a linking mechanism between attachment style and AD, it can be targeted in interventions (Brandão et al., 2022). Taking these factors into account helps guide future development of mechanism-targeted interventions for AD, helping therapists orient clinical treatment by focusing on maladaptive SC processes (Benoit et al., 2009). Support for this is seen through effectiveness of interventions targeting SC processes including emotion recognition and TOM in autism and schizophrenia populations (Berggren et al., 2018; Vass et al., 2018). This could be applied to AD: Huang et al. (2019) proposes working with depressed individuals to remedy emotion recognition biases, thus benefitting interpersonal communication, reduces the risk of depression deterioration. Additionally, attachment-based approaches may be beneficial in treating AD, with patient-specific approaches to improve and evaluate SC processes (Küçükparlak et al., 2021; Liotti, 2004).

Findings encourage wider application of interventions targeting SC, including STAIR (Skills Training in Affective and Interpersonal Regulation; MacIntosh et al., 2018), Emotion-Focused Therapy which helps patients use effective distress regulation strategies consistent with their attachment style (Read et al., 2018), and Dialectical Behaviour Therapy (DBT) which uses emotion regulation skills as a key component of the intervention (Panos et al., 2014). These interventions could be considered in a wider variety of clinical presentations, particularly those with insecure attachment style and SC impairments (Turton et al., 2022).

Increased understanding of the impact of SC and attachment style on mental health outcomes can be helpful when considering certain client groups vulnerable to poor mental health. Colonnello et al. (2022) investigated attachment and SC processes in medical students, often vulnerable to AD due to work-related stress. Research could encourage change in the medical curriculum to foster psychological awareness of these processes. Furthermore, research suggests gathering information on patients' SC ability and attachment style may help screen individuals vulnerable to developing AD and identify appropriate treatments (Arioli et al., 2018).

Methodological Issues of Included Papers

Several studies used subclinical undergraduate student or community samples as opposed to clinically diagnosed patients, thereby preventing strong conclusions to be drawn about clinical levels of AD. Although encouraging to see studies addressing this topic were carried out in a range of countries, cultural differences may impact the comparison of findings; further research exploring the potential impact of culture is warranted. Most studies had population samples that were majority female and most of them were highly educated which limits the generalization of the results. Additionally, in some papers (e.g., Benoit et al., 2009), insecure attachment styles were grouped together (avoidant and anxious), which meant there was a risk that contrasting emotion regulation strategies may bias the correlations between attachment style and strategies.

All studies used correlational designs. Additionally, papers reporting mediation analyses used a cross-sectional approach; although helpful in testing the strength and significance of relationships, correlation statistics are unable to prove that an alleged mediator is causally involved in the production of an effect (Fiedler et al., 2011). Therefore, caution is warranted when interpreting cross-sectional mediation analyses, as causal role of variables cannot be determined (Fiedler et al., 2011). There is a need for longitudinal studies to provide evidence of causality from attachment style to SC processes and mental health outcomes. Studies should aim to track individuals across their lifespan, from different cultural backgrounds, and be appropriately powered (Bauer, 2020; Brussoni et al., 2000). Additionally, there was a reliance on self-report measures, which increases the possibility that some of the strong correlations observed between constructs are due to response style bias (Althubaiti, 2016). Literature reports avoidantly attached individuals tend to dismiss emotions and bias their view of emotion regulation competency (Shaver & Mikulincer, 2007). Therefore, avoidantly attached individuals are susceptible to under-report psychological difficulties (Dozier & Lee, 1995) hence self-report measures may not capture emotion regulation ability or AD symptomology accurately in this population. Further research could use experimental tasks that reflect real-life scenarios. Different use of measures across papers means discrepancies in findings are to be expected. Future studies should use multiple attachment and SC measures to improve validity (Long et al., 2020).

Lastly, papers reviewed did not control for situational stress/distress, making it difficult to disentangle from adult attachment style. Previous research investigating adult attachment and stress suggests insecure attachment is associated with maladaptive responses to interpersonal stress and life event stressors; however further research to identify causal links is necessary (Simpson & Rholes, 2017). This review highlights how correlational research often used in attachment literature prevents causal hypotheses being tested. Future research should aim to control for the potential confounding variable of situational stress, to ascertain adult attachment style as a distinct entity.

Review Strengths and Limitations

This is the first review to synthesise literature exploring the role of SC processes in the association between insecure attachment and AD symptoms and relating it to a neuro-anatomical attachment model (Long et al., 2020), to the author's knowledge. Majority of review papers (56%) were published in the last five years, highlighting the exciting development of this research area, and review relevance. However, as there was a wide variation in SC processes explored, and a variety of attachment and AD measures used, this made it difficult to compare results, preventing statistical inferences from being drawn. Furthermore, the array of SC processes, with various terminology used, meant some literature may not have been captured in the search, despite the author doing their best to include a variety of search terms based on terms used in relevant reviews (Rokita et al., 2018; Long et al., 2020). Given the varying terminology used, including a second-rater to review papers was helpful in ensuring a consistent eligibility criteria threshold.

Conclusion

Social cognitive processes appear to be associated with insecure attachment and AD symptoms. Findings should be interpreted cautiously, given the limited quality of paper methodologies and discrepancy in measures; further high-quality research is needed to strengthen reliability of the findings. However, results are encouraging; as our understanding of attachment styles' influence on social cognitive processes grows, the greater the opportunity to use this knowledge to improve psychological interventions in preventing and treating AD. This review provides an agenda for future research in addressing the following: How can we use this knowledge to prevent the development of AD in insecurely attached adults? Would treatment for AD, with enhanced focus on SC processes, improve effectiveness for insecurely attached individuals?

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Service Improvement Project

Improving the Initial Assessment Process in the Oxford Health Learning Disability Service

Chloe Hiles

Oxford Institute of Clinical Psychology Training and Research, Division of Medical Sciences, University of Oxford, Oxford, United Kingdom

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Internal Supervisor: Dr Emily Reeves, Clinical Tutor, Clinical Psychologist, The Oxford Institute of Clinical Psychology Training and Research

Internal Supervisor: Dr Nicola Lane, Clinical Tutor, Clinical Psychologist, The Oxford Institute of Clinical Psychology Training and Research.

External Supervisor: Dr Siobhan Duke, Lead Clinical Psychologist, South Oxford Learning Disability Community Team.

Proposed Journal: *International Journal of Intellectual Disability.* This journal was chosen as it is a peer-reviewed journal with a focus on intellectual disability research, enabling findings to be disseminated to professionals working in intellectual disability services. Paper is published; Appendix 2.A.

Abstract

Introduction: In 2019, an investigation of service users' experiences of the Oxford Learning Disability (LD) team revealed dissatisfaction with the initial assessment. This project aimed to improve initial assessments by introducing resources developed collaboratively with service users. ***Method****:* Resources were piloted over four months. Initial assessment experiences were evaluated by administering questionnaires to twenty clinicians, ten service users and four carers. Qualitative data from clinicians' pre-pilot and post-pilot questionnaires were thematically analysed; service users and carers responses contributed as complementary information to the themes. ***Results****:* Clinician pre-pilot questionnaires produced four themes: 'Is this really necessary? A lot of work for little reward'; 'Not very LD-friendly'; 'Value in a thorough assessment'; 'A need for a streamlined, inclusive approach'. Post-pilot questionnaires produced 3 themes: 'Making it LD-friendly'; 'Time saving'; 'One size does not fit all'. Service users and carers data aligned with these themes. ***Discussion****:* Recommendations for improvement and implications are reported.

Keywords*:* Learning Disability, Accessibility, Initial Assessment, Communication Aids

1) Introduction

1.1 Literature Review

Individuals with a learning disability (LD) and/or autism often display a preference for predictability[1,2] and intolerance of uncertainty[3,4]. Literature highlights that intolerance of uncertainty increases anxiety symptoms within the LD population[5]. Additionally, communication difficulties are prevalent in individuals with LD and lead to barriers when expressing their needs to healthcare professionals[6]. Although literature evidence is scarce, it is hypothesised that high prevalence of anxiety in individuals with LD may relate to the tendency to perceive novel situations as threatening[5]. Heightened responses to sensory stimuli and communication difficulties may further increase the likelihood that individuals with LD will perceive new environments as unpredictable and threatening, increasing anxiety[3,4]. Therefore, services should ensure their processes are as predictable as possible to reduce anxiety and distress.

To ensure predictability of the assessment process and reduce uncertainty for the service user, National Institute for Health and Care Excellence (NICE) guidelines[7] for assessments and interventions with individuals with LD recommend providing information to the individual prior to the assessment. This should include the rationale for, and nature of, the meeting, and awareness that certain sensitive questions may be asked[7]. Additionally, NICE guidelines report assessment procedures should be person-centred, accessible for people with LD, responsive to their needs and abilities, and use adaptations such as communication aids[7].

In line with evidence base and guidelines, tailoring initial assessment procedures for individuals with LD should include consideration of preference for predictability, uncertainty intolerance and communication barriers. Person-centred care emphasises the need for service users to participate in clinical decision making[8]. Therefore, service user involvement in developing care pathways and adaptations is paramount in ensuring service users' needs are met.

1.2 Project Background and Aims

The Oxford LD Community Service offers support to adults with a LD whose health needs cannot be met by other health services in Oxfordshire. Consisting of a multi-disciplinary team (LD nurses, physiotherapists, psychiatrists, psychologists, occupational therapists and speech and language therapists), the service provides personalised care and support plans for various health needs, including physical health checks, medication reviews, psychological interventions, and support with daily living skills.

In 2019, the Patient Experience Lead of the Oxford Health LD Service investigated service users' experience of the care they received from the South Oxford LD team. A focus group was held with service users from the patient experience group. Feedback highlighted that service users felt the initial assessment process for the LD service could be improved, reporting the following:

1. The initial assessment was felt to be overwhelming as there are many topics covered.
2. Service users did not like carers answering on their behalf.
3. Service users wanted more understanding and clarity of questions being asked to inform their understanding of consent and confidentiality, especially for personal questions which they may prefer to decline to answer.

4. It would be helpful for service users to have access to an easy-read version of the assessment questions prior to the appointment, so they are prepared regarding what questions to expect.
5. To help with the vast number of topics to cover, a keyring communication aid (described below) could orient service users to what questions are being asked in each part of the appointment.

Following this feedback, clinicians and service users developed new resources to support the initial assessment process. Acting as a communication aid, the keyring aid displays images and key phrases in the format of cards attached together by a keyring, helping to orient services users to different topics in the assessment. For instance, when asking for information on physical health checks, associated images such as a picture of eyes or teeth are displayed, enabling better understanding of the topic. The idea for the keyring aid was developed within a discussion in the 2019 focus group, led by the Patient Experience Lead, on what would increase service users understanding and engagement in the initial assessment. The keyring was considered a suitable communication aid, accessible and engaging for service users, and informed by literature that recommends LD clinicians use communication aids with accessible language and images (Boardman et al., 2014). Additionally, the format of the aid was convenient for producing multiple copies and distributing to all clinicians, which could be easily stored and taken to assessments.

Unfortunately, due to clinician changes in the team, and the impact of the Covid-19 pandemic on clinical priorities, these resources were not implemented or evaluated. This project aimed to follow on from the 2019 review by understanding the initial assessment experience additionally from a clinician perspective, then implementing the new resources into the initial assessment process over a four-month period (December 2022 – March 2023) and evaluating how they impact the initial assessment process from both service user and clinician perspectives. Recommendations on how to improve the initial assessment process could then be disseminated across all three teams (North, City, South) to ensure a consistent county-wide approach. The project focused on answering the following questions:

1) What are clinicians' experiences of the initial assessment process?
2) How do the new resources impact on the initial assessment process?
3) How can the initial assessment process be improved?

2) Method

2.1 Participants

Thirty-four participants (twenty clinicians, ten service users and four carers) took part in the study using purposive sampling. Braun and Clarke (2022)[9] recommend avoiding data saturation as justification for dataset size, and instead suggest using the information power concept[10], which avoids precise calculations, focusing instead on information richness of the dataset and how it meshes with the research aims. Literature suggests information richness should be guided by research aspects including the specificity of the research question, sample diversity, scope and purpose of the project, and depth of data generated from each participant or data item [10]. With these considerations in mind, the author checked to ensure all research questions had been answered during the familiarisation of the data and initial coding phases, and that codes generated from participants responses were able to form multiple code clusters/patterns which could be separated into themes. Additionally, data was gathered from all clinicians completing initial assessments in the service, providing maximum diversity of perspectives in the target sample.

Service Users and Carers

Participants were individuals with a LD who completed an initial assessment with the LD team between December 2022 to March 2023. Where service users were unable to provide a response due to a communication impairment, carers were asked to complete a questionnaire assessing their experience of the assessment (this occurred on four instances).

Clinicians

Participants were LD service clinicians, across the North, City and South Oxford teams, who completed an initial assessment between December 2022 to March 2023. Clinicians were from the following disciplines: Nursing, Speech and Language Therapy, Physiotherapy, Occupational Therapy and Psychology.

2.2 Design

Questionnaires with a mixture of open-ended and closed questions were developed, based upon the 2019 review of the initial assessment and the author's research aims. Qualitative surveys offer a range of benefits[11]: participants can respond in an open-ended fashion, thus not restricting the scope of responses and instead allowing a depth and richness of data; they enable standardization in questions and relatively easy comparison across a qualitative dataset; they provide easy and quick access to samples larger than is typical of qualitative research; and finally, they allow anonymous responding, minimising potential courtesy response bias.

Clinician questionnaires (completed on Microsoft Forms) investigated clinicians' experiences of the initial assessment pre- and post-implementation of the resources, and the impact of the new resources. The pre-pilot questionnaire was used as a baseline to compare clinicians experience of the initial assessment before and after implementation of the resources. Both questionnaires asked clinicians to describe their experience of the initial assessment process. The post-pilot questionnaire additionally asked for clinicians' experiences of using the new resources in the initial assessment.

Service user questionnaires were collaboratively developed with a service user from the patient experience group who was part of the 2019 service review. Service users' questionnaires (distributed as hard copies) asked about the service users' experiences of the appointment and using the resources.

2.3 Ethical Considerations

All data was anonymised to prevent identification of individuals. Project approval was granted by the Clinical Governance Committee (Appendix 2.B).

2.4 Procedure

Part 1

Two meetings were held with the Patient Experience Lead to gain an understanding of the 2019 service review. Resources developed collaboratively with the Patient Experience group in 2019 were edited to reflect recent changes in the initial assessment process and to update images, with permission. The resources were:

- A Keyring Aid, a communication aid using simplified language and images to orient services users to different topics discussed in the initial assessment, to be used in the appointment. A digital version for online appointments was also developed.

- An easy-read version of the initial assessment questions, to be sent out to service users prior to their appointment.

Consultation with a Patient Experience group member involved reviewing the updated resources and service user questionnaire to ensure their accessibility. Resources and the questionnaire were revised following feedback, and an additional meeting was held with the Patient Experience group member to confirm amendments were satisfactory. Clinicians who led initial assessments were offered time within a business meeting to complete the pre-pilot questionnaire assessing their experiences of the current initial assessment process (Appendix 2.C).

Part 2

The new resources were introduced to clinicians in three team meetings (North, City and South) in November 2022. Over a four-month period, resources were distributed in all initial assessments within the Oxford Health LD service. Prior to the initial assessment, all referred service users were sent the easy-read initial assessment questions. All clinicians conducting initial assessments were provided with a Keyring Aid.

Following the initial assessment, if consented, service users (or carers if service users were unable to provide a response) were provided with questionnaires asking for feedback on the resources and the initial assessment process (Appendix 2.D). The questionnaires were distributed by the clinician carrying out the initial assessment. Participants were provided with contact information for the opportunity to get in touch with the author if required.

Upon completion of the trial period (March 2023), clinicians were emailed a post-implementation questionnaire to reflect on their experience of the initial assessment using the new resources.

Part 3

Data from the pre-pilot and post-pilot clinicians' questionnaires were separately analysed to capture experiences of the initial assessment before and after the implementation of the resources. They were then overall compared to assess for the impact of resources. Data from the service-user and carer questionnaires were compared to service users' feedback of the initial assessment in the 2019 service review. Findings and recommendations were presented in team meetings.

2.5 Analysis

Thematic analysis was conducted on all open-ended questions, as outlined by Braun & Clarke, (2006)[12]. Qualitative analysis seeks to understand 'what' and 'how' questions based upon true experiences[13,14]. Thematic analysis is a qualitative method which involves identifying, analysing, and reporting themes in data. It is a flexible approach, free from theoretical frameworks, allowing meaning of experiences to be explored within a wider social context[12]. Therefore, it was considered a suitable method for this exploratory study. The lead author read questionnaire responses several times to familiarise with the data. An inductive approach was taken to review data. Initial codes were generated; codes were formed based on common patterns then sorted into themes and sub-themes. All authors reviewed the final themes/sub-themes and interpretation of the data. Closed questions were analysed using descriptive statistics.

3) Results

Identified themes and sub-themes are presented below with example quotes provided. The pre-pilot questionnaire focuses on clinicians' experiences of the initial assessment process; the post-pilot questionnaire focuses on the impact of the new resources on the process, therefore themes from the pre-pilot and post-pilot clinicians' surveys are reported separately.

3.1 Themes. Clinicians' Perspectives of the Initial Assessment (prior to implementation of the resources)

1. Is this really necessary? A lot of work for little reward

Relevance of the process

Clinicians questioned the necessity of the process; particularly around how useful it is to collect the information at that point in time: *"It is overly lengthy and unnecessary; much of it should be completed by clinicians upon allocation rather than prior to considering whether the person will even be picked up by the team" (S17).*

Clinicians reflected on the usefulness of the information: *"we collect a lot of info which doesn't get used" (S14); "Sometimes we focus on getting a lot of general information and lose sight of the referral need" (S6).*

Uncomfortable questions

Clinicians wrote about their discomfort at asking sensitive questions: *"I am asking a person to reveal an awful lot to me without being able to give them a certain indication of the benefit this will bring to them" (S17).*

This led to clinicians feeling self-conscious when describing the process to service users and carers: "*Sometimes embarrassing explaining the process of what we do" (S1).*

Time is of the essence

A concern for clinicians appeared to be the time taken to complete the process: *"it can be a long process and to be doing this on top of your clinical work you can easily lose a whole day to work that isn't related to your caseload". (S18).*

This extended to the concern of the time taken for service users: *"if support workers are involved & they have limited time funded to give support - I'm not sure this is best for the client that their support is used for this particular assessment?" (S15).*

Often clinicians find themselves rushing through the assessment to complete the topics, which may lead to incomplete information gathering: *"I often find myself having to rush through the second half of the initial assessment and the risk assessment more" (S3).*

2. Not very LD-friendly

Service users' feelings

Clinicians reflected on the initial assessment experience from the perspective of service users: "*it can be quite invasive and overwhelming for the patient" (S13).*

Clinicians noticed service users becoming confused during the appointment: *"Sensitive questions can cause service users to look concerned or confused" (S11).*

Service users' disengagement

Clinicians identified that often service users would not be included in the appointment: "*sometimes the carer does not involve the patient as much as they would like as the process takes too long and is not person centred" (S13).* Clinicians queried the accessibility of the appointment: *"I don't think it is LD friendly at the moment." (S14).*

The non-person-centred approach can lead to service users disengaging: *"Service users can become disengaged with a long appointment." (S11)*

3. Value in a thorough assessment

Despite the drawbacks mentioned above, clinicians did comment on the benefits of having a thorough assessment in planning the best approach: *"carers are really appreciative of a thorough assessment and consideration of who can help with what." (S16).*

Clinicians commented on how the process often led to the discovery of additional needs:

"...useful to check medications and medical diagnoses against our records (if we have them), and ... establishing unmentioned health needs that service users/family/carers may not have picked up on" (S5).

4. Need for a streamlined, inclusive process

An efficient way of working

Ideas of how to streamline the assessment were highlighted with a greater focus on the primary need: *"Complete more initial assessments by profession, e.g., SLT completing dysphagia/communication referrals as a primary need, still collecting the other data as secondary needs, but focusing less on this." (S5).*

Clinicians wrote about how to condense the appointment: *“more general information competed in advance by family/carers" (S6).*

Enabling a person-centred approach

Clinicians were keen to implement a process more accessible for service users: *“I think for it to have a more accessible format to involve the service user would be great.” (S4).*

3.2 Themes. Clinicians’ Perspective of the Initial Assessment (post implementation of the resources)

1. Making it LD-friendly

Greater inclusion and engagement

Clinicians wrote about the impact of the resources in engaging and including the service user, particularly the keyring aid: *“It was a great way to make the client feel more involved.” (S1).* Clinicians reflected on the visual aspect of the keyring aid: *“I think the keyring aid is a great way to engage the service user. As it is visual, the service user can look at the images and point/comment on them” (S11).*

It was noted that it was useful to engage service users even with communication impairments: *“(they) did not have the communication skills to follow but enjoyed looking at the pictures and said “angry, sad” etc” (S4).*

Greater understanding and preparedness

Clinicians commented on how the resources, particularly the easy-read information sheet, aided service users understanding of the appointment: *“easy read sheet was helpful in helping the service users and carers to be more prepared and know what to expect for the appointment.” (S9).*

Clinicians also reflected on the use of asking the questions in the style of the questions on the easy-read information sheet: *"I think the accessible sheet was useful to have as I used it to ask the questions in a more accessible way." (S12).*

Clinicians wrote that the keyring aid seemed to enable greater understanding for service users: *"I found it helpful to orientate the client through themes of questions" (S2).*

2. Timesaving

Clinicians wrote about the easy-read information sheet reducing the appointment time: *"I found it reduces the time it takes me to do the assessment (because I just ask your simply worded questions and elaborate where needed rather than trying to ask around topics myself)" (S5).*

Clinicians reflected on the impact of the resources in improving efficiency: *"I found it most useful to give the client the paper version whilst I typed answers straight onto the RiO form on my laptop" (S6).*

3. One size does not fit all

Barriers to using the resources.

Despite positive feedback, clinicians reflected on the differences in service users' responses to the resources: *"for another they did not engage with it, it did not feel appropriate for them based on their ability level" (S9).*

A practical barrier was the mismatch between the resources and the new RiO template for the initial assessment RiO is an electronic health record system (EHR); the service began using RiO during the trial period of the resources, having changed from its previous EHR (CareNotes). Due to the unplanned nature of this change, with

CareNotes being taken offline, individualisation of key features to different services were not possible. This meant the initial assessment template form had a different question order to the original initial assessment template that the resources had been based upon:

"One of the current difficulties is having a different format on RiO to the Takeout pack so it is disjointed - not because of the great resource you have created but because of us changing systems." (S1).

Suggestions for improving the resources.

Clinicians described their ideas for improving the resources to remove the barriers mentioned above: *"Due to updates to clinical record templates, the resources could be updated to match the new required information and include some more prompts as per the guidance for completing the new RiO core assessment versus previous initial assessment" (S3).*

Clinicians requested the resources to include more questions specific to risk and to relationships/sex: *"more general topics to be included, e.g., relationships (as well as sex) ...add in more questions about risk" (S6).*

3.3 Descriptive Statistics

Figure 1a shows that overall clinicians were less likely to run out of time in post-pilot assessments than pre-pilot assessments; 21% of clinicians 'often' ran out of time in assessments without the resources, compared to 0% of clinicians in assessments with the resources. This supports qualitative feedback in reducing time required, aligning to the theme 'timesaving'. Figures 1b and 1c show that clinicians were less likely to notice service users becoming confused and overwhelmed in assessments with the resources, compared to assessments without resources; 26% of clinicians 'often' noticed service users becoming confused in pre-pilot assessments, compared to 7% of clinicians noticing this in post-pilot assessments. 79% of clinicians ‘sometimes’ noticed service users becoming overwhelmed pre-pilot, compared to 13% of clinicians ‘sometimes’ noticing service users being overwhelmed post-pilot.

Figures 1d and 1e show that clinicians were less likely to notice service users being anxious in post-pilot assessments; 68% of clinicians ‘sometimes’ noticed service user anxiety pre-pilot, compared to 20% of clinicians’ post-pilot. The number of clinicians noticing service users being ‘a little anxious’ fell from 94% to 40%, although, 7% of clinicians noticed service users being ‘very anxious’ post-pilot compared to 0% pre-pilot.

Figures 1a, 1b, 1c, 1d and 1e

Clinicians pre-pilot vs post-pilot questionnaire data. N=20.

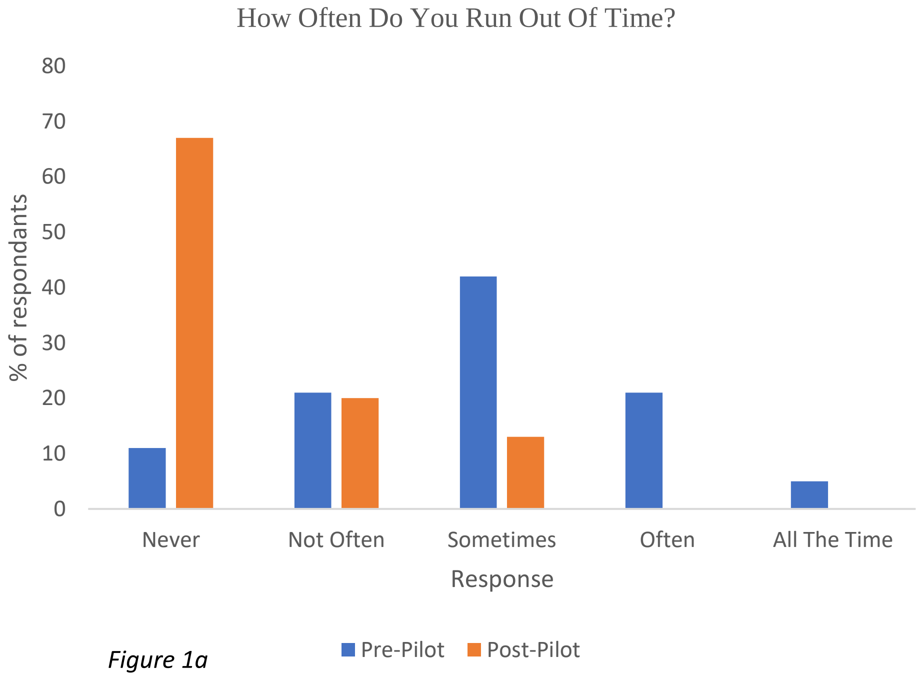
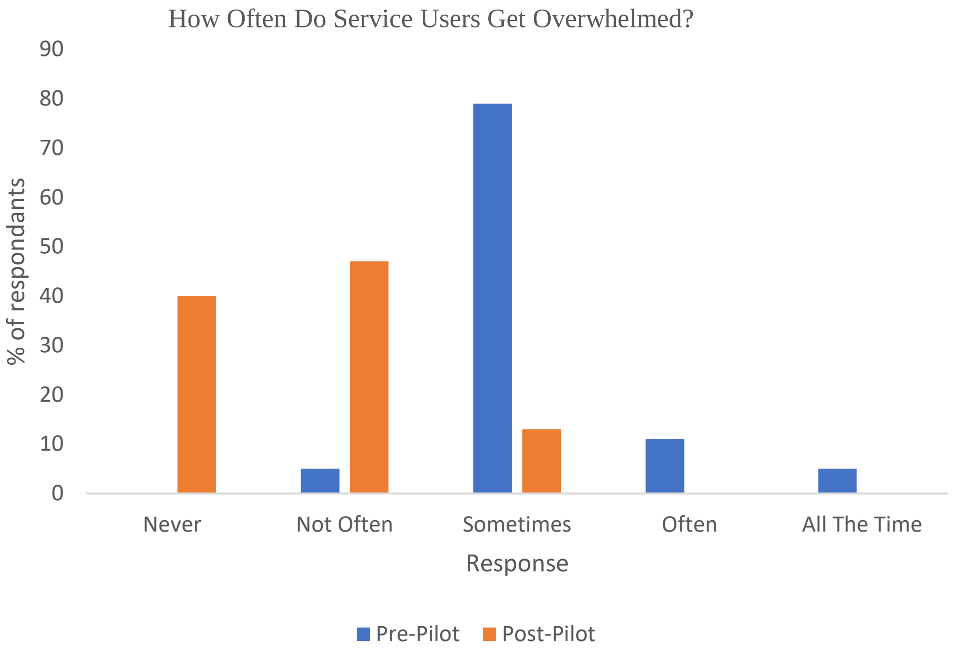


Figure 1a

Figure 1b



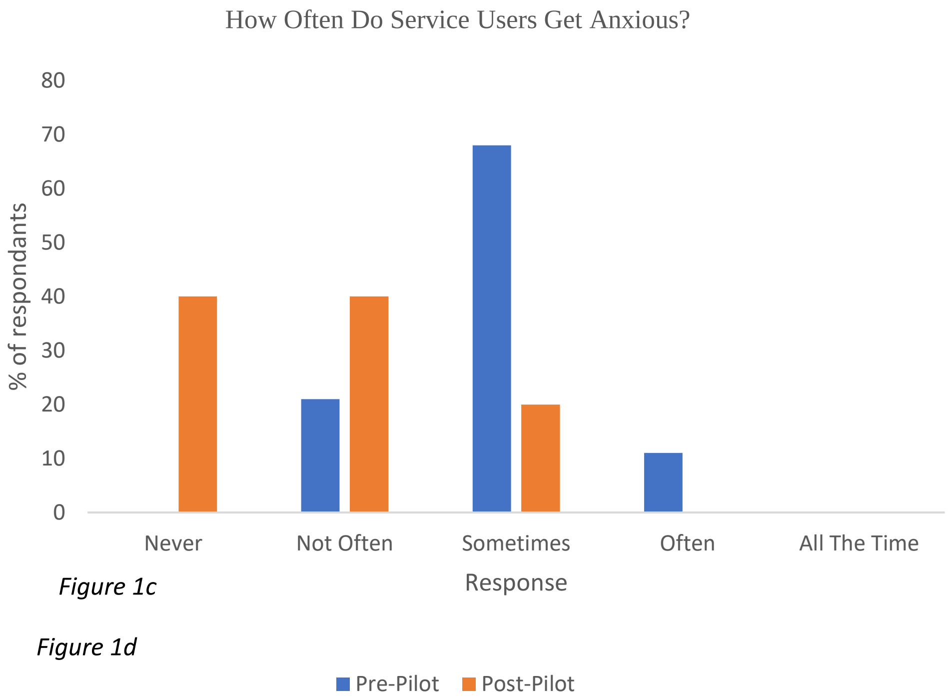


Figure 1c

Figure 1d

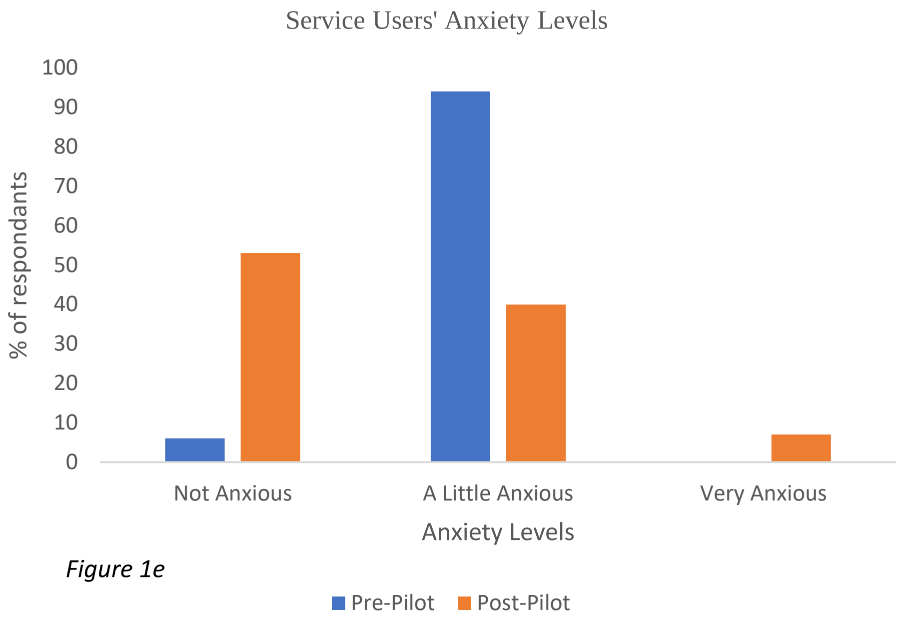


Figure 1e

3.4 Complementary Information from Service Users and Carers

Due to limited feedback received from service users, qualitative data was added as complementary information to the clinicians' themes rather than separately thematically analysed.

1. Making it LD-friendly

Greater inclusion and engagement

Both service users and carers reflected on the impact of the keyring aid in engaging the service user: *"They liked pointing at pictures and commenting on them, it was good" (Carer (C) 4); "I like looking at the pictures" (Service User (SU) 2).*

Greater understanding and preparedness

Service users wrote about how the keyring aid helped them understand topics in the appointment: *"Reminds me of what you were saying and what the questions meant." (SU1); "Helped me understand the questions" (SU2).*

Carers appreciated the easy-read information sheet in preparing them for the appointment: *"It was helpful to read through ahead of meeting to know what information was needed. We could then talk to (service user) about the meeting and let them know what questions were going to be asked." (C2).*

2. Timesaving – *(no relevant data)*

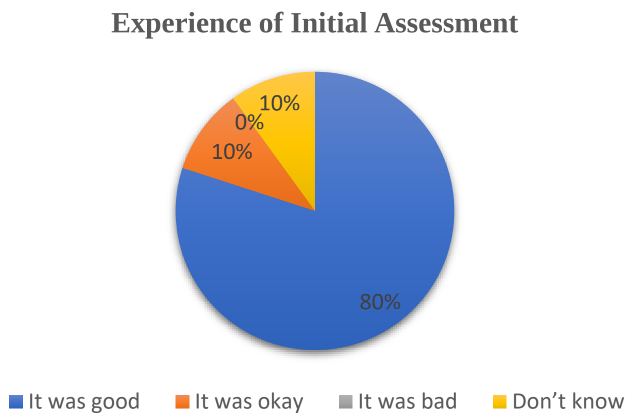
3. One size does not fit all

Suggestions for improving the resources

Service users all reported they did not wish to change the resources in any way. One carer suggested how to improve the practicality of the keyring aid: *"Maybe on a stand that could be easier to use." (C2).*

Figure 2

Service Users' Experiences of the Initial Assessment with Resources.



Overall, service users reported a good experience of the initial assessment (see Figure 2). Of the ten service users providing feedback, the majority found the resources helpful and easy to use (see Table 1). Of the four carers providing feedback, the majority found the resources enabled the service user to understand the questions and increased their preparedness for the appointment (see Table 2).

Tables 1 and 2 below depict quantitative data recorded from service user and carers questionnaire responses. For the service users and carers that reported resources were not helpful or easy to use, they did not provide any further contextual information as to why this was. As all reported they would not like to change the resources in any way, it is hypothesised that possibly the resources were inappropriate for the service user's ability.

Table 1

Service User feedback (N=10).

	Keyring Aid		**Information Sheet**	
	Yes (%)	**No (%)**	**Yes (%)**	**No (%)**
Easy to use?	70	30	90	10
Was it helpful?	70	30	100	0
Would you like to change it?	0	100	0	100

Table 2

Carer feedback (N=4).

	Keyring Aid		**Information Sheet**	
	Yes (%)	**No (%)**	**Yes (%)**	**No (%)**
Easy for service user to use?	75	25	75	25
Helped service user to feel more prepared?	N/A	N/A	100	0

Helped service user to understand the questions?	75	25	N/A	N/A
Helped service user to feel less anxious?	50	50	75	25

3.5 Service Response to the Project

Findings and recommendations were presented in the team meetings and countywide governance meeting. Clinicians fed back verbally that they supported the recommendations and were keen to continue implementing the resources. Team leads reported both clinician and service user feedback of the initial assessment process was helpful information for reviewing effectiveness and efficiency of service processes and will be referred to in future developments of the service. The resources have now been officially implemented across all teams. An easy-read summary of the project was produced for service users.

4) Discussion

4.1 Overview of Findings

The aim of this project was to explore the initial assessment experience in the Oxford LD service and evaluate the implementation of new resources in the initial assessment across a four-month period, to assess how they impact the initial assessment from both clinician and service user perspectives. To evaluate their impact, a clinician questionnaire was used to understand clinicians' perspective of the initial assessment process prior to the new resources being trialled. Main themes that emerged from this were: 'Is this really necessary? A lot of work for little reward', 'Not very LD-friendly, 'Seeing value in a thorough assessment' and 'Need for a streamlined, inclusive process'.

Following the trial period of new resources, clinicians fed back their experience. Main themes to emerge were: 'Making it LD-friendly, 'Timesaving' and 'One size does not fit all'. Service users and carers also provided input which aligned to these themes. Comparisons between pre-pilot and post-pilot themes suggest that the new resources address the clinicians' concerns of improving the efficiency and LD-friendly nature of the process and align to the clinicians' hopes for a 'more inclusive, streamlined process'.

Descriptive statistics showed clinicians reported less incidents of service users being overwhelmed or anxious in the appointment and confused by the questions, and less incidents of running out of time in appointments when the new resources were used. This suggests that the new resources contributed to lowering service users' anxiety and increasing their understanding of the assessment. As different service users were present in each initial assessment, individual differences of service users, such as temperament, will contribute to the outcomes. However, the data shows an overall trend that service users in assessments with resources were less likely to be anxious, confused or overwhelmed, and clinicians were less likely to run out of time, compared to assessments without resources. This supports the qualitative feedback that the resources improved the LD-friendliness and efficiency of the assessment. Service user and carer qualitative feedback also reported a reduction in service user anxiety and increased understanding and preparedness of the questions/appointment process.

The 2019 review of the initial assessment process reported service users found the appointment overwhelming due to the vast number of topics and did not like carers answering on their behalf. They reported wanting more understanding and clarity, particularly around sensitive questions, an easy read version of questions prior to the appointment and a keyring aid to use in the session. Whilst there were some barriers to using the new resources and suggestions for improvement, such as adding risk assessment questions, using the recommended resources appeared to help service users understand the assessment questions and reduce feelings of being overwhelmed.

Findings from the study align to our knowledge of individuals with LD and/or autism displaying a preference for predictability[2] and intolerance of uncertainty[3], which can increase anxiety symptoms[5]. By providing an easy-read version of the questions prior to the appointment, service users are more likely to feel prepared for the session thus reducing feelings of anxiety. Additionally, a keyring aid supports their understanding of the topics during the meeting. The resources aim to reduce the communication barrier between service users and clinicians, which is prevalent within the LD population when expressing their health needs to clinicians[6]. Furthermore, the new resources adhere to NICE guidelines for assessment and interventions when working with individuals with LD: providing information to the service user prior to the appointment, including rationale for the meeting and awareness that sensitive questions may be asked, and adopting a person-centred approach with accessible adaptations such as communication aids[7].

4.2 Limitations

A major limitation of this study was low representation of feedback from service users. Response rate strategies were discussed at length prior to data collection which concluded the best way to ensure response rate was for clinicians to collect the questionnaires immediately after the initial assessment appointment. The advantages of this approach were that the resources were ‘fresh’ in the mind of service users so it could be evaluated more accurately, and it did not rely on service users posting the questionnaires back, which may have lowered response rate due to increased effort required from the service user/carer. However, this approach relied on the clinician having the time capacity to provide the questionnaire post-appointment. Only ten service users and four carer questionnaires were collected, a low representation of service users who completed initial assessments within the trial period. Additionally, pre-pilot and post-pilot assessments involved different service users; therefore, when comparing pre-pilot versus post-pilot data it is difficult to establish a causal effect between the resources and outcome results, as individual differences in the service users will contribute to the results.

The thematic analysis process is subjective and therefore there is potential bias. This includes questions which the author asked in the questionnaires, the analysis itself and in the data selected for this report. The author attempted to prevent these biases by developing the service user questionnaire with a Patient Experience group member; additionally, deciding appropriate questions and sharing data with supervisors to discuss codes and themes.

During the time of resource implementation, the initial assessment process was changed to reflect the change from CareNotes to RiO electronic records system. The new order and style of questions were different to the original questions used to design the new resources. The clinicians feedback reflects this as a limitation of the resources.

4.3 Implications

Understanding clinicians and service users' views of the initial assessment, particularly around the need to ensure a person-centred approach and increase the efficiency of the process, are valuable in considering ways to conduct the initial assessment across all Oxford LD teams. The evaluation of the new resources justifies the consistent use of these resources in assessments, as overall they address clinicians and service users concerns of the initial assessment process. Findings can be shared with other LD services to demonstrate the use of resources in improving accessibility and efficiency of initial assessments, meeting NICE guidelines, and improving the experience of the process from both a service user and clinician perspective. Considering the minor barriers in using the resources and suggestions on how to improve them enables the maximum benefits of these resources.

4.4 Recommendations:

Based on the findings, recommendations were developed and disseminated to the Oxford LD teams:

1. Update resources to reflect the new RiO core assessment template.
2. Add in more sensitive questions covering risk assessment and sex/relationships.
3. Provide an instruction sheet for clinicians on how best to use the resources whilst bearing in mind the person-centred approach and the need to adapt for each service user depending on their needs.
4. Encourage option to use the easy-read information sheet in the session (asking the more accessibly worded questions, providing a paper copy to the service user/carer to read through, writing straight into RiO template form to save time).
5. To increase efficiency of the appointment, consider asking carers/service users to complete more general information in advance of the appointment.
6. Consider the need to increase the accessibility and inclusivity of the process by involving the service user as much as possible, being aware of

the fatigue and confusion the appointment can cause, asking questions in the most accessible way (using the resources where possible to aid with this).

7. Honorary Assistant Psychologists to monitor any future changes in the RiO core assessment template and update the resources accordingly (perhaps reviewing on a 6-month basis).

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Theory-Driven Research Project

The Role of Social Anxiety, Appearance Dissatisfaction and Facial Expressivity Suppression on Social Interactions in Individuals with Facial Palsy

Chloe Hiles

Oxford Institute of Clinical Psychology Training and Research, Division of Medical Sciences, University of Oxford, Oxford, United Kingdom

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Internal Supervisor: Dr Matthew Hotton, Research Tutor and Clinical Psychologist, The Oxford Institute of Clinical Psychology Training and Research.

External Supervisor: Dr Danielle Shore, Research Tutor and Deputy Research Director of Clinical Psychology Training and Research**,** The Oxford Institute of Clinical Psychology Training and Research.

Proposed Journal: *Psychology, Health, and Medicine*. This journal was chosen as it is a multidisciplinary, peer-reviewed journal focusing on psychology and health issues in practice.

This project included collaboration with another trainee (Appendix 3.B). The contribution to the work presented in this thesis is as follows: Chloe Hiles's contribution: Conceptualization; Methodology; Formal Analysis, Writing – original draft, and review and editing; Project Administration – data collection (joint working). Dr Luke Aldridge-Waddon's contribution: Project Administration – data collection (joint working).

Abstract

Introduction: This study aimed to improve understanding of social anxiety, appearance satisfaction and facial expressivity suppression in individuals with facial palsy compared to the general population, then determine whether these factors predict quality of self-evaluated social interactions in individuals with facial palsy. Role of self-focus of attention in facial expressivity suppression was additionally explored. ***Design:*** This study employed a cross-sectional online survey and experimental task. ***Participants:*** Eighty-seven individuals with facial palsy and eighty-five individuals without facial palsy (control group) participated. ***Measures:*** Social Phobia Inventory, Body-Esteem Scale for Adolescents and Adults – Appearance subset, Visual Analogue Scales assessing self-evaluation of new social interactions and facial expressivity. ***Secondary Measures:*** Facial expressivity in video task (OpenFace software). ***Results:*** Appearance dissatisfaction and facial expressivity suppression were significantly greater in individuals with facial palsy compared to the control group. Social anxiety and facial expressivity suppression predicted the quality of self-evaluated social interactions in individuals with facial palsy. Further research is needed to determine whether self-focus of attention influences facial expressivity. ***Discussion:*** Findings highlight the challenges individuals with facial palsy may face in social situations and recommend tailoring psychological interventions for individuals with facial palsy that experience social anxiety and appearance dissatisfaction. Areas for future research are discussed.

Keywords*:* Facial Palsy, Social Anxiety, Facial Expressivity, Appearance Satisfaction, Social Interactions

Introduction

Facial palsy (FP) results from damage to the facial nerve, causing a range of issues including altered facial appearance and function impairment, leading to difficulty eating, drinking, hearing, eye closure and speaking (Shindo, 1999). Individuals with FP report the inability to express emotion as the most distressing symptom (Bradbury et al., 2006), and that living with the condition has increased their awareness of the importance of facial expression in social interactions (Hamlet et al., 2021).

Appearance changes arising from FP contribute to increased anxiety, social withdrawal, and low self-esteem (Hotton et al., 2020). Individuals often report FP negatively impacts their appearance confidence, leading them to avoid mirrors and worry about how others perceive them (Hamlet et al., 2021). Despite this, appearance dissatisfaction and social anxiety has not been extensively researched in individuals with FP (Siemann et al., 2023). In a Delphi study, deeper insight into the psychological impact of FP was viewed a research priority (Hamlet et al., 2018). Emerging FP research has identified an association between greater use of avoidant coping and greater social and appearance anxiety (Siemann et al., 2023). However, no research compares social anxiety prevalence between those with and without FP. Research may help tailor psychological interventions specifically targeting social anxiety and appearance concerns in this population, supporting emerging pilot intervention studies (Hotton et al., 2022).

The human face is critical in social interactions, providing nonverbal cues regarding individuals' emotions (Frith, 2009). Smiling communicates positive intentions and promotes social connection (Heerey & Gilder, 2019). Emotional contagion and mimicry occur when exchanging facial expressions; when this process is disrupted, social interactions are impaired causing significant psychosocial distress (Dijk et al., 2018). Hence, producing fewer facial expressions creates considerable disadvantage during social interactions. Visible difference in individuals with unilateral FP is often exacerbated by impaired facial movement, as facial expression increases facial asymmetry. Individuals may restrict expressivity to minimise disfigurement, which can be perceived negatively by others, increasing social anxiety and withdrawal (Bradbury et al., 2006).

The cognitive social anxiety model (Clark & Wells, 1995) attributes safety-seeking behaviours as a maintaining factor of social anxiety. Safety-seeking behaviours provide self-protection from exposure to a feared outcome (Goetz et al., 2016); self-concealment strategies prevent negative self-evaluation (Clark & Wells, 1995; Moscovitch, 2009). As individuals with unilateral FP report concerns about others' judgement on their appearance, suppressing smiling is hypothesised as a safety-seeking behaviour, minimising facial disfigurement (Bradbury et al., 2006). Research shows smiling, which increases facial asymmetry, does not significantly change the attractiveness of paralyzed faces to casual observers, suggesting advantages of conveying facial expression outweigh the disadvantage of increased facial disfigurement (Ishii et al., 2011).

Suppression of facial expression may prevent the feared negative appraisal, but with severe implications on social interaction, increasing social anxiety and withdrawal (Bradbury et al., 2006). Suppressing facial expressions reduces conveyance of emotions and intentions (George, 2013), associated with poorer social wellbeing, negative first impressions and lower social support (Chervonsky & Hunt, 2017). Research investigating facemask-wearing in non-clinical participants highlighted it as a physical barrier to others' interpreting emotional feedback (Kastendieck et al., 2022).

Consequently, the reliance of suppression or masking of facial expressions as a safety behaviour can impair social performance; this increases social anxiety and withdrawal, despite the individual perceiving the behaviour as anxiety-reducing (Moscovitch et al., 2013). The negative feedback loop (Clarke, 1999 & Partridge, 1998) illustrates how individual's own behaviour detrimentally influences others' responses. Negative self-image and others' negative reactions leads to behavioural responses including shyness, avoidance, or aggression, further impacting self-image and other's reactions.

Clark and Wells' (1995) cognitive social anxiety model assumes self-focus of attention (SFA) and a negative self-view increases perceived social danger, maintaining social anxiety. Seeing oneself on camera during socially interactive tasks increases SFA in socially anxious participants (Bolt et al., 2014). Manipulating SFA, through mirrors or self-video, demonstrates its effect on social anxiety and safety behaviours, particularly relevant in today's world with virtual meetings. As individuals with FP have been shown to report social anxiety (Pattinson et al., 2021), heightened SFA may increase facial expressivity suppression as a safety-seeking behaviour.

Research Questions and Hypotheses

The study aimed to address the following questions:

1) Do individuals with FP report greater social anxiety relative to the general population?

Hypothesis 1: Compared to the control group, participants in the FP group will report greater social anxiety (measured by Social Phobia Inventory (SPIN)).

2) Do individuals with FP report reduced appearance satisfaction relative to the general population?

Hypothesis 2: Compared to the control group, participants in the FP group will report reduced appearance satisfaction (measured by Body Esteem Scale for Adolescents and Adults (BESAA) – Appearance subset).

3) Do individuals with FP engage in greater deliberate suppression of facial expressions relative to the general population?

Hypothesis 3: Compared to the control group, participants in the FP group will report greater deliberate suppression of facial expressions (measured by Visual Analogue Scale (VAS))

4) Do individuals with FP report a more negative self-evaluation of new social interactions relative to the general population?

Hypothesis 4: Compared to the control group, participants in the FP group will report greater negative self-evaluations of new social interactions (measured by VAS).

5) Do social anxiety, appearance satisfaction and facial expressivity predict self-evaluation of new social interactions in individuals with FP, whilst controlling for facial function?

Hypothesis 5: Social anxiety (SPIN), facial expressivity (VAS) and appearance satisfaction (BESAA) will each predict self-evaluation of social interaction (VAS) in the clinical group, when controlling for self-reported facial function (measured by Facial Disability Inventory (FDI)).

Exploratory research questions are:

6) Does seeing oneself on camera increase facial expressivity suppression in both groups?

Hypothesis 6: Facial expressivity suppression (measured by Action Units (AU)) increases in both groups when self-view-camera is on, compared to when self-view-camera is off.

7) Does seeing oneself on camera moderate the relationship between social anxiety and facial expressivity suppression in individuals with facial palsy?

Hypothesis 7: Camera condition (self-view on/off) moderates the relationship between social anxiety (SPIN) and facial expressivity (AUs) in individuals with FP.

Method

Design

The study employed a cross-sectional design. Participants completed an online survey and experimental task using the Gorilla Research Platform. The experimental task utilised a 2 (group; between-factor) x2 (camera condition; within-factor) x2 (type of facial expressivity; within-factor) mixed design.

Patient and Public Involvement

Facial Palsy UK charity consulted on study aims and materials and supported recruitment. Two individuals with FP were consulted with to adjust wording of participant adverts and pilot the task.

Ethics

Oxford University Central University Research Ethics Committee (CUREC; Reference number R84230/RE001; Appendix 3.A) approved the study. All participants provided informed consent.

Joint working

This project was coordinated with a related trainee project recruiting from the same clinical population. Trainee collaboration on data collection was approved by research supervisors (Appendix 3.B).

Participants

The study included 172 participants (eighty-seven with FP and eighty-five controls). Of these, twenty-five participants with FP and thirty-two control participants completed Part 2 of the study (video task). Forty-three of these videos (nineteen with FP, twenty-four controls) were eligible for analysis; confidence rating of >75%.

Inclusion/Exclusion Criteria

Participants experiencing acquired unilateral FP, to maximise homogeneity of symptom severity, were recruited via social media and Facial Palsy UK. The control group was recruited from the general population via social media, snowball sampling and word of mouth. Following recruitment of the FP group, control participants were recruited by asking participants and colleagues to share with friends; social media adverts on Facebook and Instagram were targeted to audiences matching demographic characteristics to the FP group. Following data collection, statistical analyses were then used to compare demographic characteristics between groups.

Inclusion criteria:

- 18+ years of age
- Any gender
- Current unilateral, acquired FP diagnosis (FP group only)
- English-speaking
- Internet access
- Capacity to consent

Exclusion criteria:

- Neurodevelopmental condition diagnosis (e.g., autism spectrum disorder)
- Using medication affecting psychological/neurocognitive functioning

These were excluded to avoid possible confounding effects on outcomes (e.g., social anxiety).

Power Analysis

Using Kastendieck et al.'s (2022) conservative effect size (f = .15) for hypothesis 1, a priori power analysis was computed using the G*Power analysis (Faul et al., 2013). With an alpha level of 0.05 and aiming for 95% power, the required sample size was approximately N = 148. Allowing for 10% data attrition, the recruitment target was 82 participants for each group. For the video task analysis, the novelty of the task in assessing facial expressivity suppression within a FP population meant a power calculation was not implemented. Instead, all participants completing self-report measures were invited to take part in the video task, offering an opportunity to pilot the task and report on preliminary findings.

Measures

Demographic measures (gender, age, ethnicity, educational attainment) were collected.

FP information

The physical function subset of the Facial Disability Index (FDI) (Vanswearingen & Brach, 1996) was administered to evaluate FP impairment. The subscale produces reliable scores (theta reliability: = .88) (Vanswearingen & Brach, 1996); it was used to infer if disability or the behavioural response of facial expressivity suppression predicts self-evaluation of social interaction.

Social anxiety

The Social Phobia Inventory (SPIN) (Connor et al., 2000) uses 17 items to effectively measure severity of social anxiety. It exhibits acceptable psychometric properties (Connor et al., 2000).

Appearance satisfaction

The Body Esteem Scale for Adolescents and Adults (BESAA) appearance sub-scale measures general feelings about appearance. The scale is easy-to-administer and psychometrically sound (Mendelson et al., 2001).

Facial expressivity

Participants completed a Visual Analogue Scale (VAS) rating how much they suppress their facial expression during social interactions. The VAS is validated in research as a self-report measure (Facco et al., 2013). For the video task, OpenFace 2.0 (Baltrusaitis et al., 2018), analysed facial activity through Action Units (AU) as classified in the Facial Action Coding System (Ekman & Friesen, 1978); AUs are individual components of muscle movement used to measure the presence and intensity of all anatomically based facial movements. Research shows good to excellent inter-reliability for the occurrence, intensity, and timing of individual AUs (Sayette et al., 2001). Lower AU scores indicate reduced facial expressions. AU6-r measured eye movement intensity (orbicularis oculi - cheek raiser), and AU12-r measured smile movement intensity (zygomatic major - lip corner puller) (Farnsworth, 2019; Ekman & Friesen, 1971). Detection confidence is computed by OpenFace via a separate confidence network trained to predict the expected landmark detection error (Drimalla et al., 2020). All frames that were not tracked successfully or with a detection confidence below 75% were excluded; as guided by facial expressivity research

(Drimalla et al., 2020). OpenFace 2.0 is shown to reliably measure action units; evidenced across three public data sets (Baltrusaitis et al., 2018).

Social Outcomes

A VAS measured self-evaluation of new social interactions, consisting of four statements: 'I find getting to know people… pleasant/not pleasant; When meeting people I come across as… confident/not confident; I find getting to know someone new… easy/not easy; Meeting people for the first time is… exciting/not exciting.' The scale, made up of a composite score of all four items, had a high level of internal consistency in the current study, determined by a Cronbach's alpha of 0.89.

Depression

The Depression, Anxiety, Stress Scale-21 (DASS-21) measures depression, anxiety, and stress (Lovibond & Lovibond, 1995) with high internal consistency and concurrent validity (Antony et al., 1998). The depression subscale was used to control for potential confounding effects of mood on social anxiety and appearance satisfaction.

Alexithymia

Research indicates that alexithymia traits affect nonverbal expression of emotion (Wagner & Lee, 2008). The Toronto Alexithymia Scale (TAS-20) (Bagby et al., 1994) measures differences in alexithymia traits, which may impact facial expressivity, controlling a potential confounding variable in the analysis. The scale shows strong reliability and validity (Bagby et al., 1994).

Empathy

The Interpersonal Reactivity Index (IRI; Davis, 1983) assesses empathy; it is easy-to-use with acceptable psychometric properties (Carey et al., 1988). Empathy was measured to account for potential confounding effects on quality of social interactions, facial expressivity suppression and social anxiety.

Procedure

Participants read the information sheet via Qualtrics platform. After signing the consent form, participants were provided with a unique identification code which enabled them to withdraw their data by emailing researchers by 31st March 2024. They then completed the study on Gorilla Research platform. A debrief page signposting links for mental-health support was provided. The task consisted of two parts, taking approximately one hour.

Part 1

Participants completed self-report measures then either completed Part 2 or entered their email address to receive a link and later complete Part 2.

Part 2

Participants were given a brief video/audio test then shown two brief clips of individuals describing positive experiences (videos extracted from Ong et al., (2021)). After each clip, participants were instructed to briefly discuss a positive experience in response to the clips (simulating a social interaction). Self-view-camera was on in one video response and off in the other; this order alternated to counterbalance any repeat effects.

Statistical-Analyses

Data was analysed using SPSS (Version 29.0.1.0). Histograms, P-plots, and Q-plots were visually inspected for data normality. Normally distributed data was analysed using parametric tests; where data violated parametric assumptions, appropriate non-parametric tests were run, or data transformed. In the video task analysis, the small sample size meant statistical analyses were likely underpowered. However, providing an opportunity for preliminary analysis of a novel approach, data was analysed using appropriate tests for the hypotheses. Findings are reported, although caution is warranted in interpreting the results, given conclusions are unable to be drawn. No outliers were removed from the analyses. Differences in outcome variables were compared between participants that completed the video task and those that did not, using chi-square tests for gender and ethnicity, Mann-Whitney U test for age, and 2x2 ANOVAs (FP/control x completed/did not complete video task) for alexithymia, social anxiety, depression, appearance satisfaction, facial expressivity, and social outcomes.

A hierarchical multiple regression was used to determine which of the independent variables predicted the self-evaluation of social interactions in the FP group. Order and choice of variables were determined by the author: to remove the impact of functional impairment of FP, the FDI was the first variable added to the model. Next, alexithymia and depression measures were added to control for the effects of these covariates. The addition of social anxiety, facial expressivity, and appearance satisfaction assessed possible causal effects when predicting the outcome variable. A separate hierarchical multiple regression model was run for the control group, without the FDI.

Results

Participant Demographics

Table 1 shows descriptive statistics of participant demographics. There were no significant group differences regarding gender, $\chi^2(1, N = 171) = 1.83, p = .18$, ethnicity, $\chi^2(1, N = 171) = 3.553, p = .06$, education attainment $\chi^2(3, N = 171) = 1.97, p = .58$, or age, $U = 3785, z = .27, p = .79$.

Table 1

Participant Demographics.

	FP Group (n=87)	Control Group (n=85)	Total (n=172)
Gender			
Female	81	73	154
Male	6	11	17
Other	0	1*	1
Age			
Range	27-84	21-80	21-84
Mean (SD)	52.59 (11.7)	51.54 (14.3)	52.07 (13.0)
Ethnicity**			
White	80	70	150
Mixed/Multiple	2	4	6
Asian/Asian British	3	8	11
Black/African/Caribbean/Black British	2	2	4
Other	0	1	1
Education Attainment			
Left school at 14-16	8	10	18
Left school at 18	5	7	12
Undergraduate degree	27	19	46
Postgraduate degree	47	49	96
Facial Palsy Group:			
Duration of FP (months)			
Range	0***-502		
Mean (SD)	95.2 (120.5)		
Diagnosis			
Bell's Palsy	55		
Ramsay Hunt Syndrome	14		
Acoustic Neuroma	9		
Salivary Gland Tumour	3		
Nonspecific	2		
Cavernoma Bleed	1		

Inteaneural Perineurioma of Cranial Nerves	1
Unspecified	1
Cholesteatoma	1
Laterality	
Left side	24
Right-side	28
Not stated	35

**To not violate chi-square assumptions, non-binary participant was removed from gender comparisons between groups. **To not violate chi-square assumptions, ethnicity data was transformed into 'white' and 'non-white'. ***0 = diagnosis of < 2 weeks.*

Potential Confounds

An independent-samples t-test demonstrated differences in alexithymia (TAS-20) between groups. Participants with FP scored significantly higher (*M* = 51.63, *SD* = 14.83) than the control participants (*M* = 45.65, *SD* = 10.43; *M* = -5.99, 95% CI [-9.84, -2.13], *t*(154.52) = -3.067, *p* = .003. A Mann-Whitney U test demonstrated differences in depression (DASS-depression subset) between groups. Participants with FP (*Mdn* = 57) scored significantly higher than control participants (*Mdn* = 53), *U* = 2284.5, *z* = -4.36, *p* = <.001. Therefore, depression and alexithymia were included as co-variates in the main analysis. An independent-samples t-test determined no differences in empathy (IRI scores) between groups, *M* = 0.16, 95% CI [-3.91, 4.23], *t*(164) = .076, *p* = .94.

Main Analysis

1) Do individuals with FP report greater social anxiety relative to the general population?

A Mann-Whitney U test determined social anxiety was significantly higher in participants with FP (*Mdn* = 20) than in controls (*Mdn* = 12), *U* = 2698, *z* = -3.06, *p* = .002. After adjusting for covariates, an ANCOVA determined no significant difference in social anxiety between groups, *F*(1, 168) = .32, *p* = .57, pη^2 = .002. See Table 2 for relevant means and standard deviations.

Table 2

Adjusted and Unadjusted Means and Variability for Social Anxiety, with Alexithymia and Depression as covariates.

		Unadjusted		Adjusted	
	N	M	SD	M	SE
Facial Palsy	87	23.85	16.09	20.84	1.27
Control	85	16.71	13.32	19.80	1.29

Note: N = number of participants. M = Mean. SD = Standard Deviation. SE = Standard Error.

Percentage of social anxiety scores above clinical threshold in each group were compared using chi-square test; significant group differences were found, $\chi^2(1, N = 172) = 6.21$ $p = .01$. Table 3 presents observed frequencies and percentages of social anxiety scores above clinical threshold for each group.

Table 3

Crosstabulation of Social Anxiety Scores Above/Below Clinical Threshold and Group.

Group		Above Clinical Threshold* (%)	Below Clinical Threshold (%)
Facial Palsy	87	45 (52)	42 (48)
Control	85	28 (33)	57 (67)

**>19 on SPIN = above clinical threshold.*

2) Do individuals with FP report reduced appearance satisfaction relative to the general population?

An ANCOVA determined appearance satisfaction was significantly greater in the control group compared to the FP group after adjusting for covariates, $F(1, 168) = 56.15$, $p < .001$, $p\eta^2 = .25$. Table 4 shows relevant means and standard deviations.

Table 4

Adjusted and Unadjusted Means and Variability for Appearance Satisfaction, with Alexithymia and Depression as covariates.

		Unadjusted		Adjusted	
	N	M	SD	M	SE

Facial Palsy	87	11.89	7.78	12.89	14.43
Control	85	22.45	7.61	21.42	22.98

Note: N = number of participants. M = Mean. SD = Standard Deviation. SE = Standard Error.

3) Do individuals with FP engage in greater deliberate suppression of facial expressions relative to the general population?

An ANCOVA determined deliberate facial expressivity suppression was greater in the FP group compared to controls after adjusting for covariates, $F(1, 156) = 12.79$, $p < .001$, $p\eta^2 = .08$. Table 5 shows relevant means and standard deviations.

Table 5

Adjusted and Unadjusted Means and Variability for Facial Expressivity, with Alexithymia and Depression as covariates.

		Unadjusted		Adjusted	
	N*	M	SD	M	SE
Facial Palsy	83	0.87	0.48	0.86	0.05
Control	81	0.59	0.44	0.59	0.05

*Note: N = number of participants. M = Mean. SD = Standard Deviation. SE = Standard Error. *8 missing data cases.*

4) Do individuals with FP report a more negative self-evaluation of new social interactions relative to the general population?

An ANCOVA determined the FP group reported greater negative self-evaluation of new social interactions compared to controls after adjusting for covariates, $F(1, 160) = 13.64$, $p < .001$, $p\eta^2 = .08$. Table 6 shows relevant means and standard deviations.

Table 6

Adjusted and Unadjusted Means and Variability for Self-Evaluation of Social Interactions, with Alexithymia and Depression as covariates.

		Unadjusted		Adjusted	
	N*	M	SD	M	SE
Facial Palsy	80	6.34	2.09	6.13	0.21
Control	80	4.76	1.85	4.98	0.22

*Note: N = number of participants. M = Mean. SD = Standard Deviation. SE = Standard Error. *12 missing data cases.*

5) Do social anxiety, appearance satisfaction and facial expressivity predict self-evaluation of new social interactions in individuals with FP, whilst controlling for facial function?

A hierarchical multiple regression determined whether social anxiety, appearance satisfaction, and self-reported facial expressivity predicted self-evaluation of new social interactions when controlling for facial function, depression, and alexithymia. Table 7 shows full details on each regression model. Model 1 was significant, $R^2 = .08$, $F(1, 78) = 7.01$, $p < .010$, with facial function positively predicting social ratings (increased facial function predicted greater negative social ratings). The addition of alexithymia and depression (Model 2) led to a non-significant increase in R^2 of .05, $F(2, 76) = 2.10$, $p = .13$; the model was not improved by addition of these variables. The addition of appearance satisfaction, social anxiety and facial expressivity (Model 3) led to a significant increase in R^2 of .44, $F(3, 73) = 25.28$, $p < .001$. Coefficients of Model 3 show appearance satisfaction was not significant ($p = .49$), whereas social anxiety and facial expressivity were significant ($p < .001$); greater social anxiety and suppression of facial expressivity predicted more negative self-evaluation of new social interactions. Model 3 was significant, adjusted $R^2 = .57$, $F(6, 73) = 16.36$, $p < .001$.

Table 7

Hierarchical Multiple Regression Analysis.

	Step 1		Step 2		Step 3	
Variable	B	β	B	β	B	β
Constant	22.72**		29.73*		19.36*	
FDI - Physical	.30*	.29	.26	.24*	.050	.05
DASS-Depression			-.44	-.23	-.12	-.06
TAS			.02	.015	.23	.18
SPIN					-.63**	-.46
BESAA					.17	.06
Facial Expressivity					1.54**	.53
R^2	.08		.13		.57	
F	7.01*		3.80*		16.36**	
⊿ R^2	.08		.05		.44	
△ F	7.01*		2.10		25.28**	

*Note. N = 80. *p<0.5, ** p<.001.*

For the control group, Table 8 shows full details on each regression model. Model 1 was significant, $R^2 = .18$, $F(2, 77) = 8.63$, $p < .001$; alexithymia and depression predicted social ratings (increased alexithymia and depression predicted greater negative social ratings). The addition of appearance satisfaction, social anxiety and facial expressivity (Model 2) led to a significant increase in R^2 of .51, $F(3, 74) = 16.60$, $p < .001$. Coefficients of Model 2 show all variables were significant; social anxiety (p =.002), appearance satisfaction (p =.030), and facial expressivity (p <.001).

Table 8

Hierarchical Multiple Regression Analysis.

	Step 1		Step 2	
Variable	B	β	B	β
Constant	79.27**		68.03**	
DASS-Depression	-.547*	-.26	.08	.04
TAS	-.44*	-.26	-.05	-.03
SPIN			-.50*	-.35
BESAA			.58*	.25
Facial Expressivity			-6.76**	-.40
R^2	.18		.51	
F	8.63**		15.51**	
⊿ R^2	.18		.33	

△ *F*	8.63**	16.60**

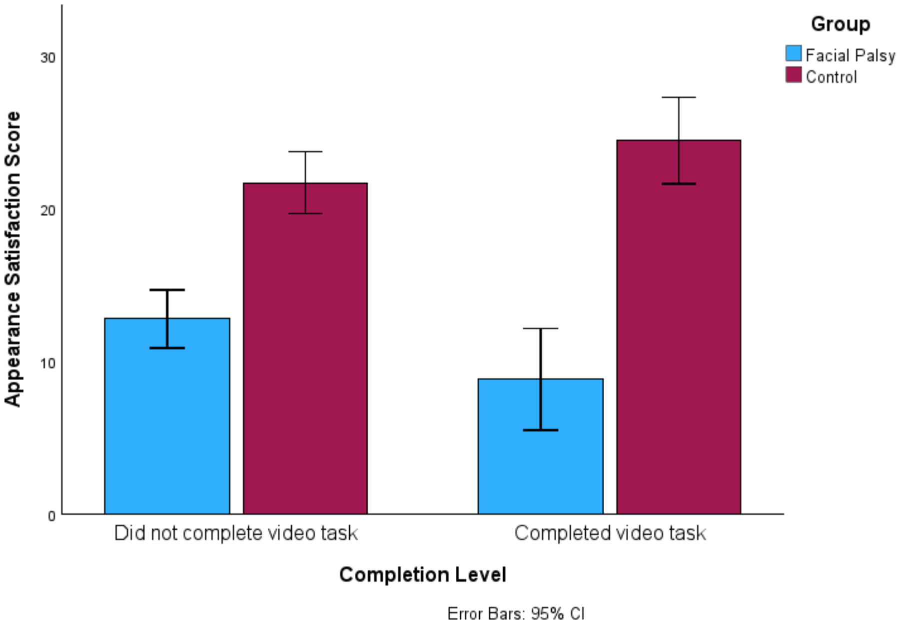
*Note. N = 80. *p<0.5, ** p<.001.*

Exploratory Analysis

Differences in outcome variables were compared between those who completed versus did not complete the video task. There were no significant differences between groups in any variables; however for appearance satisfaction the ANOVA showed a significant interaction between group (FP/control) and level of completion on appearance satisfaction, $F(1, 168) = 6.20$, $p = .014$, $p\eta^2 = .04$; those with FP who completed the video task had reduced appearance satisfaction than those who did not, while controls showed no difference, see Figure 1.

Figure 1

Appearance Satisfaction Score Group Differences.



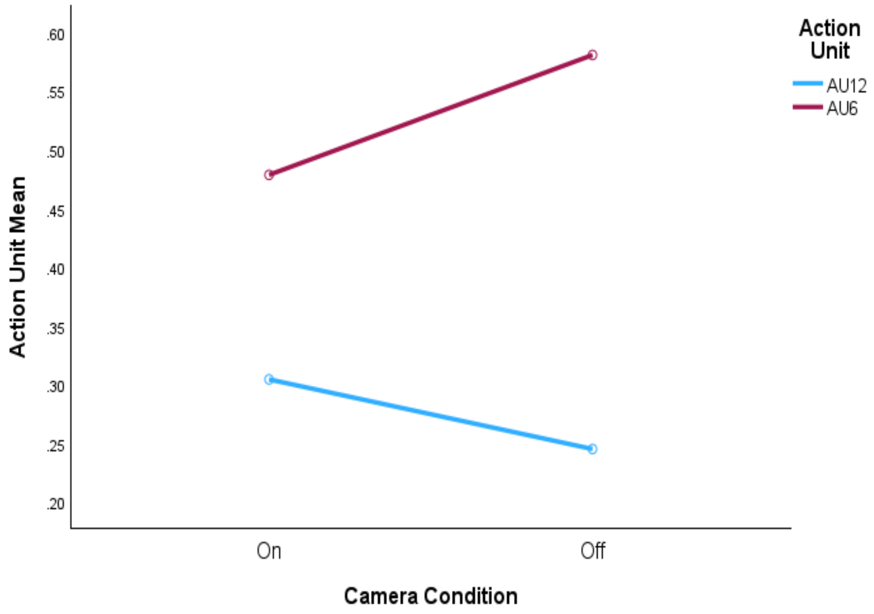
6) Does seeing oneself on camera increase facial expressivity suppression in both groups?

A three-way mixed ANOVA was run to understand the effects of group (control/FP), camera condition (self-view camera on/off) and facial expressivity action unit (AU) (mouth (AU12) or eye (AU6)) on facial expressivity score. There was no significant main effect of group, *F*(1, 41) = 102.40, *p* = .49, or camera condition, *F*(1, 41) = .000, *p* = .10. There was a significant main effect of AU, *F*(1, 41) = 8.53, *p* = .006. AU6 (eye movement) was significantly higher (M =.52, SE =.06) than AU12 (mouth movement), (M=.35, SE =.06). There was no significant two-way interaction between group and camera condition, *F*(1, 41) = .58, *p* = .45, or group and facial expressivity, *F*(1, 41) = 2.06, *p* = .16. There was a significant two-way interaction between camera condition and AU, *F*(1, 41) = 10.09, *p* = .003, with mouth movement decreasing and eye movement increasing with the camera off. While the three-way interaction was not significant, F(1, 41) = 3.73, p = .06, $p\eta^2$ = .08, Figure 2 shows AU12 (mouth movement) decreased when camera condition was off in both groups, and AU6 (eye movement) increased when camera was off for FP group only.

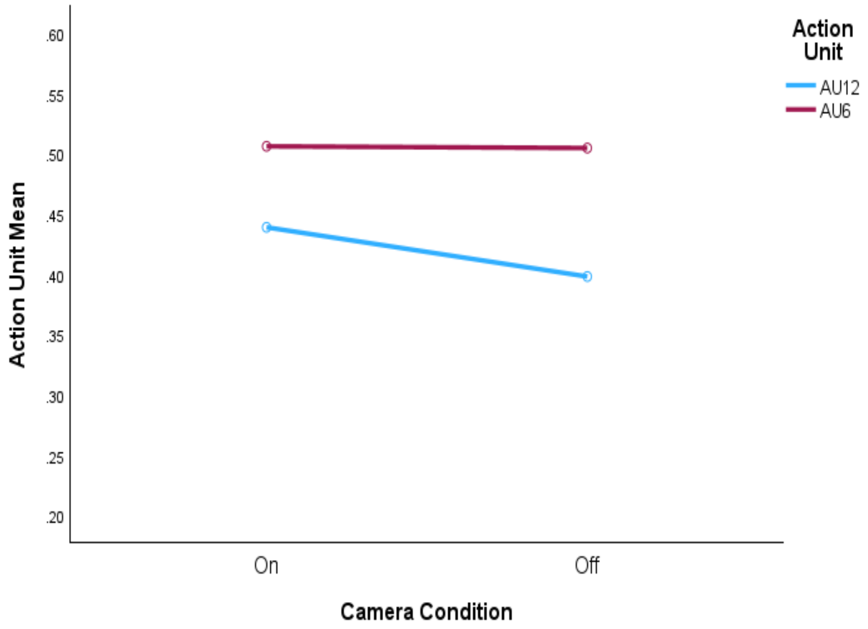
Figure 2

Mean AU scores for Camera Conditions and Groups.

Facial Palsy Group



Control Group



7) Does seeing oneself on camera moderate the relationship between social anxiety and facial expressivity suppression in individuals with facial palsy?

A moderation analysis was performed using the PROCESS tool. The outcome variable was facial expressivity (total AUs), predictor variable was social anxiety (SPIN), and potential moderator was camera condition (on/off). Results are presented in Table 8. Social anxiety and camera conditions were not independent predictors of facial expressivity. The interaction between camera condition and social anxiety was not significant; camera condition did not moderate the relationship between social anxiety and facial expressivity.

Table 9

Moderation Analysis.

	b	***SE B***	***t***	***p***
Constant	.83	.14	6.14	.00
Social Anxiety	-.002	.01	-.20	.84
Camera Condition	-.04	.19	-.23	.82
Interaction	-.003	.02	-.19	.85

Note. N = 43.

Discussion

The present study investigated differences in social anxiety, appearance satisfaction, deliberate suppression of facial expressivity and self-rated quality of new social interactions between participants with FP and controls. Results did not support our first hypothesis; social anxiety did not differ between FP and control groups when controlling for alexithymia and depression. However, findings supported our second hypothesis; the FP group reported reduced appearance satisfaction compared to controls. Our third hypothesis, that participants with FP would self-report greater suppression of facial expressions than controls, was supported by the findings. Participants with FP reported a more negative self-evaluation of new social interactions than controls, supporting our fourth hypothesis. Results provide partial support for our fifth hypothesis: social anxiety and facial expressivity were significant predictors of social interaction self-evaluations in individuals with FP even when controlling for facial function, depression, and alexithymia traits; appearance satisfaction was not a significant predictor. In the control group, social anxiety, appearance satisfaction and facial expressivity significantly predicted social interaction self-evaluations whilst controlling for depression and alexithymia.

For hypotheses six and seven, the limited sample size meant conclusions could not be established due to lack of statistical power. Although camera condition did not appear to impact facial expressivity in both groups, nor moderate a relationship between social anxiety and facial expressivity in the FP group, caution is warranted in interpreting these results and calls for further research to draw conclusions.

Differences in appearance satisfaction between groups is consistent with emerging research of individuals with FP reporting low appearance confidence (Hamlet et al., 2021). Despite social anxiety in individuals with FP reported in the literature (Siemann et al., 2023), we did not find differences between individuals with FP and controls; this is the first study comparing social anxiety levels with a control group. There were large differences between groups for unadjusted social anxiety (see Table 2); supported by a significant Mann-Witney U test. Moreover, participants with FP were more likely to meet clinical threshold for social anxiety than controls. The non-significant ANCOVA, controlling depression and alexithymia, suggests that while social anxiety differences exist between those with FP and controls, these factors may explain differences in social anxiety. Depression levels were greater in the FP group compared to controls; given participants with FP reported greater appearance dissatisfaction and negative new social interactions, they may engage in greater avoidance of social situations (Norris et al., 2019). Possibly, reduced quality of social interactions and increased social isolation increases depression in this population rather than social anxiety (Thompson & Kent, 2001). Despite this, social anxiety, not depression, predicted individuals with FP negatively self-evaluating themselves in new social interactions. Although not possible to test within the cross-sectional design, avoidance due to social anxiety may consequently lead to depression (Siemann et al., 2023). Future research could improve understanding of the relationship between these variables. Additionally, variety of FP symptom duration may help explain findings, with newly diagnosed participants perhaps less likely to experience social anxiety.

Facial expressions are important for positive social interactions (Dijk et al., 2018; Frith, 2009). Our findings show participants with FP more greatly suppress facial expressions and more negatively self-evaluate new social interactions. Moreover, reduced self-reported facial expressivity predicted participants with FP negatively self-evaluating themselves in new social interactions whilst controlling for facial function impairment, alexithymia, and depression. This was a greater predictor than appearance satisfaction, highlighting the potential importance of facial expressivity over appearance. in individuals with FP. Despite individuals with FP reporting greater appearance dissatisfaction than controls, appearance satisfaction was a significant predictor of social interaction self-evaluations in the control group only. Possibly FP influences the importance an individual places appearance satisfaction in social interactions. Qualitative research exploring the role of appearance satisfaction and social performance in individuals with FP may provide greater understanding of this finding. Findings align with the negative feedback loop (Clarke, 1999; Partridge, 1998); negative self-image leads to facial expression suppression, reducing quality of social interactions.

This is the first study to investigate facial expressivity via a video task in individuals with FP to the author's knowledge. Although conclusions regarding significance of video task findings must be tentative due to the limited sample size, piloting this task highlights considerations for further research; . recruiting participants to take part in a task involving a video recording was challenging given the prevalence of heightened social and appearance anxiety in this population (Siemann et al., 2023). Additionally, several videos did not meet confidence levels required to accurately detect facial expressions. Inviting participants to complete the study in-person reduces the likelihood of poor-quality recordings, whilst widening recruitment to people who do not own a desktop/webcam. Interestingly, participants with FP that completed the video task showed reduced appearance satisfaction than those that did not complete it, highlighting the need for qualitative research to better understand this effect.

An incidental finding was that alexithymia levels were higher in the FP group compared to the control group. Recent research suggests individuals with congenital FP have difficulty identifying certain emotions (Lomoriello et al., 2023). Potentially, results can be attributed to the importance of facial mimicry for understanding others facial expressions (Wood et al., 2016).

Clinical Implications

Findings highlight the need to tailor psychological interventions for individuals with FP who report social anxiety or distress in social interactions, advocating psychological interventions including social skills training and psychoeducation to emphasise the importance of facial expressivity in social interactions. Suppressing facial expressions is associated with poorer social performance (Chervonsky & Hunt, 2017). Heightened facial asymmetry does not impact how casual observers rate participants level of attraction (Ishii et al., 2011); suggesting the advantage of facial expressivity despite visible difference. Negative social performance is associated with poorer mental health outcomes (Dijk et al., 2018), therefore incorporating possible consequences of expressivity suppression into clinical formulations enables greater insight into how this behaviour may maintain psychological distress. Early application of these interventions may help prevent the development of worsening social outcomes, in turn improving psychological symptoms associated with reduced social outcomes, such as depression and social anxiety (Thompson & Kent, 2001). Findings show individuals with FP risk developing depression and appearance dissatisfaction, consistent with previous research (Hotton et al., 2020; Siemann et al., 2023). Psychological screening for these factors would determine individuals who would benefit from psychological intervention.

Limitations and Future Directions

Given the cross-sectional study design, causal conclusions cannot be drawn. Longitudinal, experimental designs would establish relationship directions. Reliance on self-report measures limits validity and led to difficulty interpreting whether facial expressivity suppression was due to deliberate suppression or physical impairment. Future research could include observer ratings of participants social interactions and facial expressivity, additionally using a formal projective assessment of facial expressivity in participants with FP e.g., Sunnybrook Rating Scale (Ross et al., 1996), or House Brackman Scale (House & Brackmann, 1985). The video task data was likely underpowered due to small sample sizes, caused by difficulty recruiting participants and low-quality video recordings. A laboratory set-up would allow higher-quality recordings to detect facial expression accurately (e.g., better lighting) in addition to widening recruitment to individuals who do not own a desktop/webcam.

Conclusion

This study found that compared to controls, individuals with FP report significantly higher levels of appearance dissatisfaction, facial expression suppression, depression, alexithymia, and negative self-evaluation of new social interactions. Greatest predictors of self-evaluation in new social interactions in individuals with FP were social anxiety and suppression of facial expressivity. Findings provide knowledge for tailored psychological interventions, whilst raising awareness of challenges individuals with FP may face in social settings.

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Executive Summary

Why did we do this study?

Facial Palsy (FP) is a condition that causes weakness of facial muscles due to damage or injury to the facial nerve. When individuals with FP express emotion such as smiling, their face can become more asymmetrical. Previous research shows that individuals can experience distress at the visible difference caused by the condition and may receive negative judgement from others. Therefore, individuals with FP may experience greater levels of social anxiety and appearance dissatisfaction. This may cause them to deliberately suppress facial expressions when in social situations, to reduce visible difference caused by facial asymmetry. This can impact on the quality of new social interactions, as human-beings rely greatly on facial expressions in social situations to identify and communicate emotion. Research also suggests that seeing one’s own face in social situations (e.g., on camera during a video call) heightens awareness of our self-image, which may increase social anxiety. In individuals with FP, this may mean they are more likely to suppress facial expressions as a way of masking the visible difference caused by the condition.

Our research aimed to investigate whether individuals with FP show greater levels of social anxiety and appearance dissatisfaction to the general population, and whether they suppress facial expressions further in social situations. We then wanted to find out if these factors impact how individuals evaluate their performance in new social interactions. An additional aim was to explore whether seeing oneself on camera in a social situation may increase facial expressivity suppression.

This research is important in understanding how we provide appropriate therapeutic approaches for individuals with FP experiencing social anxiety and appearance dissatisfaction. Additionally, this research aims to impact at a wider level in raising awareness of the difficulties individuals with FP may face in social interactions.

How was the study carried out?

People with FP advised in the design of the study. Adults with FP were recruited through social media and through the Facial Palsy UK charity. To compare people with FP to the general population, a control group of adults without FP was recruited via social media. Both groups took part in online questionnaires to measure social anxiety, appearance satisfaction, facial expressivity, and self-evaluation of new social interactions. Participants were then given the option to complete a video task, which involved watching a brief video of an actor talking about a positive experience; participants then had to provide a brief response to the video by talking about a personal positive experience (as if in a new social situation). To measure the impact of seeing oneself on camera, participants completed this task twice; in one round they could see themselves on camera, and in the other they could not. Facial expressivity was recorded by a computer software programme.

What did the study find?

Eighty-seven individuals with FP and eighty-five individuals without FP completed the questionnaires in the study. Of these, nineteen individuals with FP and twenty-four individuals without FP completed the video task, which measured facial expressivity. Most participants were white females. The study found that FP individuals had higher levels of appearance dissatisfaction, depression, poorer self-evaluation of new social interactions, and greater suppression of facial expressions than those without FP. It also found that in individuals with FP, those with higher levels of social anxiety and facial expressivity suppression were more likely to rate new social interactions more negatively. There was not enough data for the video task to show whether there were significant differences in facial expressivity levels between individuals with and without FP, or whether facial expressivity was impacted by self-view camera being on or off. Further research with a larger sample size is required.

What did we conclude?

It is important to be aware that FP individuals face challenges in new social situations. This research shows that tailoring psychological interventions to support FP individuals is needed, with a focus on reducing facial expressivity suppression, and improving appearance satisfaction and social outcomes.

Connecting Narrative

Embarking on this thesis has allowed me to develop my research skills and more greatly appreciate the research process. Initially, I was excited to be carving out my own research journey; although given the time limitations of the course, it felt daunting to know I would have to learn and adapt quickly from setbacks and obstacles along the way. I was open to ideas and met with several potential supervisors in various research fields; however, I found myself gravitating to research topics that I had clinical experience in. Having worked in Health Psychology settings prior to training, I was excited by the prospect of furthering understanding of psychological factors relating to physical health conditions. For me, it felt meaningful to contribute research towards a clinical population where public knowledge of the condition is limited, therefore raising awareness of the psychological impact is crucial. This selection process was similar when deciding on my service improvement project, with my experience of working in a Learning Disability service highlighting to me the worthwhile endeavour of improving accessibility of services. For my systematic review, this was an opportunity to expand my knowledge of attachment and social cognition. Given the ever-growing interest in how attachment influences mental health, I was drawn to understanding the underlying mechanisms of this relationship.

A theme connecting all my projects is the importance of social connection on mental health and barriers people may face in achieving this, including insecure attachment style, communication impairments and suppression of facial expressions. I hope my research provides a meaningful contribution in raising awareness and highlighting possible avenues to improve individuals' interpersonal experiences and thereby reduce psychological distress.

Service Improvement Project (SIP)

I started with this project as I was fortunate to have been assigned a placement in the Oxford Learning Disability team. Having the opportunity to observe an initial assessment, I was surprised at the length of these appointments and the amount of information being passed around the room. It felt motivating to not only use resources that were originally developed by service users, but also to address an issue they had highlighted. Once the resources were launched across the teams, it was encouraging to have several clinicians requesting more keyring aids. Despite this, it was a struggle getting clinicians to collect service user feedback of the resources. This meant I had to rely more on clinicians' feedback of resources which felt a shame to not encapsulate more of service users' views, given they were the drivers behind the project. However, the service user and carer feedback gathered was positive, and clinicians feedback helped to understand how the resources improve the efficiency and effectiveness of the initial assessment, which indirectly would likely improve service users' experiences. It felt rewarding to present the findings to all teams and hear that the resources were being routinely used. Seeing how projects can impact on service user, carer and clinicians' experiences has motivated me to conduct similar projects in the future.

Systematic Literature Review (SLR)

Out of all my projects, I had initially thought this project would feel most manageable, given it was not reliant on waiting for ethnical approval or participant recruitment. However, I quickly realised my naivety to the time required for an SLR. This project took considerable time to develop; I knew that I wanted to focus on attachment's influence on mental health outcomes but felt lost in the variety and breadth of literature. My supervisor suggested speaking with a trainee in the year above to advise on how to narrow down my research question, this was immensely helpful. I then found the review paper which postulated the neuroanatomical model of attachment; this framed my project and once I had a specific question, I felt much more confident in carrying out the literature search. I was grateful to be working alongside a second-rater who was experienced with SLR's and happy to share their advice on data screening and extraction. It was helpful to gain experience critiquing papers ahead of my theory-driven project to highlight possible research biases.

Theory-Driven Research Project (TDRP)

Although facial palsy was a new concept to me, my interest in supporting people with this condition quickly grew, driven by my supervisor's enthusiasm and experience in the area, alongside meeting experts with lived experience. When recruiting through social media, I joined various Facebook community groups and was inspired by the amazing support these communities provided. I found it a valuable experience interacting with participants directly to address any research queries and felt moved by the community being so supportive of the research; along with the findings, this enabled me to see how life-changing this condition is and I greatly empathised with the frustrations of this community in the lack of public awareness of the condition. Although excited by the amount of people that wanted to take part in the research, I had underestimated the technical issues and anxieties surrounding a video task, especially for individuals that are distressed by how they look. Hindsight is a wonderful thing; should I hopefully carry out research with this population again, I would pay greater attention to engaging participants in potential anxiety-provoking tasks. This was a steep learning curve for me in understanding how research can easily go awry and learning how to be flexible and adaptive in changing recruitment strategies to gather participants; for example, providing a video advert to encourage participation of the video task, and amending the ethics application to split the study into two parts (questionnaires and video task), enabling participants to complete the questionnaires on their phone and then the video task on a desktop later.

Overall, producing this thesis has provided me with a new appreciation of the research skills that psychologists have to offer to the NHS and multi-disciplinary teams. Although admittedly stressful at times, I feel proud of my research journey and have learnt a great deal along the way. Hopefully I can continue developing these skills in my future career.

Acknowledgements

I am very grateful to all the participants for their valuable time and effort in participating in these projects; this would not have been possible without them. I hope to disseminate the results in a meaningful way to do their contribution justice. A huge thank you to Facial Palsy UK for supporting me with my TDRP recruitment.

Thank you to my research supervisors Matt, Danielle, Siobhan, Emily, Nicola, and Fin for being consistently available, knowledgeable, and very patient with my many questions. An added thank you to Matt for his excellent support as my course tutor. Finally thank you to my fellow trainees, for all the moral support and many laughs over the last three years.

Appendix 1.A: SRL Search-Terms

“Attachment Style" OR "Attachment System" OR “Attachment Orientation” OR “Attachment Security” OR "Insecure Attachment" OR "Anxious Attachment" OR "Avoidant Attachment"

AND

“Emotion* Process*” OR “Social Cognition” OR “Social Information Processing” OR “Social Behaviour” OR “Mentalisation/Mentalization” OR “Emotion* Regulat*” OR “Emotion* Dysregul* OR “Theory of Mind” OR “Emotion Recognition” OR “Self-Regulation” OR “Attribution” OR “Face Perception” OR “Social Perception” OR “Emotion Perception” OR “Social Inference”

AND

“Affective Disorder” OR “Depression” OR “Anxiety” OR “Mood Disorder” OR “Unipolar Depression” OR “Postpartum Depression” OR “Atypical Depression” OR “Seasonal Affective Disorder” OR “Bipolar Disorder” OR “Dysthymia” OR “Cyclothymia” OR “Generalised Anxiety Disorder” OR “Panic” OR “Phobia” OR “Agoraphobia” OR “Obsessive Compulsive Disorder” OR “Post-Traumatic Stress Disorder”

Please note, Affective Disorders included were defined by the International Society for Affective Disorders (ISAD) (https://www.isad.org.uk/) which states affective disorders include: Unipolar Depression and its variants including Postpartum Depression, Atypical Depression, Seasonal Affective Disorder, Bipolar Disorder, Dysthymia and Cyclothymia; Generalised Anxiety Disorder; Panic Disorder; Social Phobia; Phobias including Agoraphobia, Obsessive Compulsive Disorder, Post-traumatic stress disorder.

Appendix 1.B: SRL Quality Assessment Tool

(National Institutes of Health, 2014)

National Institute of Health (NIH) Study Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies			
Criteria	*Yes*	*No*	*Other (CD, NR, NA)**
1. Was the research question or objective in this paper clearly stated?			
2. Was the study population clearly specified and defined?			
3. Was the participation rate of eligible persons at least 50%?			
4. Were all the subjects selected or recruited from the same or similar populations (including the same time period)? Were inclusion and exclusion criteria for being in the study pre-specified and applied uniformly to all participants?			
5. Was a sample size justification, power description, or variance and effect estimates provided?			
6. For the analyses in this paper, were the exposure(s) of interest measured prior to the outcome(s) being measured?			
7. Was the timeframe sufficient so that one could reasonably expect to see an association between exposure and outcome if it existed?			
8. For exposures that can vary in amount or level, did the study examine different levels of the exposure as related to the outcome (e.g., categories of exposure, or exposure measured as continuous variable)?			
9. Were the exposure measures (independent variables) clearly defined, valid, reliable, and implemented consistently across all study participants?			

10. Was the exposure(s) assessed more than once over time?			
11. Were the outcome measures (dependent variables) clearly defined, valid, reliable, and implemented consistently across all study participants?			
12. Were the outcome assessors blinded to the exposure status of participants?			
13. Was loss to follow-up after baseline 20% or less?			
14. Were key potential confounding variables measured and adjusted statistically for their impact on the relationship between exposure(s) and outcome(s)?			
**CD, cannot determine; NA, not applicable; NR, not reported*			
Quality rating: Good/Fair/Poor (see guidance)			

Appendix 1.C: SRL Journal Submission Guidelines for Behaviour Research and Therapy

The major focus of *Behaviour Research and Therapy* is an experimental psychopathology approach to understanding emotional and behavioural disorders and their prevention and treatment, using cognitive, behavioural, and psychophysiological (including neural) methods and models. This includes laboratory-based experimental studies with healthy, at risk and subclinical individuals that inform clinical application as well as studies with clinically severe samples. The following types of submissions are encouraged: theoretical reviews of mechanisms that contribute to psychopathology and that offer new treatment targets; tests of novel, mechanistically focused psychological interventions, especially ones that include theory-driven or experimentally-derived predictors, moderators and mediators; and innovations in dissemination and implementation of evidence-based practices into clinical practice in psychology and associated fields, especially those that target underlying mechanisms or focus on novel approaches to treatment delivery. In addition to traditional psychological disorders, the scope of the journal includes behavioural medicine (e.g., chronic pain). The journal will not consider manuscripts dealing primarily with measurement, psychometric analyses, and personality assessment.

The Editor and Associate Editors will make an initial determination of whether or not submissions fall within the scope of the journal and/or are of sufficient merit and importance to warrant full review.

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This Journal recommends including your original trial protocol as supplementary material using the SPIRIT reporting guidelines when preparing the original protocol. If the original protocol has already been published please instead include a link to it in the main text of your paper.

For meta-analysis, the PRISMA (http://www.prisma-statement.org/?) guidelines should be followed; authors should present a flow diagramme and attach with their cover letter the PRISMA checklist. For systematic reviews it is recommended that the PRISMA guidelines are followed, although it is not compulsory.

While regular-length papers have no explicit limits in terms of numbers of words, tables/figures, and references, authors are encouraged to keep their length below 35 total pages. A paper's length must be justified by its empirical strength and the significance of its contribution to the literature.

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Appendices

If there is more than one appendix, they should be identified as A, B, etc. Formulae and equations in appendices should be given separate numbering: Eq. (A.1), Eq. (A.2), etc.; in a subsequent appendix, Eq. (B.1) and so on. Similarly for tables and figures: Table A.1; Fig. A.1, etc.

Essential title page information

- ***Title.*** Concise and informative. Titles are often used in information-retrieval systems. Avoid abbreviations and formulae where possible.
- ***Author names and affiliations.*** Please clearly indicate the given name(s) and family name(s) of each author and check that all names are accurately spelled. You can add your name between parentheses in your own script behind the English transliteration. Present the authors' affiliation addresses (where the actual work was done) below the names. Indicate all affiliations with a lower-case superscript letter immediately after the author's name and in front of the appropriate address. Provide the full postal address of each affiliation, including the country name and, if available, the e-mail address of each author.
- ***Corresponding author.*** Clearly indicate who will handle correspondence at all stages of refereeing and publication, also post-publication. This responsibility includes answering any future queries about Methodology and Materials. **Ensure that the e-mail address is given and that contact details are kept up to date by the**

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- ***Present/permanent address.*** If an author has moved since the work described in the article was done, or was visiting at the time, a 'Present address' (or 'Permanent address') may be indicated as a footnote to that author's name. The address at which the author actually did the work must be retained as the main, affiliation address. Superscript Arabic numerals are used for such footnotes.

Highlights

Highlights are mandatory for this journal as they help increase the discoverability of your article via search engines. They consist of a short collection of bullet points that capture the novel results of your research as well as new methods that were used during the study (if any). Please have a look at the examples here: example Highlights.

Highlights should be submitted in a separate editable file in the online submission system. Please use 'Highlights' in the file name and include 3 to 5 bullet points (maximum 85 characters, including spaces, per bullet point).

Abstract

A concise and factual abstract is required with a maximum length of 200 words. The abstract should state briefly the purpose of the research, the principal results and major conclusions. An abstract is often presented separately from the article, so it must be able to stand alone. For this reason, References should be avoided, but if essential, then cite the author(s) and year(s). Also, non-standard or uncommon abbreviations should be avoided, but if essential they must be defined at their first mention in the abstract itself.

Graphical abstract

Although a graphical abstract is optional, its use is encouraged as it draws more attention to the online article. The graphical abstract should summarize the contents of the article in a concise, pictorial form designed to capture the attention of a wide readership. Graphical abstracts should be submitted as a separate file in the online submission system. Image size: Please provide an image with a minimum of 531 × 1328 pixels (h × w) or proportionally more. The image should be readable at a size of 5 × 13 cm using a regular screen resolution of 96 dpi. Preferred file types: TIFF, EPS, PDF or MS Office files. You can view Example Graphical Abstracts on our information site.

Keywords

Immediately after the abstract, provide a maximum of 6 keywords, to be chosen from the APA list of index descriptors. These keywords will be used for indexing purposes.

Abbreviations

Define abbreviations that are not standard in this field in a footnote to be placed on the first page of the article. Such abbreviations that are unavoidable in the abstract must be defined at their first mention there, as well as in the footnote. Ensure consistency of abbreviations throughout the article.

Acknowledgements

Collate acknowledgements in a separate section at the end of the article before the references and do not, therefore, include them on the title page, as a footnote to the title or otherwise. List here those individuals who provided help during the research (e.g., providing language help, writing assistance or proof reading the article, etc.).

Formatting of funding sources
List funding sources in this standard way to facilitate compliance to funder's requirements:

Funding: This work was supported by the National Institutes of Health [grant numbers xxxx, yyyy]; the Bill & Melinda Gates Foundation, Seattle, WA [grant number zzzz]; and the United States Institutes of Peace [grant number aaaa].

It is not necessary to include detailed descriptions on the program or type of grants and awards. When funding is from a block grant or other resources available to a university, college, or other research institution, submit the name of the institute or organization that provided the funding.

If no funding has been provided for the research, it is recommended to include the following sentence:

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Shorter communications
This option is designed to allow publication of research reports that are not suitable for publication as regular articles. Shorter Communications are appropriate for articles with a specialized focus or of particular didactic value. Manuscripts should be between 3000-5000 words, and must not exceed the upper word limit. This limit includes the abstract, text, and references, but not the title page, tables and figures.

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General points
- Make sure you use uniform lettering and sizing of your original artwork.
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- Aim to use the following fonts in your illustrations: Arial, Courier, Times New Roman, Symbol, or use fonts that look similar.
- Number the illustrations according to their sequence in the text.
- Use a logical naming convention for your artwork files.
- Provide captions to illustrations separately.
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- Ensure that color images are accessible to all, including those with impaired color vision.

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You are urged to visit this site; some excerpts from the detailed information are given here.
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EPS (or PDF): Vector drawings, embed all used fonts.
TIFF (or JPEG): Color or grayscale photographs (halftones), keep to a minimum of 300 dpi.
TIFF (or JPEG): Bitmapped (pure black & white pixels) line drawings, keep to a minimum of 1000 dpi.
TIFF (or JPEG): Combinations bitmapped line/half-tone (color or grayscale), keep to a minimum of 500 dpi.

Please do not:

- Supply files that are optimized for screen use (e.g., GIF, BMP, PICT, WPG); these typically have a low number of pixels and limited set of colors;
- Supply files that are too low in resolution;
- Submit graphics that are disproportionately large for the content.

Tables

Please submit tables as editable text and not as images. Tables can be placed either next to the relevant text in the article, or on separate page(s) at the end. Number tables consecutively in accordance with their appearance in the text and place any table notes below the table body. Be sparing in the use of tables and ensure that the data presented in them do not duplicate results described elsewhere in the article. Please avoid using vertical rules and shading in table cells.

References

Citation in text

Please ensure that every reference cited in the text is also present in the reference list (and vice versa). Any references cited in the abstract must be given in full. Unpublished results and personal communications are not recommended in the reference list, but may be mentioned in the text. If these references are included in the reference list they should follow the standard reference style of the journal and should include a substitution of the publication date with either 'Unpublished results' or 'Personal communication'. Citation of a reference as 'in press' implies that the item has been accepted for publication.

Web references

As a minimum, the full URL should be given and the date when the reference was last accessed. Any further information, if known (DOI, author names, dates, reference to a source publication, etc.), should also be given. Web references can be listed separately (e.g., after the reference list) under a different heading if desired, or can be included in the reference list.

Data references

This journal encourages you to cite underlying or relevant datasets in your manuscript by citing them in your text and including a data reference in your Reference List. Data references should include the following elements: author name(s), dataset title, data repository, version (where available), year, and global persistent identifier. Add [dataset] immediately before the reference so we can properly identify it as a data reference. The [dataset] identifier will not appear in your published article.

Preprint references

Where a preprint has subsequently become available as a peer-reviewed publication, the formal publication should be used as the reference. If there are preprints that are central to your work or that cover crucial developments in the topic, but are not yet formally published, these may be referenced. Preprints should be clearly marked as such, for example by including the word preprint, or the name of the preprint server, as part of the reference. The preprint DOI should also be provided.

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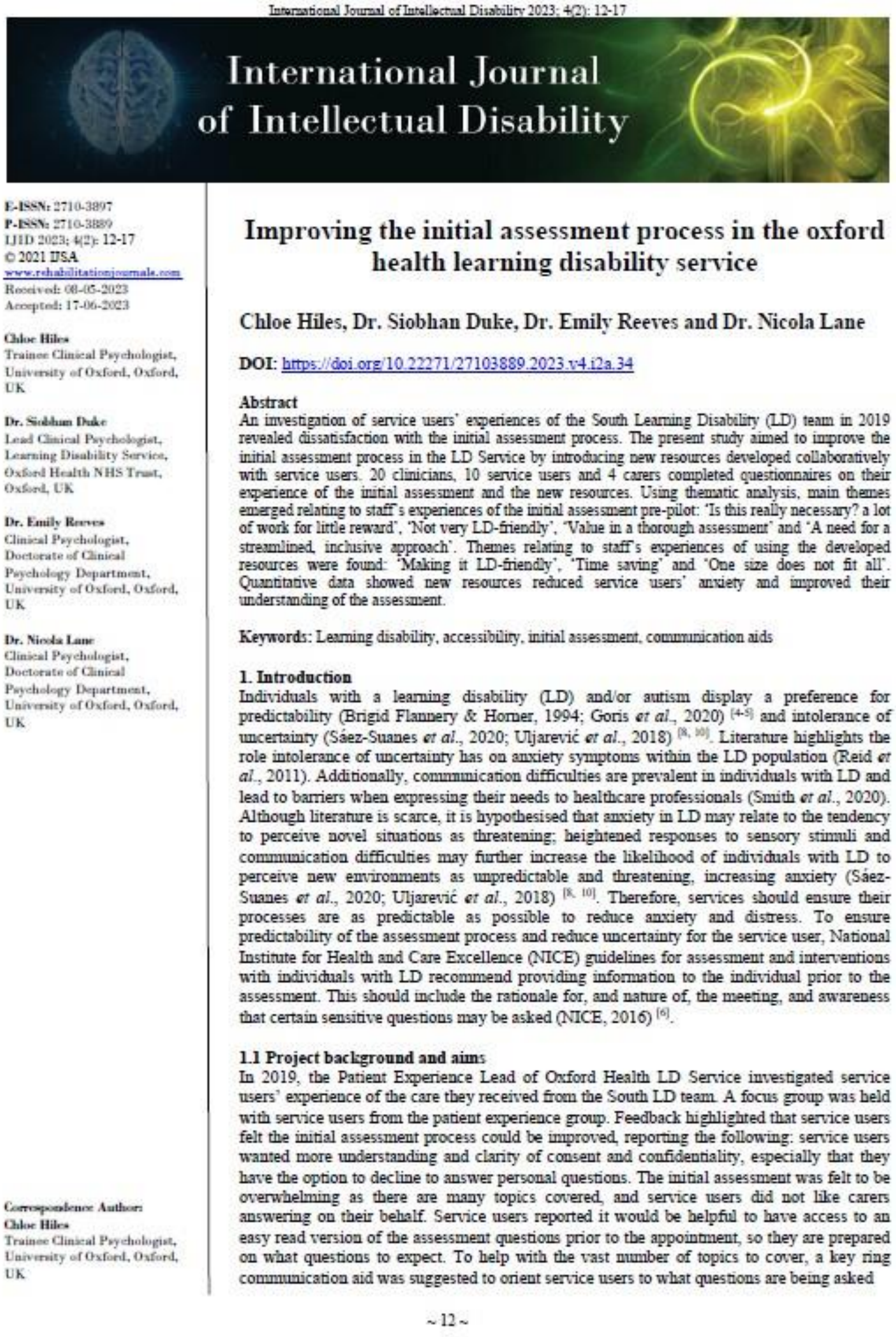
Appendix 1.D: SRL Paper Highlights

The proposed journal specifies that ‘highlights are mandatory’. These consist of three to five bullet points (maximum 85 characters, including spaces, per bullet point). The following highlights are proposed for the current paper:

- Exploring the link between attachment, social cognition, and affective disorders.
- 23 studies were systematically reviewed and narratively synthesised.
- Majority of papers were rated of fair quality.
- Insecure attachment is linked to impaired social cognition, supporting ‘NAMA’.
- Social cognition is associated with attachment and affective disorder symptomology.

Appendix 2.A: SIP Published Manuscript



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Chloe Hiles
Trainee Clinical Psychologist,
University of Oxford, Oxford,
UK

Dr. Siobhan Duke
Lead Clinical Psychologist,
Learning Disability Service,
Oxford Health NHS Trust,
Oxford, UK

Dr. Emily Reeves
Clinical Psychologist,
Doctorate of Clinical
Psychology Department,
University of Oxford, Oxford,
UK

Dr. Nicola Lane
Clinical Psychologist,
Doctorate of Clinical
Psychology Department,
University of Oxford, Oxford,
UK

Correspondence Author:
Chloe Hiles
Trainee Clinical Psychologist,
University of Oxford, Oxford,
UK

Improving the initial assessment process in the oxford health learning disability service

Chloe Hiles, Dr. Siobhan Duke, Dr. Emily Reeves and Dr. Nicola Lane

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Abstract

An investigation of service users' experiences of the South Learning Disability (LD) team in 2019 revealed dissatisfaction with the initial assessment process. The present study aimed to improve the initial assessment process in the LD Service by introducing new resources developed collaboratively with service users. 20 clinicians, 10 service users and 4 carers completed questionnaires on their experience of the initial assessment and the new resources. Using thematic analysis, main themes emerged relating to staff's experiences of the initial assessment pre-pilot: 'Is this really necessary? a lot of work for little reward', 'Not very LD-friendly', 'Value in a thorough assessment' and 'A need for a streamlined, inclusive approach'. Themes relating to staff's experiences of using the developed resources were found: 'Making it LD-friendly', 'Time saving' and 'One size does not fit all'. Quantitative data showed new resources reduced service users' anxiety and improved their understanding of the assessment.

Keywords: Learning disability, accessibility, initial assessment, communication aids

1. Introduction

Individuals with a learning disability (LD) and/or autism display a preference for predictability (Brigid Flannery & Horner, 1994; Goris *et al.*, 2020) [4-5] and intolerance of uncertainty (Sáez-Suanes *et al.*, 2020; Uljarević *et al.*, 2018) [8, 10]. Literature highlights the role intolerance of uncertainty has on anxiety symptoms within the LD population (Reid *et al.*, 2011). Additionally, communication difficulties are prevalent in individuals with LD and lead to barriers when expressing their needs to healthcare professionals (Smith *et al.*, 2020). Although literature is scarce, it is hypothesised that anxiety in LD may relate to the tendency to perceive novel situations as threatening; heightened responses to sensory stimuli and communication difficulties may further increase the likelihood of individuals with LD to perceive new environments as unpredictable and threatening, increasing anxiety (Sáez-Suanes *et al.*, 2020; Uljarević *et al.*, 2018) [8, 10]. Therefore, services should ensure their processes are as predictable as possible to reduce anxiety and distress. To ensure predictability of the assessment process and reduce uncertainty for the service user, National Institute for Health and Care Excellence (NICE) guidelines for assessment and interventions with individuals with LD recommend providing information to the individual prior to the assessment. This should include the rationale for, and nature of, the meeting, and awareness that certain sensitive questions may be asked (NICE, 2016) [6].

1.1 Project background and aims

In 2019, the Patient Experience Lead of Oxford Health LD Service investigated service users' experience of the care they received from the South LD team. A focus group was held with service users from the patient experience group. Feedback highlighted that service users felt the initial assessment process could be improved, reporting the following: service users wanted more understanding and clarity of consent and confidentiality, especially that they have the option to decline to answer personal questions. The initial assessment was felt to be overwhelming as there are many topics covered, and service users did not like carers answering on their behalf. Service users reported it would be helpful to have access to an easy read version of the assessment questions prior to the appointment, so they are prepared on what questions to expect. To help with the vast number of topics to cover, a key ring communication aid was suggested to orient service users to what questions are being asked in each part of the appointment. This project aimed to understand the initial assessment experience from a staff and service user experience, then implement new resources into the initial assessment process over a four-month period (Dec 2022 - Mar 2023) and evaluate how they impact the initial assessment process from both service user and staff perspective.

2. Method

2.1 Participants

34 participants (20 clinicians, 10 service users and 4 carers) took part in the study using purposive sampling (see below). Participants included individuals with a LD who completed an initial assessment with the LD team between December 2022 to March 2023. Where service users were unable to provide a response due to a communication impairment, carers were asked to complete a questionnaire assessing their experience of the assessment. Participants were LD service staff, across the North, City and South Oxfordshire teams, who completed an initial assessment between Dec 2022 to Mar 2023.

2.2 Design

This study used thematic analysis; a qualitative method which involves identifying, analysing, and reporting themes in data. Questionnaires with a mixture of open-ended and closed questions were developed, based upon the 2019 review of the initial assessment and the author's research aims.

2.3 Ethical Considerations

All data was anonymised to prevent identification of individuals. Project approval was granted by the Service Governance Committee.

2.4 Procedure

Resources were developed collaboratively with the Patient Experience group. The resources were: an easy-read version of the Initial Assessment questions, to be sent out to service users prior to their appointment; and a Keyring Aid, a communication aid using simplified language and images to orient services users to different topics discussed in the Initial Assessment. Over a four-month period, resources were distributed in all initial assessments within the Oxford Health LD service. Prior to the initial assessment, all referred service users were sent the easy-read Initial Assessment Questions. All staff conducting initial assessments were provided with a Keyring Aid. Following the initial assessment, if consented, service users (or carers if service users were unable to provide a response) were provided with questionnaires asking for feedback on the resources and the initial assessment process. Upon completion of the trial period (March 2023), staff who led initial assessments were emailed a post-implementation questionnaire to reflect on their experience of the initial assessment using the new resources.

3. Results

Closed questions were analysed using descriptive statistics. Thematic analysis was conducted on all open-ended questions, as outlined by Braun & Clarke, (2006) [1].

3.1 Themes

Staff's perspectives of the Initial Assessment (prior to implementation of the resources)

1. Is this really necessary? A lot of work for little reward

Relevance of the process

Staff questioned the necessity of the process; particularly around how useful it is to collect the information at that point in time: "It is overly lengthy and unnecessary; much of it should be completed by clinicians upon allocation rather than prior to considering whether the person will even be picked up by the team" (S17). Staff reflected on the usefulness of the information: "we collect a lot of info which doesn't get used" (S14); "Sometimes we focus on getting a lot of general information and lose sight of the referral need" (S6).

Uncomfortable questions

Staff wrote about their discomfort at asking sensitive questions: "I am asking a person to reveal an awful lot to me without being able to give them a certain indication of the benefit this will bring to them" (S17). This led to staff feeling self-conscious when describing the process to service users and carers: "Sometimes embarrassing explaining the process of what we do" (S1).

Time is of the essence

A concern for staff appeared to be the time taken to complete the process: "it can be a long process and to be doing this on top of your clinical work you can easily lose a whole day to work that isn't related to your caseload". (S18). This extended to the concern of the time taken for service users: "if support workers are involved & they have limited time funded time to give support - I'm not sure this is best for client that their support is used for this particular assessment?" (S15). Often staff find themselves rushing through the assessment to complete the topics, which may lead to incomplete information gathering: "I often find myself having to rush through the second half of the IA and the risk assessment more" (S3).

2. Not very LD-friendly

Service users' feelings

Staff reflected on the initial assessment experience from the perspective of service users: "it can be quite invasive and overwhelming for the patient" (S13). Staff wrote about noticing service users becoming confused and anxious during the appointment: "Sensitive questions can cause service users to look concerned or confused" (S11).

Service users' disengagement

Staff identified that often service users would not be included in the appointment: "sometimes the carer does not involve the patient as much as they would like as the process takes too long and is not person centred" (S13). Staff queried the accessibility of the appointment: "I don't think it is LD friendly at the moment." (S14). The non-person-centred approach can lead to service users disengaging: "Service users can become disengaged with a long appointment." (S11)

3. Value in a thorough assessment

Despite the drawbacks mentioned above, staff did comment on the benefits of having a thorough assessment in planning the best approach: "carers are really appreciative of a thorough assessment and consideration of who can help with what." (S16). Staff commented on how the process often led to the discovery of additional needs: "useful to check medications and medical diagnoses against our records (if we have them), and establishing unmentioned health needs that service users/family/carers may not have picked up on" (S5).

4. Need for a streamlined, inclusive process

An efficient way of working: Ideas of how to streamline the assessment were highlighted with a greater focus on the primary need: "Complete more initial assessments by profession, e.g., SLT completing dysphagia/communication referrals as a primary need, still collecting the other data as secondary needs, but focusing less on this." (S5). Staff wrote about how to condense the appointment: "more general information competed in advance by family/ carers" (S6).

Enabling a person-centred approach

Staff were keen to implement a process more accessible for service users: "I think for it to have a more accessible format to involve the SU would be great, as is being trialled." (S4).

Staff's perspective of the Initial Assessment (post implementation of the resources)

1. Making it LD-friendly

Greater inclusion and engagement: Staff wrote about the impact of the resources in engaging and including the service user, particularly the keyring aid: "It was a great way to make client feel more involved." (S1). It was noted that it was useful to engage service users even with communication impairments: "(they) did not have the communication skills to follow but enjoyed looking at the pictures and said "angry, sad" etc" (S4). Staff reflected on the visual aspect of the keyring aid: "I think the keyring aid is a great way to engage the service user. As it is visual, the service user can look at the images and point/comment on them" (S11).

Greater understanding and preparedness

Staff commented on how the resources, particularly the easy-read information sheet, aided service users understanding of the appointment: "easy read sheet was helpful in helping the service users and carers to be more prepared and know what to expect for the appointment." (S9). Staff also reflected on the use of asking the questions in the style of the questions on the easy-read information sheet: "I think the accessible sheet was useful to have as I used it to ask the questions in a more accessible way." (S12). Staff wrote that the keyring aid seemed to enable greater understanding for service users: "I found it helpful to orientate the client through themes of questions" (S2).

2. Timesaving

Staff wrote about the easy-read information sheet reducing the appointment time: "I found it reduces the time it takes me to do the assessment (because I just ask your simply worded questions and elaborate where needed rather than trying to ask around topics myself)" (S5). Staff reflected on the impact of the resources in improving efficiency: "I found it most useful to give the client the paper version whilst I typed answers straight onto the RiO form on my laptop" (S6).

3. One size does not fit all

Barriers to using the resources

Despite positive feedback, staff reflected on the differences in service users' responses to the resources: "for another they did not engage with it, it did not feel appropriate for them based on their ability level" (S9).

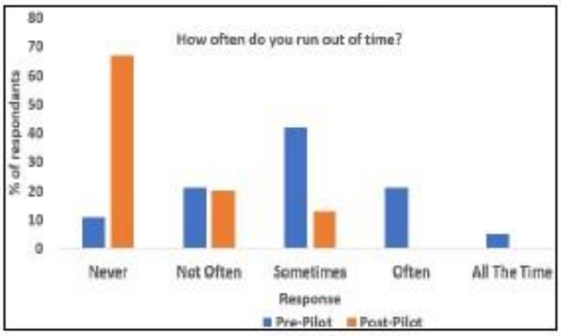
Suggestions for improving the resources

Staff requested the resources to include more questions specific to risk and to relationships/sex: "more general topics to be included, e.g. relationships (as well as sex) add in more questions about risk" (S6).

3.2 Descriptive Statistic

Figures 1a, b, c, d and e: Staff pre-pilot questionnaire vs post-pilot questionnaire data

Figure 1a shows that overall staff were less likely to run out of time in post-pilot assessments than pre-pilot assessments. Figures 1b and 1c show that staff were less likely to notice service users becoming confused and overwhelmed in assessments with the resources, compared to assessments without resources. Figures 1d and 1e show that staff were less likely to notice service users being anxious in post-pilot assessments. As different service users were present in each initial assessment, individual differences of service users, such as temperament, will contribute to the outcomes. However, the data shows an overall trend that service users in assessments with resources were less likely to be anxious, confused or overwhelmed, and staff were less likely to run out of time, compared to assessments without resources. This supports the qualitative feedback that the resources improved the LD-friendliness and efficiency of the assessment.



(a)

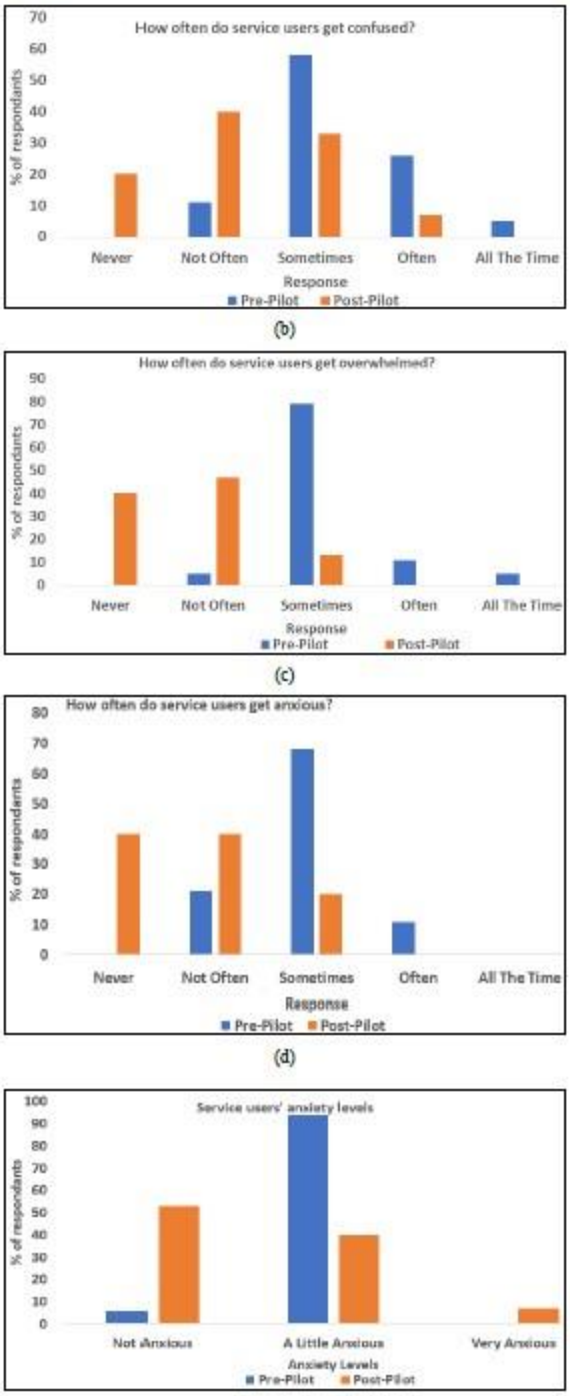


Fig 1: a, b, c, d and e: Staff pre-pilot questionnaire vs post-pilot questionnaire data

3.3 Complementary Information from Service Users and Carers

Due to limited feedback received from service users, qualitative data was added as complementary information rather than separately thematically analysed. Both service users and carers reflected on the impact of the keyring aid in engaging the service user: "Liked pointing at pictures and commenting on them, it was good" (C4); "I like looking at the pictures" (SU2). Service users wrote about how the keyring aid helped them understand topics in the appointment: "Reminds me of what you were saying and what the questions meant." (SU1); "Helped me understand the questions" (SU2). Carers appreciated the easy-read information sheet in preparing them for the appointment: "It was helpful to read through ahead of meeting to know what information was needed. We could then talk to (service user) about the meeting and let them know what questions were going to be asked." (C2). Service users all reported they did not wish to change the resources in any way. One carer suggested how to improve the practicality of the keyring aid: "Maybe on a stand that could be easier to use." (C2).

Overall, service users reported a good experience of the initial assessment (Tables 1 and 2 below).

Table 1: Service user feedback (N=10)

	Keyring Aid		Information Sheet	
	Yes (%)	No (%)	Yes (%)	No (%)
Easy to use?	70	30	90	10
Was it helpful?	70	30	100	0
Would you like to change it?	0	100	0	100

Table 2: Carer feedback (N=4)

	Keyring Aid		Information Sheet	
	Yes (%)	No (%)	Yes (%)	No (%)
Easy for service user to use?	75	25	75	25
Helped service user to feel more prepared?	N/A	N/A	100	0
Helped service user to understand the questions?	75	25	N/A	N/A
Helped service user to feel less anxious?	50	50	75	25

3.4 Researcher Bias

The author acknowledges that the thematic analysis process is subjective and therefore there is potential bias. The author attempted to prevent these biases by developing the service-user questionnaire with a patient experience group member, additionally deciding appropriate questions and sharing data with both supervisors to discuss codes and themes.

4. Discussion

The aim of this project was to evaluate the implementation of new resources in the initial assessment process of Oxford community LD services across a four-month period and assess how they impact the initial assessment from both staff, service user and carer perspectives. To evaluate their impact, a staff survey was used to understand staff's perspective of the initial assessment process prior to the new resources being trialled. Main themes that emerged from this were: 'Is this really necessary? A lot of work for little reward', 'Not very LD-friendly, 'Seeing value in a thorough assessment' and 'Need for a streamlined, inclusive process'. The 2019 review of the initial assessment process reported service users found the appointment overwhelming due to the vast number of topics and did not like carers answering on their behalf. They reported wanting more understanding and clarity, particularly around answering sensitive questions, an easy read version of questions prior to the appointment and a key ring aid to use in the session. Whilst there were some barriers to using the new resources and suggestions for improvement, such as adding risk assessment questions, using the recommended resources appeared to help service users understand the purpose of the assessment and reduced feelings of being overwhelmed.

4.1 Limitations

A major limitation of this study was low representation of feedback from service users. Only 10 service users and 4 carer questionnaires were collected, a low representation of service users who carried out initial assessments within the trial period. Additionally, pre-pilot and post-pilot assessments involved different service users; therefore, when comparing pre-pilot versus post-pilot data it is difficult to establish a causal effect between the resources and improved outcome.

5. Conclusion

Understanding staff and service users' views of the initial assessment, particularly around the need to ensure a person-centred approach and increase the efficiency of the process, are valuable in considering ways to conduct the initial assessment across all Oxford LD teams. The evaluation of the new resources justifies the consistent use of these resources in assessments, as overall they address the staff and service users concerns of the initial assessment process. Findings can be shared with other LD services to demonstrate the use of resources in improving accessibility and efficiency of initial assessments, meeting NICE guidelines, and improving the experience of the process from both a service user and clinician perspective. Considering the minor barriers in using the resources and suggestions on how to improve them enables the maximum benefits of these resources.

6. Recommendations

Based on the findings, recommendations were developed and disseminated to the LD community teams:

1. Add in more sensitive questions covering risk assessment and sex/relationships.
2. Provide an instruction sheet for clinicians on how best to use the resources whilst bearing in mind the person-centred approach and how to adapt for each individual.
3. Encourage clinicians to use the easy-read information sheet in the session (Asking the more accessibly

worded questions, providing a paper copy to the service user/carer to read through, writing straight into RiO template form to save time).

4. To increase efficiency of the appointment, consider asking carers/service users to complete more general information in advance of the appointment.
5. Consider the need to increase the accessibility and inclusivity of the process by involving the service user as much as possible, being aware of the fatigue and confusion the appointment can cause, asking questions in the most accessible way (Using the resources where possible to aid with this).
6. Honorary Assistant Psychologists to monitor any future changes in the RiO core assessment template and update the resources accordingly (perhaps reviewing on a 6 month basis.

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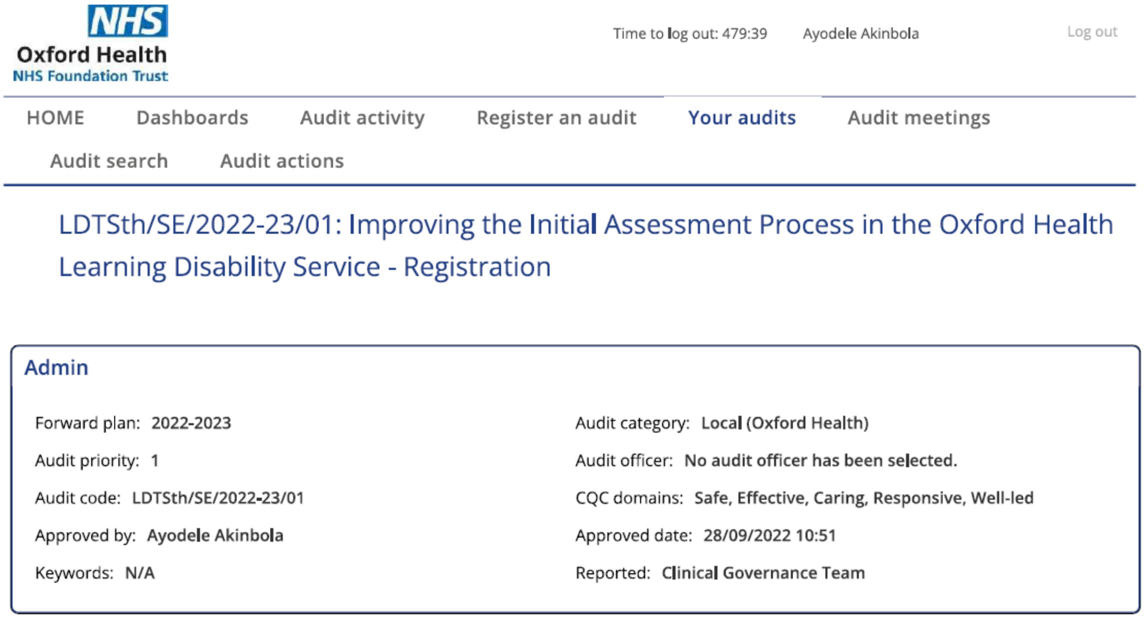
Appendix 2.B: SIP Clinical Governance Committee Approval



LDTSth/SE/2022-23/01: Improving the Initial Assessment Process in the Oxford Health Learning Disability Service - Registration

Admin

Forward plan: 2022-2023

Audit priority: 1

Audit code: LDTSth/SE/2022-23/01

Approved by: Ayodele Akinbola

Keywords: N/A

Audit category: Local (Oxford Health)

Audit officer: No audit officer has been selected.

CQC domains: Safe, Effective, Caring, Responsive, Well-led

Approved date: 28/09/2022 10:51

Reported: Clinical Governance Team

Appendix 2.C: SIP Clinician Questionnaires

Pre-Pilot Questionnaire:

1) What is your opinion of the current initial assessment process?

2) *a)* On average, how often do you run out of time to complete all the topics in the assessment?

(Never, Not often, Sometimes, Often, All the time)

b) Please expand further:

3) *a)* On average, how often do you notice service users becoming overwhelmed during the assessment?

(Never, Not often, Sometimes, Often, All the time)

b) Please expand further:

4) *a)* On average, how often do you notice service users becoming confused by the questions during the initial assessment?

(Never, Not often, Sometimes, Often, All the time)

b) Please expand further:

5) *a)* On average, how often do you notice service users being anxious in the initial assessment?

(Never, Not often, Sometimes, Often, All the time)

b) Please expand further:

6) *a)* On average, what anxiety levels do you notice service users experiencing in the initial assessment?

(Not anxious, a little anxious, very anxious)

b) Please expand further:

7) If you could change anything about the initial assessment process, what would it be?

Post-Pilot Questionnaire:

1) Roughly how many core assessments did you carry out using the new resource?

(1, 2-3, 4+)

2) Please comment on your experience of using the new resources in the core assessment.

3) Are there any ways you would improve the resources?

4) Please write any comments that service users or carers said to you about the new resources or the core assessment in general:

5) *a)* On average, how often did you run out of time to complete all the topics in the assessment?

(Never, Not often, Sometimes, Often, All the time)

b) Please expand further:

6) *a)* On average, how often did you notice service users becoming overwhelmed during assessment?

(Never, not often, sometimes, often, all the time)

b) Please expand further:

7) *a)* On average, how often did you notice service users becoming confused by the questions during the initial assessment?

(Never, Not often, Sometimes, Often, All the time)

b) Please expand further:

8) *a)* On average, how often did you notice service users being anxious in the initial assessment?

(Never, Not often, Sometimes, Often, All the time)

b) Please expand further:

9) *a)* On average, what anxiety levels did you notice service users experiencing in the initial assessment?

(Not anxious, a little anxious, very anxious)

b) Please expand further:

10) How easy do you think it was for service users to use the resources?

Appendix 2.D: SIP Service User Questionnaires

Survey

Please tell us what you think about your **appointment with our team.**

If there are any questions you do not want to answer leave them blank.

NHS
Oxford Health
NHS Foundation Trust

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1. What did you think about your appointment with our team?

☺ It was good ☐

😐 It was okay ☐

☹ It was bad ☐

? Don’t know ☐

2. Did you talk about everything you wanted to in your appointment with our team?

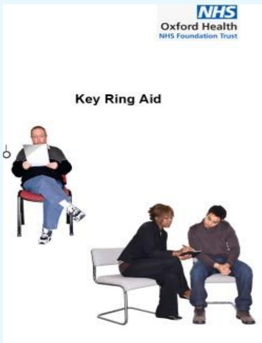
✓ Yes ☐

✗ No ☐

3. If you said no, what did you want to talk about?

---

4. Did you use the **Key Ring Aid** in your appointment with our team?



NHS
Oxford Health
NHS Foundation Trust

Key Ring Aid

✓ Yes ☐

✗ No ☐

5. Was the **Key Ring Aid** helpful to have in your appointment?

✓ Yes ☐

✗ No ☐

6. If you said yes please tell us why the **Key Ring Aid** helped.

7. If you said no please tell us why the **Key Ring Aid** did not help.

8. Was the **Key Ring Aid** easy to use?

✓ Yes ☐

✗ No ☐

9. Would you like to change the **Key Ring Aid?**

No ☐

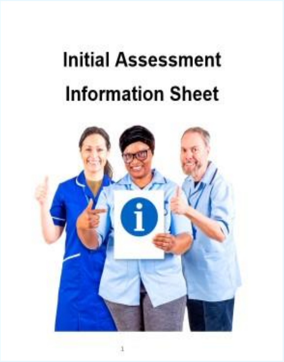
Aa Bigger word size ☐

Less words ☐

Other ☐

Please write your ideas here:

10. Did you read the **Information Sheet** before your appointment with our team?



Initial Assessment

Information Sheet

✓ Yes ☐

✗ No ☐

11. Was the **Information Sheet** easy to read?

✓ Yes ☐

✗ No ☐

12. Was the **Information Sheet** helpful to read before your appointment?

✓ Yes ☐

✗ No ☐

13. If you said yes please tell us why the **Information Sheet** helped.

14. If you said no please tell us why the **Information Sheet** did not help.

15. Would you like to change the **Information Sheet?**

✓  No ☐

Aa Bigger word size ☐

Words Less words ☐

Other ☐

Please write your ideas here:

16. Is there anything else you want to tell us about your appointment with our team?

Thank you for doing this survey.

If you have any questions about the survey, get in touch:

email **LDSouth@oxfordhealth.nhs.uk**

☎ **01865 903 100**

Carer Questionnaire Version

1. Do you feel there was enough time in the appointment to cover everything the service user / you wanted to say?

☐ Yes

☐ No

Please explain the reasons for your answer:

2. Do you have any comments you wish to make about the core assessment appointment?

3. Do you think the **Easy Read Information Sheet** helped the service user to feel more prepared for the appointment?

☐ Yes

☐ No

Please explain the reasons for your answer:

4. Do you think the **Easy Read Information Sheet** helped the service user to feel less anxious before their appointment?

☐ Yes

☐ No

Please explain the reasons for your answer:

5. How easy was it for the service user to read the **Easy Read Information Sheet?**

☐ Not easy

☐ Somewhat easy

☐ Easy

6. Do you think the **Key Ring Aid** helped the service user to be less anxious during the appointment?

☐ Yes

☐ No

Please explain the reasons for your answer:

7. Do you think the **Key Ring Aid** helped the service user to understand the questions asked in the appointment?

☐ Yes

☐ No

Please explain the reasons for your answer:

8. How easy was it for the service user to use the **Key Ring Aid?**

☐

☐ Not easy

☐ Somewhat easy

☐ Easy

9. If you could change anything about these resources**,** what would it be?

Appendix 2.E: SIP Journal Submission Guidelines for International Journal of Intellectual Disabilities

Submit Manuscript: Manuscript can be submitted through email attachment at **intellectual.manuscript@gmail.com** or through Online Submission.

Click the following links to download Copyright Agreement and Authorship Responsibility form.
1. Words File, 2. PDF File

Manuscripts Submission: Manuscript must be submitted with a covering letter from the author of correspondence to the Managing Editor by e-mail submission at **intellectual.manuscript@gmail.com**. After the successful submission of manuscript the corresponding author will be acknowledged within one week. Any quarry regarding the preparation & submission of a manuscript to the journal should be addressed via contact us. English is the official language of the journal. Original Research Articles not previously published and not being considered for publication elsewhere only should be submitted.
Corresponding authors must be declared that the manuscript is submitted on behalf of all authors. Copyright belongs to the publisher upon acceptance of the manuscript. Submission of a manuscript signifies acceptance of journal's guidelines for authors.

Manuscript presentation: These articles should clearly describe new and carefully confirmed results and experimental procedure which should be given in the required details for others to verify the work. **The manuscript should be prepared in English using "MS Word". "Times New Roman" font should be used. Manuscripts must be typed double spaced with margins of one inch (2.5 cm) at the top, bottom and the sides and, all pages numbered starting from the title page. Lines should be numbered in the margins with a continuous numbering from the start of the manuscript**.

The font size should be of 12pt but main headings may be of 14pt and subheadings 12 but bold. All research articles should have the following sections: **Title page, Abstract, Key words, Introduction, Materials and methods, Results, Discussion, Conclusion, Acknowledgement (if any) and References. The sections in the text should be subdivided as 1, 1.1, 2, 2.1, 2.1.2 likewise. The Author may provide at least three potential reviewers of same research field (optional), not from the host institute with their full addresses e-mail id and mobile number**.

Title: The title should then followed by the author name and the institution name and address by indicating suitable superscripts. The title page should contain the title of the paper in bold face, title case, names of the authors in normal face, upper case (font size 12) followed by the address(es) in normal face lower case. An asterisk (*) must be placed after the corresponding author's name as superscript whose email id, fax, telephone number can be given. Corresponding author has the responsibility to ensure that all co-authors are aware and approve the contents of the submitted manuscript.

Abstract: This section should detail the problems, experimental approach, major findings and conclusion in one paragraph and should appear on the second page. Avoid abbreviation, diagram and references in the abstract. It should be single - spaced and should not exceed 150 words for full papers.
Keywords: Author(s) must give about 4-6 key words which can identify the most important subjects covered by the paper. They must be placed at the end of the abstract.

Introduction: The manuscript should include a brief introduction stating the purpose of the investigation and relating the manuscript to similar previous research. Only information essential to the arguments should be presented.

Materials and Methods: This section must contain specific details about the materials studied, instruments used, specialized chemical source and related experimental details which allows other research worker to reproduce the results. Obtain permission for all fully borrowed, adapted, and modified tables and provide a credit line in the footnote.

Results and Discussions: The results should be concisely presented. Results and discussion may be separate or combined based on the author's requirement. Tables and figures should be designed to maximize the comprehension of the experimental data. The interpreted results should be explained clearly in discussions and should relate them to the existing knowledge in the field as clearly as possible. Tables, Graphs and figures (Illustrations) should be inserted into the main text at respective place they should appear when published and should have appropriate numbers and titles with an explanatory heading. Labels on the table, graph and figures MUST be in the text form and should not form part of the image. These photographs must be clear and sharp. Digital files are recommended for highest quality reproduction.

Conclusion: The author should conclude his/her finding accordingly.

Acknowledgement (if any): This section can be kept at the end of the manuscript before the reference section. This section can be used to acknowledge the help of those who do not qualify for authorship or to acknowledge funding, donated resources or significant contribution to the research.

References: References to the literature cited in the manuscript should be numbered in order of appearance in the manuscript and cited in the text with superscript numbers. The reference number should follow the following format.

For Journals Format: Author(s) of article (surname initials). Title of the manuscript, Journal title abbreviated Year of publication; volume number (issue number): page numbers.
Standard journal article: (If more than six authors, the first six shall be listed followed by et al.)
Panda BB, Gaur K, Kori ML, Tyagi LK, Nema RK, Sharma CS et al. Anti-Inflammatory and analgesic activity of Jatropha gossypifolia in experimental animal models. Global Journal of Pharmacology 2009; 3(1):1-5.

For Books and other monograph Format: Author AB, Author BB, Author CC. Title of Book. Ed, Vol, Publisher, City, year, page numbers.

Nadkarni KM. Indian Materia Medica. Edn 3, Vol. I, Popular Prakashan, Mumbai, 2000, 242-246.

For Patent Reference: Aviv H, Friedman D and Vered K. Submicron emulsions as ocular drug delivery vehicles. U.S. Patent 5496811; 1996.

For Website Reference: Habitat utilization pattern by winter migrants at Kolleru lake in Andhra Pradesh. https://www.biospace.com. 27 may, 2007.

Appendix 3.A: TDRP Ethics Approval

MEDICAL SCIENCES INTERDIVISIONAL RESEARCH ETHICS COMMITTEE
Research Services, Boundary Brook House, Churchill Drive, Headington, Oxford, OX3 7GB
Tel: +44(0)1865 616575
ethics@medsci.ox.ac.uk

UNIVERSITY OF
OXFORD

CONFIDENTIAL

Dr Matthew Hotton, Chloe Hiles & Dr Luke Aldridge-Waddon
Oxford Institute of Clinical Psychology Training & Research
Isis Education Centre
Warneford Hospital
Oxford

31 January 2023

Dear Dr Hotton, Chloe and Dr Aldridge-Waddon,

Research Ethics Approval - CUREC 1

Ethics Approval Reference: R84230/RE001

Study title: Facial emotional mimicry, facial expressivity suppression, social anxiety and interpersonal interaction quality in individuals with Facial Palsy

Short title: Investigating social interaction in individuals with Facial Palsy

The above application has been considered on behalf of the Medical Sciences Interdivisional Research Ethics Committee (MS IDREC) in accordance with the University's procedures for ethical approval of all research involving human participants.

I am pleased to inform you that, on the basis of the information provided to the IDREC, the proposed research has been judged as meeting appropriate ethical standards, and approval has been granted for a period of **5 years**, commencing on **1st February 2023.**

Amendments
Should there be any subsequent changes to the study, you should submit details to the MS IDREC for consideration and approval. Details of changes must be listed on an amendment form.

Yours Sincerely
DocuSigned by:
Leah Butts
9F14889D2BC549A...
Mrs Leah Butts
Research Ethics Administrator

for
Dr Helen Barnby-Porritt
Research Ethics Manager

Appendix 3.B: TDRP Joint Working

Another trainee on the Oxford doctoral course was also recruiting participants within the facial palsy population for their project. As trainees were both recruiting from a hard-to-reach clinical population, it was discussed within the senior research team and agreed with research supervisors that trainees work together for recruitment and data collection purposes, to improve efficiency and maximise data collection. Both trainees were responsible for equally contributing to recruitment, data collection and preparing study materials. Data analysis and report write-up were carried out independently. Given the overlap in data recruitment and similar method format delivery, it was agreed with research supervisors for trainees to merge their applications to submit as one CUREC application, covering both research projects. Implications of joint working was discussed and detailed in both trainees' research contracts. Co-authorship has been agreed for research dissemination.

Appendix 3.C: TDRP Journal Submission Guidelines for Psychology, Health and Medicine

Research Article Method

- Should be written with the following elements in the following order: title page; abstract; keywords; main text introduction, materials and methods, results, discussion; acknowledgments; declaration of interest statement; author contributions statement; references; appendices (as appropriate); table(s) with caption(s) (on individual pages); figures; figure captions (as a list).
- Should be between 2500 and 7000 words
- Should contain a structured abstract of 200 words.
    - The abstract structure should be as follows: Introduction, Methods, Results, Discussion.
- Should contain between 3 and 6 **keywords**. Read making your article more discoverable, including information on choosing a title and search engine optimization.

- Author Contributions Statement: Please provide an author contributions statement at the end of your article, before the references, that outlines which author(s) were involved in the conception and design, or analysis and interpretation of the data; the drafting of the paper, revising it critically for intellectual content; and the final approval of the version to be published; and that all authors agree to be accountable for all aspects of the work.
- Further information about this article type: Methods articles are a medium length, peer-reviewed article type that describes an advancement or development of current methods and research procedures. These should include adequate and appropriate validation to be considered. Any datasets associated with the paper must publish all experimental controls and make full datasets available where possible. If there are concerns about identifying factors in datasets, these should be discussed with the Editor-in-Chief prior to submission.
- Please note, that authors submitting protocol and methodology articles have the option to share their methods on protocols.io. Please note, this is not required for submission but is encouraged.

Style Guidelines

Please refer to these quick style guidelines when preparing your paper, rather than any published articles or a sample copy.

Any spelling style is acceptable so long as it is consistent within the manuscript.

Please use single quotation marks, except where ‘a quotation is “within” a quotation’.

Please note that long quotations should be indented without quotation marks.

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Papers may be submitted in Word or LaTeX formats. Figures should be saved separately from the text. To assist you in preparing your paper, we provide formatting template(s).

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A LaTeX template is available for this journal. Please save the LaTeX template to your hard drive and open it, ready for use, by clicking on the icon in Windows Explorer.

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References

Please use this T&F standard APA reference style when preparing your paper.
An EndNote output style is also available to assist you.

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Checklist: What to Include

1. **Author details.** Please ensure everyone meeting the International Committee of Medical Journal Editors (ICMJE) requirements for authorship is included as an author of your paper. Please ensure all listed authors meet the Taylor & Francis authorship criteria. All authors of a manuscript should include their full name and affiliation on the cover page of the manuscript. Where available, please also include ORCiDs and social media handles (Facebook, Twitter or LinkedIn). One author will need to be identified as the corresponding author, with their email address normally displayed in the article PDF (depending on the journal) and the online article. Authors' affiliations are the affiliations where the research was conducted. If any of the named co-authors moves affiliation during the peer-review process, the new affiliation can be given as a footnote. Please note that no changes to affiliation can be made after your paper is accepted. Read more on authorship.
2. **Graphical abstract** (optional). This is an image to give readers a clear idea of the content of your article. For the optimal online display, your image should be supplied in landscape format with a 2:1 aspect ratio (2 length x 1 height). Graphical abstracts will often be displayed online at a width of 525px, therefore please ensure your image is legible at this size. Save the graphical abstract as a

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3. You can opt to include a **video abstract** with your article. Find out how these can help your work reach a wider audience, and what to think about when filming.
4. **Funding details.** Please supply all details required by your funding and grant-awarding bodies as follows:
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   This work was supported by the [Funding Agency] under Grant [number xxxx].
   For multiple agency grants
   This work was supported by the [Funding Agency #1] under Grant [number xxxx]; [Funding Agency #2] under Grant [number xxxx]; and [Funding Agency #3] under Grant [number xxxx].
5. **Disclosure statement.** This is to acknowledge any financial or non-financial interest that has arisen from the direct applications of your research. If there are no relevant competing interests to declare please state this within the article, for example: *The authors report there are no competing interests to declare*. Further guidance on what is a conflict of interest and how to disclose it.
6. **Data availability statement.** If there is a data set associated with the paper, please provide information about where the data supporting the results or analyses presented in the paper can be found. Where applicable, this should include the hyperlink, DOI or other persistent identifier associated with the data set(s). Templates are also available to support authors.
7. **Data deposition.** If you choose to share or make the data underlying the study open, please deposit your data in a recognized data repository prior to or at the time of submission. You will be asked to provide the DOI, pre-reserved DOI, or other persistent identifier for the data set.
8. **Supplemental online material.** Supplemental material can be a video, dataset, fileset, sound file or anything which supports (and is pertinent to) your paper. We publish supplemental material online via Figshare. Find out more about supplemental material and how to submit it with your article.
9. **Figures.** Figures should be high quality (1200 dpi for line art, 600 dpi for grayscale and 300 dpi for colour, at the correct size). Figures should be supplied in one of our preferred file formats: EPS, PS, JPEG, TIFF, or Microsoft Word (DOC or DOCX) files are acceptable for figures that have been drawn in Word. For information relating to other file types, please consult our Submission of electronic artwork document.
10. **Tables.** Tables should present new information rather than duplicating what is in the text. Readers should be able to interpret the table without reference to the text. Please supply editable files.
11. **Equations.** If you are submitting your manuscript as a Word document, please ensure that equations are editable. More information about mathematical symbols and equations.
12. **Units.** Please use SI units (non-italicized).

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