Adversity and Imagery: A Developmental Psychopathology Lens



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Abstracts

Critical Review of the Literature

Attachment Patterns and Autobiographical Episodic Memory Functioning: A Systemic Review of Adult Studies to Advance Clinical Psychological Science

Patterns of insecure attachment are associated with psychopathology but the mechanisms involved remain poorly understood. Cognitive science proposes that attachment patterns are influenced by the autobiographical memory system and in turn influence its ongoing functioning. Disturbances in autobiographical memory represent cognitive risks for later emotional difficulties. We systemically reviewed 32 studies (in 27 articles) examining the association between attachment patterns and autobiographical episodic memory (AEM) in individuals from the age of 16 (i.e., from young to older adulthood). Attachment patterns were associated with key areas of AEM phenomenology, including intensity and arousal; detail, specificity, and vividness; coherence and fragmentation; and accuracy and latency. These associations appeared to be moderated by contextual and individual factors; mediated by emotional regulation and schema-based processing; linked to mental health outcomes. Attachment patterns may also influence the impact of certain AEM-based manipulations. We conclude by providing critical discussion and a research agenda for bringing together attachment, memory, and emotion, with a view to promote mechanism-driven treatment innovation in clinical psychology.

Service Improvement Project

Assessment of Digital Risks in Child and Adolescent Mental Health Services: A Mixed-Method, Theory-Driven Study of Clinicians' Experiences and Perspectives

Children and adolescents in the UK spend increasingly more time in the digital world, raising societal fears about digital risks in this age group. Professionals are not always aware of the ever-developing research or guidance available around digital safety. This gap underscores the need to understand current experiences and determinants of digital risk assessment, including clinicians' views on barriers and facilitators. A mixed-method design was used. Fifty-three clinicians working in child and adolescent mental health services (CAMHS) in South England took part in a survey; of these 12 took part in semi-structured interviews. A psychological model of behavioural change (COM-B: capabilities, opportunities, motivation, and behaviour) guided the analyses. Survey data revealed that clinicians showed awareness and concerns for several digital risk issues but there appeared to be gaps in their knowledge and practice. Interview data revealed different factors influencing staff enquiry about digital risks in CAMHS. These included aspects of capabilities (knowledge and skills), opportunities (resources, organisational context, and empowerment of youth), and motivations (habit change, emotional experiences, and professional identity/role). Targeting both staff-level and organisation-level barriers to digital risk assessments in CAMHS is crucial. This study informs service improvement to ensure that children and young people safely navigate the digital world.

Main Research Project

Specificity of Episodic Future Thinking in Adolescents: Comparing Autism Spectrum, Childhood Maltreatment, and Typical Development

Autism and maltreatment are associated with seemingly overlapping difficulties across functional domains (e.g., social, emotional, and sensory) as well as high rates of psychiatric problems. A cognitive approach focussing on affect-laden cognition, such as episodic future thinking (FT), may inform the differentiation of these developmental differences and treatment innovations in mental health in these presentations. Three groups of adolescents aged 10-16 completed a newly adapted Autobiographical Future Thinking Test in an online written format. The groups were i) autism, ii) maltreatment, and iii) typical development (TD), matched in age, sex, and socioeconomic status. The maltreatment group generated fewer specific future events relative to the TD group, while FT specificity in the autism group did not significantly differ from the other groups. Lower FT specificity was associated with more depressive (but not anxiety symptoms), particularly in the autism group. Overall, these findings shed light on the cognitive profiles of both autism and maltreatment and indicate potential novel intervention targets for mental health. Our study also lays the foundation for future studies comparing these two development presentations with improved designs and a broader set of cognitive and clinical domains.

Critical Review of the Literature

Attachment Patterns and Autobiographical Episodic Memory Functioning: A Systemic Review of Adult Studies to Advance Clinical Psychological Science

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Abstract

Patterns of insecure attachment are associated with psychopathology but the mechanisms involved remain poorly understood. Cognitive science proposes that attachment patterns are influenced by the autobiographical memory system and in turn influence its ongoing functioning. Disturbances in autobiographical memory represent cognitive risks for later emotional difficulties. We systemically reviewed 32 studies (in 27 articles) examining the association between attachment patterns and autobiographical episodic memory (AEM) in individuals from the age of 16 (i.e., from young to older adulthood). Attachment patterns were associated with key areas of AEM phenomenology, including intensity and arousal; detail, specificity, and vividness; coherence and fragmentation; and accuracy and latency. These associations appeared to be moderated by contextual and individual factors; mediated by emotional regulation and schema-based processing; linked to mental health outcomes. Attachment patterns may also influence the impact of certain AEM-based manipulations. We conclude by providing critical discussion and a research agenda for bringing together attachment, memory, and emotion, with a view to promote mechanism-driven treatment innovation in clinical psychology.

Keywords: attachment, internal working model, autobiographical memory, mental imagery, emotional disorders

Introduction

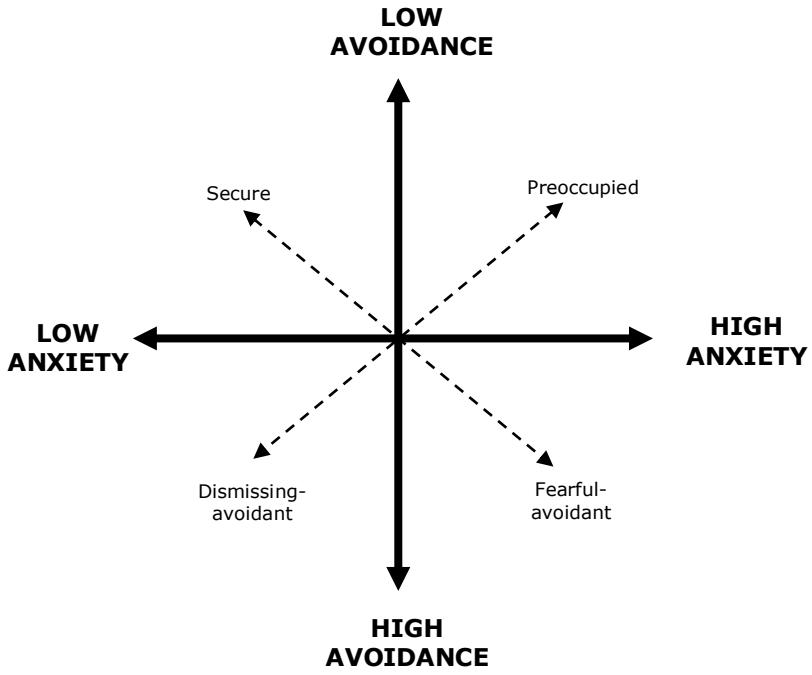
A key tenet in developmental science is that experiences with caregiving figures contribute to different attachment patterns from early on in life (Ainsworth & Bowlby, 1991; Bowlby, 1969). These attachment patterns are thought to initially maximise the infant's survival (Bowlby, 1969) but also exert major influences later on adolescent and adult relationships (E. Waters et al., 2000). Attachment ideas have attracted great interest from researchers and practitioners, providing a framework for understanding emotional disturbances across the lifespan. Although attachment insecurity in itself is not equivalent to psychopathology (Zilberstein, 2014), it is an established risk factor for mental health difficulties including depression and anxiety disorders (Mullen, 2019) and reduces the effectiveness of psychological treatments (Levy et al., 2018). However, the mechanisms through which attachment insecurity influences psychopathology remain poorly understood, greatly limiting our ability to develop more effective interventions to prevent and treat lifelong emotional difficulties (Barlow et al., 2013; Holmes et al., 2018) associated with attachment insecurity. Understanding how attachment influences mental health – at multiple levels of analyses – represents a research priority (Insel et al., 2010).

Bowlby (1969) argued that early attachment interactions result in affect-laden mental representations, also called "internal working models (IWMs)". Although their exact nature remains an issue of ongoing controversy (e.g., Rutter, 2014), many theorists posit that IWMs are intimately linked to the autobiographical memory system (Collins & Read, 1994; Conway, 2005; Crittenden, 2006; H. S. Waters & Waters, 2006), comprising script-like, semantic, verbal-based sequences of events of prototype distress episodes encompassing how other attachment figures recognise and respond to one's distress (H. S. Waters & Waters, 2006), which are in turn are derived from

generalisation of unique affect-laden, sensory-based memories depicting specific interactions (Collins & Read, 1994). Not only IWMs have a cognitive basis in memory, but they can also serve as templates for subsequent information processing, including of autobiographical memories more broadly (Dykas & Cassidy, 2011). In this article, we will consider the role of autobiographical memories as one potential cognitive (modifiable) mechanism through which attachment patterns influence mental health in adulthood.

Figure 1

Proposed Overlap between Dimensional and Categorical Models of Attachment Patterns



Note. Adapted from Fraley et al. (2015)

Conceptualising Attachment Patterns

Contemporary models in adults characterise attachment patterns using a dimensional approach (Fraley et al., 2000, 2015). A dominant model by Brennan and colleagues (1998) distinguishes two independent dimensions of attachment avoidance and attachment anxiety (Figure 1). Individuals high in attachment anxiety over-activate the attachment system through hypervigilance to threat, preoccupation with loss and excessive care-seeking. Individuals high in attachment avoidance under-activate the attachment system by emphasising self-reliance, emotional suppression, and distancing from others. Individuals high in attachment security display low attachment anxiety and avoidance, thus having flexibility between relying on others and oneself according to the context and goals (Mikulincer & Shaver, 2007).

Figure 2

Early Memories of Child-Parent Interactions Reported in the Adult Attachment Interview for Three Attachment Patterns

Memories in response to the word "*difficult*":

Secure attachment (secure-autonomous)
"…I had three siblings and I'd say it's likely that all of us found her difficult. She had a harsh voice most of the time, I remember that, and she also had a harsh hand. But like I said, my father left when I was 4, and she was the sole breadwinner, and she was trying hard to keep us on the straight and narrow. The time she spanked me the hardest was the day when she came home and I wasn't there. I was over at our neighbour's house. I think it scared her. So she was a difficult mother for me."

Anxious attachment (insecure-preoccupied)
"…Wait 'til your dad comes home…There were some bad times with her, you know she called me up the other day and…like, what did I think of her new boyfriend? Like who needs this? But yeah, difficult, like when she does come over she can be impossible with her grandson, and I'm the only one who's got her a grandchild. She should be grateful..."

Avoidant attachment (insecure-dismissing)
"…When she was weak, when she cried. Sobbed through our neighbour's funeral. Embarrassing, couldn't wait to get away from her…"

Note. Extracted from Main et al. (2008)

Such dimension models overlap with categorical models (Bartholomew & Horowitz, 1991; Hazan & Shaver, 1987), which stem from initial formulations on infant attachment (Ainsworth et al., 1978) and later notions of self-protection strategies (Crittenden, 2006; Landa & Duschinsky, 2013). Crucially, categorising attachment patterns is informed by episodic memory recall of early care-receiving experiences (Figure 2), as these are assumed to reflect their IWMs (Main et al., 2008).

Autobiographical Memory and Psychopathology

Autobiographical memories refer to personally-meaningful memories formed in an everyday context (Conway, 2001; Conway & Pleydell-Pearce, 2000; Rubin, 2005). The Self-Memory Model (Conway & Pleydell-Pearce, 2000) argues that the autobiographical memory system is organised hierarchically, with the top starting with lifetime periods (e.g., "my first relationship"), followed by general events ("our holiday trips together"), which further contain event-specific knowledge ("the time we got lost kayaking around a Swedish Island while freezing"). The latter involves highly-detailed and vivid recollections of individual episodes typically in the form of sensory-based mental images (Conway, 2001). We will focus on autobiographical *episodic* memories (AEMs) as two of their key features – mental imagery (Rubin et al., 2003) and involuntary/intrusive retrieval (Berntsen & Hall, 2004) – are key to emotional disorders (Brewin et al., 2010; Ji et al., 2016).

Autobiographical memories serve several broad functions, including problem-solving, self-soothing, creating intimacy, maintaining a coherent sense of self over time (Bluck et al., 2005), and even predicting the future (Schacter et al., 2017). By influencing our thoughts, feelings and behaviours, autobiographical memories play an important role in mental health. Autobiographical memory features have been implicated in the onset and maintenance of emotional disorders (Dalgleish & Brewin,

2007), such as the presence of negative images in anxiety disorders (Hirsch & Holmes, 2007), reduced specificity of memory recall and future thinking in depression (Gamble et al., 2019; Williams et al., 2007), and intrusive and recurrent trauma memories in post-traumatic stress disorder or PTSD (Ehlers et al., 2004). Autobiographical memory disruptions are also apparent early in development signalling latent vulnerability in those susceptible to later psychopathology (McCrory et al., 2017).

Bringing Together Attachment, Autobiographical Memory, and Emotions

IWMs underlying different attachment patterns can act as information-processing "filters" across a range of cognitive-affective domains (Dykas & Cassidy, 2011; Mikulincer & Shaver, 2007), including encoding, organisation and retrieval of autobiographical memories (Thompson, 2008). Dykas & Cassidy's dual-process model (2011) proposes that insecurely-attached (vs. securely-attached) individuals will process attachment-relevant information by i) excluding such information all together if it is likely to cause psychological pain (i.e., as an emotional regulation strategy) or ii) filtering it in a way that is consistent with their negative (vs. positive) attachment-related experiences (i.e., via schema-based processing). Consistently, avoidantly-attached individuals show tendencies to distance themselves from others during distress while anxiously-attached individuals appear to access attachment-relevant information more quickly such as their attachment figures' names (for a comprehensive review see Dykas & Cassidy, 2011)

For autobiographical memories, individuals are thought to be motivated to process attachment-relevant information to maintain a coherent self-image, thus information that fits with attachment-related experiences is more likely to be later accessible and available (Conway, 2005; Conway & Pleydell-Pearce, 2000). Accordingly, avoidant attachment has been linked to slower retrieval of childhood events (Dykas et al., 2014)

and reduced benefit from security-based (memory-based) priming techniques (Bryant & Chan, 2017), while anxious attachment has been linked to increased memory errors for interpersonal events (Hudson & Fraley, 2018) and enhanced benefit from security-based priming techniques instead (Gillath & Karantzas, 2019). The possibility that IWMs bias information-processing in ways that reinforce their pre-existing structures may also partly explain their relative stability across the lifespan.

Review Questions

The postulated attachment-related biases on autobiographical memories, alongside the data linking such memories and emotional psychopathology, suggest that attachment security/insecurity relates to later emotional disorders through its impact on AEM functioning. We aim to systemically review adult studies examining attachment patterns and AEM functioning, by building on earlier theoretical and empirical foundations connecting attachment and emotional memory in childhood (Chae et al., 2011; Farrar et al., 1997; Valentino, 2011).

Our primary question was: 1) what aspects of AEM functioning are associated with patterns of attachment security and/or insecurity in adults (from age 16), as identified in clinical and non-clinical studies? We chose to focus on age 16 onwards as it coincides with the beginning of young adulthood (Arnett, 2000) linked to self-development (Sebastian et al., 2008) and laying down of long-lasting self-defining memories (Conway, 2005). Most health problems also emerge for the first time in that period (Patel et al., 2007), representing a pivotal time for treatment innovation.

Our secondary questions were as follows: 2) which factors influence the associations between attachment patterns and AEM functioning; and 3) what are the clinical implications for psychological interventions harnessing AEM to improve outcomes in emotional disorders?

Methods

Search Strategy

A review protocol was registered in PROSPERO (registration number: CRD42020216345) and the study selection process followed PRISMA guidelines (Moher et al., 2009). Searching databases were PsycINFO, MEDLINE and Embase. The search terms included the following concepts: "attachment" (search terms: "attachment" OR "internal working model") and "autobiographical memory" (search terms: "memory" OR "representation"). No restrictions or limitations were imposed during the search (including no restrictions for publication dates). Both clinical and non-clinical studies were included.

Inclusion and Exclusion Criteria

Inclusion criteria were original empirical studies published in peer-reviewed journals; using quantitative analyses; with participants aged 16 or above (to include young adults and onwards); and written in English. Studies were also included if attachment patterns and AEM functioning were assessed separately in different measures and within the same adult participants; attachment patterns were assessed directly in the participants (e.g., not in their parents); and attachment patterns were about relationships with people (e.g., not with objects/pets). Exclusion criteria were studies where participants' mean age was below 16, articles were not in English; and lacking measures of attachment and/or AEM.

Searches were performed on 20/07/2022. Titles and abstracts were used for initial screening followed by full-text screening by the lead author. Inter-rater reliabilities for a subset of these (10% by the second rater) achieved good to excellent agreement: initial

screening: Cohen's kappa =.82; full-text screening: Cohen's kappa =1.00 (Altman, 1991).

Data Synthesis

Study information was extracted for: sample size; basic demographics such as age, sex, ethnicity, and the country where the study was conducted; type of attachment measure; type of attachment pattern captured; type of AEM measure; study design (e.g., correlational vs longitudinal; sample type); and any mental health outcomes. Quality assessment was performed using the NIH Study Quality Assessment Tools (National Institutes of Health, 2014). Inter-rater reliabilities for a subset of these (30% by the second rater) achieved excellent agreement: data extraction: Cohen's kappa =.99; quality assessment: Cohen's kappa =.97 (Altman, 1991).

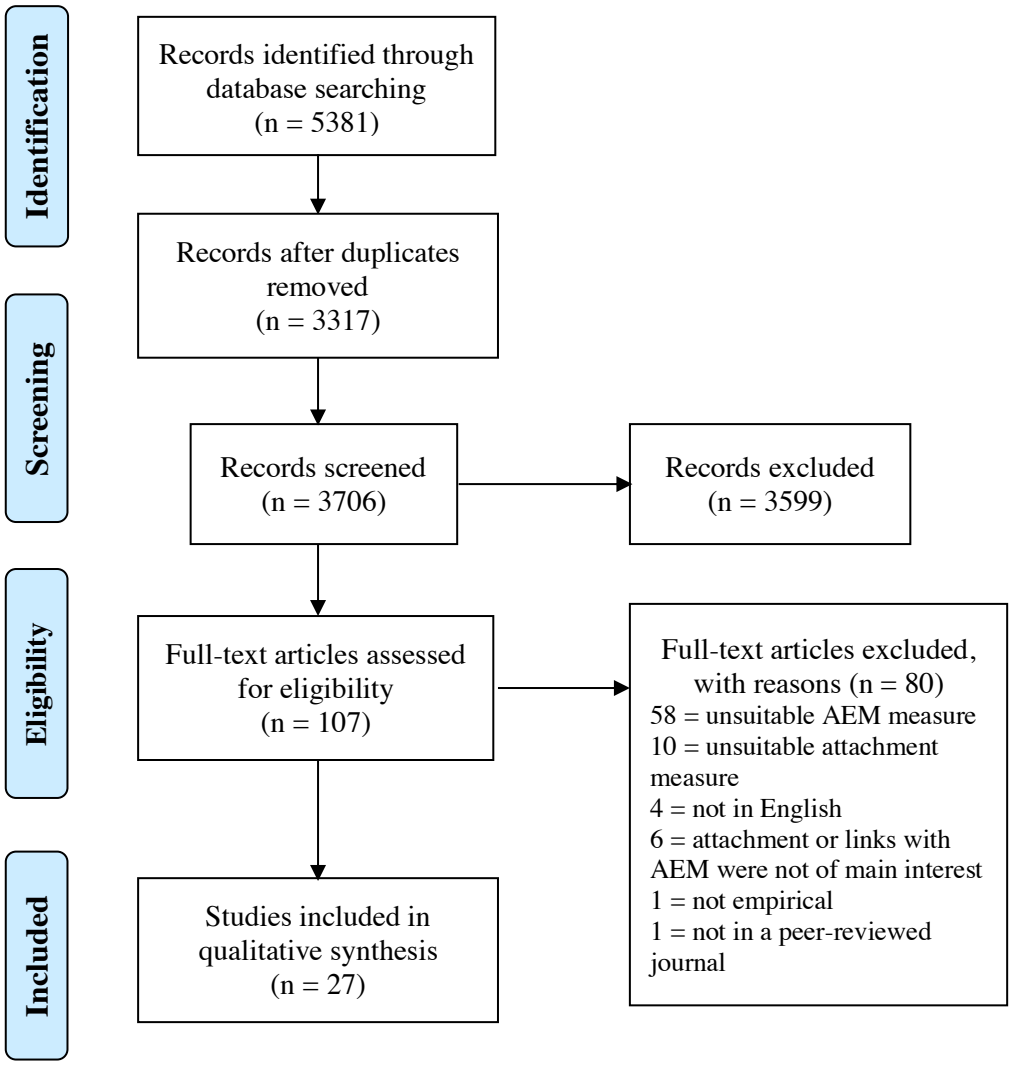
Due to the heterogeneity of studies (i.e., design of measures of attachment and indices of AEM functioning), a meta-analysis was not appropriate at this point in time. A narrative synthesis was conducted to showcase the range of AEM features considered; candidate mediators and moderators of any attachment-AEM links; and possible impact on mental health outcomes.

Results

To organise our findings, we will begin with an overview of key study characteristics (Table 1) alongside an overall quality appraisal. We will then describe the broad patterns of associations found between attachment insecurity and AEM phenomenology; candidate factors influencing (i.e., moderators) and explaining such associations (i.e., mediators or mechanisms); potential relevance of these associations to mental health outcomes and to the effectiveness of AEM-based manipulations.

Figure 3

PRISMA Flowchart for Study Selection



Note. AEM = Autobiographical episodic memory

Study Characteristics

In total, 32 studies from 27 articles met all inclusion/exclusion criteria (Figure 3). Sample sizes ranged from 17 to 1061 participants, although most were below 100 participants (13 [41%]). Most studies were correlational designs when examining the relationship between attachment and AEM (29 [91%]) rather than prospective designs. Most studies (19 [59%]) focused on young adults (aged 16-26), while only a minority (4 [13%]) focused on older adults (aged 60 and above). The majority recruited university students (20 [63%]) with only a subset focused on clinical samples (4 [13%]). Most studies were from the USA (13 [41%]) and other high-income Western countries (e.g., UK and Canada) with a few exceptions (e.g., China and Turkey). Most studies reported sex ratios (female vs. male) but did not consider other dimensions of gender identity. Most participants across studies self-identified as White or Caucasian, with only a few (4 [13%]) focused exclusively on non-White participants (Chinese and African Americans). However, reports on ethnicity were often completely absent [14 [44%]).

Measures of Attachment Patterns

Most studies (19 [59%]) included the *Experience in Close Relationship* self-report questionnaire (ECR; Brennan et al., 1998) and its variants (Fraley et al., 2000; Wei et al., 2007), which yielded dimensions on attachment avoidance and attachment anxiety. Other dimensional measures used included the *Relationship Questionnaire* (Griffin & Bartholomew, 1994) and the *Older Adults Marital Attachment Scale* (used by Y. Wang et al., 2016, 2018) – the latter developed specifically in a Chinese sample. A minority of studies (7 [23%]) used self-report measures that yielded categories of secure and insecure attachment styles. These were the *Relationship Questionnaire* (Bartholomew & Horowitz, 1991) and the *Attachment Scale* (Hazan & Shaver, 1987). Two remaining studies used the *Adult Attachment Interview* (AAI; George et al., 1996), which is the

gold-standard interview that yields categories of secure and insecure attachment patterns. While the self-report measures mostly focus on romantic/marital relationships, the AAI focuses on parents. The relative merits and drawbacks of different attachment measures have been comprehensively reviewed elsewhere (Ravitz et al., 2010).

Measures of AEM Functioning

A variety of memory activation methods were used. Well-established cuing methods include the retrieval of specific memories in relation to word cues in variants of the *Autobiographical Memory Test* (Williams et al., 1996) or in response to four emotion words (happiness, sadness, anxiety and anger) in the *Memory for Childhood Experiences Task* (Mikulincer & Orbach, 1995). Pictorial cues were used in an adapted *Autobiographical Memory Interview* (Cao et al., 2018).

Other measures directed participants to specific life stages. The *Life History Timeline* involved reporting significant life events to each age period and event category, such as relationships and work (Elnick et al., 1999). Several studies focused on a period of emotional significance, including adolescence (Kohn et al., 2012; McCabe & Peterson, 2012), marriage (Y. Wang et al., 2016, 2018), very first memories (McCabe & Peterson, 2012), or traumatic events, for the latter using the *Autobiographical Memory Questionnaire* (Rubin et al., 2003) or the *Trauma Memory Questionnaire* (Halligan et al., 2002). Some studies allowed open-ended retrieval through free recall to elaborate on self-defining memories (Singer & Moffitt, 1992; Sutin & Gillath, 2009), transgression memories (Cortes & Wilson, 2016) or romantic relational memories (Crawford et al., 2021; Zengel et al., 2019). A few of these assessed phenomenology of the retrieved memories via The *Memory Characteristics Questionnaire* (Johnson et al., 1988).

Table 1

Key Design Characteristics of Studies Included in the Review

Authors (year)	N	Age (mean, SD)	Sex (f/m; other)	Study design	Sample type	Country	Ethnicity	Attachment measure (focus)	Attachment patterns considered (C or D)	Autobiographical episodic memory measure	Mental health outcome
Beyderman & Young (2016)	100	46.60 (10.43)	40/60	Correlational	Outpatient psychiatric patients	USA	100% African Americans	ECR (general)	Anxiety & avoidance (D)	Autobiographical memory task	DID
Borelli et al. (2014)	32	30.96 (7.51)	32/0	Prospective	Nondeployed spouses	USA	80% European American; 4% Asian American; 2% African American; 9% Hispanic American	ECR-R (romantic)	Avoidance (D)	Memory savouring task	NA
Cao et al. (2018)	YA: 37; OA: 40	YA: 22.41 (1.95); OA: 64.58 (4.02)	YA: 20/17; OA: 29/11	Correlational	University students and community	China	NR	RQ (general)	Secure & insecure (C)	Adapted autobiographical memory interview	NA
Cavanagh et al. (2015)	71	20.19 (2.00)	43/0	Correlational	University students	USA	72% Caucasian; 8% American Indian/Alaskan; 8% Hispano/Latino	RSQ (general)	Secure/insecure (D)	Memory Reflection task	NA
Cortes & Wilson (2016; Study 1)	209	NR	171/32 (6 NR)	Correlational	University students	Canada	NR	ECR-R (general)	Anxiety (D)	Transgression vs. kindness memory	NA
Cortes & Wilson (2016; Study 2)	160	NR	112/48	Correlational	University students & MTW	Canada	NR	ECR-R (general)	Anxiety (D)	Transgression vs. kindness memory	NA
Cortes & Wilson (2016; Study 3)	199	NR	161/35 (3 NR)	Correlational	University students	Canada	NR	ECR-R (general)	Anxiety (D)	Transgression vs. kindness memory	NA
Crawford et al., (2021)	284	NR	191/92	Correlational	University students	New Zealand	NR	ECR-R (romantic)	Anxiety & avoidance (D)	Autobiographical event recall	NA

Authors (year)	N	Age (mean, SD)	Sex (f/m; other)	Study design	Sample type	Country	Ethnicity	Attachment measure (focus)	Attachment patterns considered (C or D)	Autobiographical episodic memory measure	Mental health outcome
Dykas et al. (2014)	189	16.50 (0.58)	118/0	Correlational	High school students	USA	73% White; 15% African American; 10% Asian; 3% Hispanic	AAI (parents)	Dismissing & preoccupied (D)	Memory for childhood experiences task	NA
Edelstein et al. (2005)	102	23.14 (3.35)	79/23	Correlational	Childhood sexual abuse survivors	USA	66% White; 10% African American; 13% Hispanic; 1% Asian American; 10% Mixed	RSQ (general)	Anxiety & avoidance (D)	Historical records of childhood sexual abuse	NA
Elnick et al. (1999)	220	59.1 (12.2)	116/104	Correlational	Community sample	USA	97% White	RQ (general)	Secure, dismissing, preoccupied & fearful (D)	Life history timeline & significant life events narrative	NA
Gentzler & Kern (2006)	119	20.9 (NR)	69/50	Prospective	University students	USA	80% Caucasian; 17% African-American; 2% Asian-American; 1% Latino-American; 8% NR	ECR (general)	Anxiety & avoidance (D)	Diary study of emotional reactions to daily events	NA
Goldner & Scharf (2017)	83	21.13 (5.21)	83/0	Correlational	NR	Israel	NR	RQ (general)	Secure, dismissing, preoccupied, fearful and profound distrust (D)	Self-defining memory task	NA
Haggerty et al. (2010)	79	22.6 (5.64)	60/19	Correlational	University students	USA	(% NR) Majority White	ECR (general)	Anxiety & avoidance (D)	Early memories task	NA
Kohn et al. (2012)	163	NR	94/69	Correlational	University students	USA	NR	RQ (general)	Secure, dismissing, preoccupied & fearful (D)	Memory for childhood experiences task	NA
Kungl et al. (2016)	42	19.46 (1.27)	22/20	Correlational	Community sample	Germany	NR	AAI (parents)	Secure, insecure-dismissing, insecure-preoccupied (C)	Emotional memory during adolescence	NA
Luo et al (2020; Study 1)	60	Range = 18-25	34/0	Correlational	University students	China	100% Chinese	ECR (general)	Secure, anxious & avoidant (C)	Emotional memory to cue words	NA

Authors (year)	N	Age (mean, SD)	Sex (f/m; other)	Study design	Sample type	Country	Ethnicity	Attachment measure (focus)	Attachment patterns considered (C or D)	Autobiographical episodic memory measure	Mental health outcome
Marigold et al (2014; Study 1)	88	19 (SD NR)	61/27	Correlational	University students	Canada	NR	ECR (romantic)	Anxiety (D)	Transgression memory towards romantic partner	NA
Marigold et al (2014; Study 2)	92	20 (SD NR)	47/44 (1 NR)	Correlational	University students	Canada	NR	ECR (romantic)	Anxiety (D)	Transgression memory from romantic partner	NA
McCabe & Peterson (2012)	195	19.4 (2.02)	105/90	Correlational	University students	USA	NR	ECR (romantic)	Anxiety and avoidance (D)	First memory and adolescent memory	NA
Mikulincer & Sheffi (2000; Study 1)	110	Median = 21	32/78	Correlational	University students	Israel	NR	AS (general)	Secure, avoidant & anxious-ambivalent (C)	Positive memory	NA
Mikulincer & Orbach (1995)	120	Range = 19-27	42/78	Correlational	University students	Israel	NR	AS (general)	Secure, avoidant & anxious-ambivalent (C)	Memory for childhood experiences task	NA
Naismith et al. (2018; Study 1)	53	32 (11.1)	44/9	Correlational	Patients from a specialist BPD clinic	UK	66% White' 11% Asian or Asian British; 6% Black or Black British; 4% Mixed; 4% Other	ECR–SF (general)	Anxiety and avoidance (D)	Compassion-focused imagery (from memory and imagination)	NA
Naismith et al. (2018; Study 2)	17	34 (10.6)	15/2	Correlational	Patients from a specialist BPD clinic	UK	82% White 6% Asian or Asian British; 6% Mixed; 6% Other	ECR-SF (general)	Anxiety & avoidance (D)	Daily practice in compassionate imagery for one week	NA
Ogle et al. (2015)	1061	63.47 (2.76)	61% male	Correlational	University students (past) and their spouses	USA	99% White	ECR-SF (general)	Anxiety & avoidance (D)	Autobiographical Memory Questionnaire	PCL-S
Öner & Gülgöz (2016)	113	20.88 (1.11)	67/46	Correlational	University students	Turkey	NR	ECR-R (romantic)	Anxiety & avoidance (D)	Memory Characteristics Questionnaire	NA
Quinn et al. (2015)	81	29.62 (4.00)	81/0	Prospective	Recent mothers	UK	(% NR) Majority White	ECR-R (romantic/general)	Anxiety & avoidance (D)	Trauma Memory Questionnaire	IES

Authors (year)	N	Age (mean, SD)	Sex (f/m; other)	Study design	Sample type	Country	Ethnicity	Attachment measure (focus)	Attachment patterns considered (C or D)	Autobiographical episodic memory measure	Mental health outcome
Sutin & Gillath (2009; Study 1)	454	19.69 (1.66)	64% female	Correlational	University students	USA	42% Asian; 39% Caucasian; 8% Latino; 1% Black; 10% Bi-racial	ECR (general)	Anxiety & avoidance (D)	Self-defining memory	MASQ
Sutin & Gillath (2009; Study 2)	543	19.3 (2.1)	62% female	Correlational	University students	USA	40% Asian; 30% Caucasian; 8% Latino; 1% Black; 11% Bi-racial; 10% NR	ECR (general)	Anxiety & avoidance (D)	Self-defining memory	MASQ
Wang et al. (2016)	242	67.93 (5.23)	138/104	Correlational	Older married adults	China	100% Chinese	OAMAS (marital)	Anxiety, avoidance & security (D)	Memory of marriage	NA
Wang et al. (2018)	94	65.33 (3.91)	57/37	Correlational	Older Married adults	China	100% Chinese	OAMAS (marital)	Anxiety, avoidance & security (D)	Memory of marriage	NA
Zengel et al. (2019)	MTW:85 US: 132	MTW: 40.00 (13.66); US: 19.27 (24.74)	MTW: 72%/NR; US: 50%/NR	Correlational	University students and MTW	USA	MTW: 84% Caucasian; 8% African American: 1% Asian 2% Hispanic; 1% Native American; 4% NR US: 46% Caucasian; 2% African American; 2% Asian; 2%, Hispanic; 17% bi-racial; 4% multiracial	RQ (general)	Secure vs. non-secure (C)	Relationship memory	NA

Note. Proportions within ethnicity were rounded to nearest integer and converted to % when available. AAI = Adult Attachment Interview (George et al., 1996); AS = Attachment Scale (Hazan & Shaver, 1987); DID = Diagnostic Inventory of Depression (Zimmerman et al., 2004); ECR = Experiences in Close Relationship Questionnaire (Brennan et al., 1998); ECR-R = The Experiences in Close Relationships Questionnaire – Revised (Fraley et al., 2000); ECR-SF = Experiences in Close Relationship Scale-Short Form (Wei et al., 2007); IES = Impact of Event Scale (Weiss & Marmer, 1997); MASQ = Mini-Mood and Anxiety Symptom Questionnaire (Watson et al., 1995); OAMAS = Older Adults Marital Attachment Scale (D. Wang et al., 2015); PCL-S = PTSD Check List-Stressor Specific Version (Weathers et al., 1993); RQ = Relationship Questionnaire (Bartholomew & Horowitz, 1991); RSQ = Relationship Scale Questionnaire (Griffin & Bartholomew, 1994); BPD = Borderline Personality Disorder; D= dimensional; C = categorical; OA = older adults; YA = younger adults; MTW = Mechanical Turk workers; US = University students; NA = not applicable; NR = not reported

Two studies capitalised on ways to record the initial encoded event which then served as stimuli for a delayed recall test, using a diary method (Gentzler & Kerns, 2006) and checking historical records (Edelstein et al., 2005).

Finally, a range of studies examined the impact of AEM-based manipulations or interventions, including the use of nostalgia memory (Cavanagh et al., 2015), positive attachment memories (Borelli et al., 2014; Mikulincer & Shaver, 2001), transgression memories (Cortes & Wilson, 2016; Marigold et al., 2014), and compassion-focused imagery (Naismith et al., 2018).

Appraisal of Studies

Most studies were deemed of moderate quality (Table 2) due to limitations in establishing causal inferences. Research questions and study populations across studies were generally well-defined. However, most designs used were correlational and there was no repeated assessment of attachment patterns of AEM functioning for the few prospective studies included (Borelli et al., 2014; Sutin & Gillath, 2009). Due to the stringent study selection process, all studies reviewed used appropriate measures of both attachment patterns and AEM functioning. Although several studies capitalised on large cohort data (Elnick et al., 1999; Ogle et al., 2015; Sutin & Gillath, 2009), appropriate justification for sample sizes was variable across studies. Confounds of attachment patterns that were considered include baseline anxiety (Borelli et al., 2014; Mikulincer & Sheffi, 2000), neuroticism (Ogle et al., 2015), verbal ability (Y. Wang et al., 2018), age (Y. Wang et al., 2016), relationship satisfaction (Borelli et al., 2014), relationship length, (Y. Wang et al., 2016) and centrality of the event recalled (Ogle et al., 2015), although this was not always the case or consistent across studies.

Table 2

Quality Appraisal of Studies Included in the Review

Authors (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	Quality rating
Beyderman & Young (2016)	yes	yes	NR	yes	no	no	no	yes	yes	no	yes	yes	NA	yes	8; fair
Borelli et al. (2014)	yes	yes	yes	yes	no	yes	yes	yes	yes	no	yes	yes	yes	yes	12; good
Cao et al. (2018)	yes	yes	NR	yes	no	no	no	yes	yes	no	yes	yes	NA	no	7; fair
Cavanagh et al. (2015)	yes	yes	NR	NR	yes	no	no	yes	yes	no	yes	yes	NA	no	7: fair
Cortes & Wilson (2016; Study 1)	yes	yes	NR	yes	yes	yes	no	yes	yes	no	yes	yes	NA	no	9: fair
Cortes & Wilson (2016; Study 2)	yes	yes	NR	yes	yes	yes	no	yes	yes	no	yes	yes	NA	no	9: fair
Cortes & Wilson (2016; Study 3)	yes	yes	NR	yes	yes	yes	no	yes	yes	no	yes	yes	NA	no	9: fair
Crawford et al. (2021)	yes	yes	NR	no	no	no	no	yes	yes	no	yes	yes	NA	no	6: fair

Authors (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	Quality rating
Dykas et al. (2014)	yes	yes	NR	yes	no	no	no	yes	yes	no	yes	yes	NA	no	7: fair
Edelstein et al. (2005)	yes	yes	no	yes	yes	no	no	yes	yes	no	yes	yes	NA	yes	9: fair
Elnick et al. (1999)	yes	yes	yes	yes	no	no	no	yes	yes	no	yes	yes	NA	no	8: fair
Gentzler & Kern (2006)	yes	yes	NR	yes	no	yes	no	yes	yes	no	yes	yes	NR	yes	9: fair
Goldner & Scharf (2017)	yes	yes	NR	yes	yes	no	no	yes	yes	no	yes	yes	NA	no	8: fair
Haggerty et al. (2010)	yes	yes	NR	NR	no	no	no	yes	yes	no	yes	yes	NA	yes	7: fair
Kohn et al. (2012)	yes	yes	NR	yes	no	no	no	yes	yes	no	yes	yes	NA	no	7: fair
Kungl et al. (2016)	yes	yes	NR	NR	no	yes	yes	yes	yes	no	yes	yes	NR	no	8: fair
Luo et al (2020; Study 1)	yes	yes	NR	yes	no	no	no	yes	yes	no	yes	NR	NA	no	6: fair
Marigold et al (2014; Study 1)	yes	yes	NR	NR	no	no	no	yes	yes	no	yes	yes	NA	yes	7: fair

Authors (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	Quality rating
Marigold et al (2014; Study 2)	Yes	Yes	NR	NR	no	no	no	yes	yes	no	yes	yes	NA	yes	7: fair
McCabe & Peterson (2012)	no	yes	NR	NR	yes	no	no	yes	yes	no	yes	yes	NA	no	6: fair
Mikulincer & Sheffi (2000; Study 1)	yes	yes	NR	NR	no	no	no	yes	yes	no	yes	no	NA	yes	6: fair
Mikulincer & Orbach (1995)	yes	yes	NR	NR	no	no	no	yes	yes	no	yes	no	NA	no	5: fair
Naismith et al. (2018; Study 1)	yes	yes	NR	yes	yes	no	no	yes	yes	no	yes	yes	NA	yes	9: fair
Naismith et al. (2018; Study 2)	yes	yes	yes	yes	no	no	no	yes	yes	no	yes	yes	NA	yes	9: fair
Ogle et al. (2015)	yes	yes	NR	NR	yes	no	no	yes	yes	no	yes	yes	NR	yes	8: fair
Öner & Gülgöz (2016)	no	yes	yes	yes	no	no	no	yes	yes	no	yes	yes	NA	no	7: fair
Quinn et al. (2015)	yes	yes	no	yes	no	yes	yes	yes	yes	no	yes	yes	yes	yes	11: good
Sutin & Gillath (2009; Study 1)	yes	yes	NR	no	yes	no	no	yes	yes	no	yes	yes	NA	no	7: fair

Authors (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	Quality rating
Sutin & Gillath (2009; Study 2)	yes	yes	NR	no	yes	no	no	yes	yes	no	yes	yes	NA	no	7: fair
Wang et al. (2016)	yes	yes	no	yes	yes	no	no	yes	yes	no	yes	yes	NA	yes	9: fair
Wang et al. (2018)	yes	yes	no	yes	yes	no	no	yes	yes	no	yes	yes	NA	yes	9: fair
Zengel et al. (2019)	yes	yes	NR	yes	yes	no	no	yes	yes	no	yes	yes	NA	no	8: 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)?; CD, cannot determine; NA, not applicable; NR, not reported

What Aspects of AEM Functioning are Associated with Individual Differences in Attachment Patterns?

Most studies examined AEM phenomenology (Table 1) and were synthesised below by i) memory intensity and arousal; ii) memory details, specificity, and vividness; iii) memory coherence and fragmentation; and iv) memory latency and accuracy. A minority of studies described memory content. Both attachment categories and dimensions were used to describe the key findings (Figure 4).

Memory Intensity and Arousal

Attachment anxiety appeared to be associated with increased intensity while attachment avoidance with decreased intensity. In a seminal study by Mikulincer and Orbach (1995), anxiously-attached adults reported increased intensity of early childhood memories for both dominant emotions (e.g., sadness in a sad memory) and non-dominant emotions (e.g., anger in a sad memory), whereas avoidantly-attached adults reported decreased intensity specifically for sad and anxious memories, relative to securely-attached adults. Attachment anxiety was also associated with increased intensity of negative memories (Sutin & Gillath, 2009; Study 1) whereas attachment avoidance with reduced intensity of non-valence specific memories (Sutin & Gillath, 2009; Study 2) and caregiver memories (Haggerty et al., 2010). Cortes & Wilson (2016; Studies 1-3) showed that individuals with high attachment anxiety perceive negative memories (of transgression) subjectively closer in time relative to positive memories (of kindness), independent of actual calendar time, which may partially explain their higher perceived intensity of negative memories at retrieval. A recent study by Dykas et al. (2014) also used Mikulincer and Orbach's memory paradigm (albeit in a younger sample and with another attachment measure) and replicated the findings on memory intensity in anxiously-attached but not in avoidantly-attached adults.

Figure 4

Hypothetical Depiction of the Phenomenology of Autobiographical Episodic Memories by Patterns of Attachment



Note. Three adults with different attachment patterns may differentially recall the same autobiographical event. The securely-attached adult on the left-hand side recalls a negative memory of an interpersonal conflict; the anxiously-attached adult on the right-hand side recalls the same event and experiences it as more emotionally intense and more quickly accessible; the avoidantly-attached adult in the middle also recalls the same event and experiences it as less emotionally intense, less detailed, less coherent, and less quickly accessible.

Others have shown similar effects of attachment anxiety and avoidance on memory intensity. Relative to secure attachment, both attachment anxiety and avoidance were associated with higher intensity of trauma memory (Ogle et al., 2015) and underestimated intensity of the positive affect previously experienced for positive events (Gentzler & Kerns, 2006). Both of these insecure attachment patterns were also associated with comparable neurophysiological markers of increased emotional arousal (i.e., enhanced right-sided parietal activity as revealed by electroencephalography or EEG) during memory retrieval relative to a resting period (Kungl et al., 2016). Securely-attached adults (Zengel et al. 2019) – using attachment categories – showed a tendency for affective intensity to fade less over time for positive compared to negative memories of current relationships, yet such a "fading affect bias" was absent in insecurely-attached adults. This suggests that insecure attachment might be related to a reduction in benefits from positive affect generated by their relationship memories. Consistently, Crawford et al. (2021) found that such a "fading affect bias" is associated with lower attachment avoidance – using a dimensional measure – which reflects attachment security. However, they also found that it was associated with higher attachment anxiety which reflects attachment insecurity instead. Discrepancies between both studies may be due to the use of categorical versus dimensional measures of attachment patterns.

Memory Details, Specificity and Vividness

Attachment avoidance may reduce the level of details retrieved in memory. Sutin and Gilliath (2009) found that attachment avoidance was associated with self-reported lower agreement with statements such as "I can picture this memory in great detail in my mind" for positive (Study 1), negative (Study 1), and non-valence specific AEMs (Study 2). It was also found that attachment anxiety was related to less detailed positive

AEMs (Study 2). Using a more objective method (with research-led coding of memory elaboration), avoidant attachment was associated with fewer unique details in a study on memories of adolescence (McCabe & Peterson, 2012).

Patterns on past memories can also extend to future imagined events too. A study by Cao et al. (2018) demonstrated that securely-attached younger and older adults generated more episodic/internal details for remembered *and* imagined attachment-relevant events compared to attachment-irrelevant events. This attachment-relevance enhancement on recall was absent in both insecurely-attached younger and older adults.

The link between memory detail and vividness may depend on the specific form of insecure attachment, as shown in a study with older adults by Wang et al. (2018). Reduced memory details may reflect attempts to keep aversive memories at bay (Williams et al., 2007) by avoidantly-attached adults, which at times may backfire and result in *more* vivid negative memories akin to intrusive memories in PTSD (Ehlers et al., 2004). Reduced memory detail, however, may also reflect excessive arousal impeding optimal cognitive performance, such that anxiously-attached individuals can experience *less* vivid negative memories (Y. Wang et al., 2018). Vividness was scored objectively in Wang et al.'s study (rather than via self-report) which may not truly reflect people's subjective experiences. Vividness and detail seem to represent distinct memory properties that are related in a complex manner.

Another related memory feature to detail is *specificity* – the extent to which an AEM refers to a unique event rather than a broader event category (i.e., overgeneral memory). Using the well-established test of memory specificity, Beyderman and Young (2016) found no association between anxious/avoidant attachment and memory specificity in African-American adults, contrary to predictions from developmental psychopathology models linking insecure attachment with overgeneral memory

(Valentino, 2011). Their clinical sample exhibited previous substance abuse which could have greatly impaired memory retrieval all together.

Memory Coherence and Fragmentation

Memory coherence refers to one's ability to re-construct past experiences through a connected and logical narrative (Vanderveren et al., 2020). Attachment avoidance is thought to recruit a "defensive" strategy to deactivate the attachment system, contributing to less coherent memory descriptions (Mikulincer et al., 2009). Accordingly, attachment avoidance was associated with less coherent AEMs of both positive and negative memories of marriage in older Chinese adults (Y. Wang et al., 2018) and of both first memories and adolescence memories in US-based young adults (McCabe & Peterson, 2012). However, Quinn et al. (2015) did not find links between attachment patterns and more fragmented (i.e., less coherent) memories for childbirth trauma in mothers. Differences in methodologies for memory assessment for coherence (objective coding) and fragmentation (self-report) may partly explain such discrepancies.

Memory Latency and Accuracy

Attachment insecurity may impact memory performance. Slower retrieval of childhood memories has been found for avoidantly-attached relative to securely-attached adults (Dykas et al., 2014; Mikulincer & Orbach, 1995). Conversely, faster retrieval of (specifically anxious and sad) memories has been found for anxiously-attached adults (Mikulincer & Orbach, 1995). A more recent study found slower retrieval of AEMs for both avoidantly- and anxiously-attached adults (Luo et al., 2020; Study 1), but only avoidantly-attached adults showed a concurrent neurophysiological marker of reduced emotional processing presumably reflecting attempts at reducing memory accessibility (i.e., a diminished late positive potential – as captured using EEG

– when comparing negative relative to neutral memories). The absence of such biological correlates in the anxious attachment group suggests that a different mechanism may be at play.

Memory accuracy is often challenging to study for autobiographical memories as researchers tend to have little control over the encoding of the original event. However, a study by Edelstein et al.(2005) took advantage of access to confirmed records from 14 years earlier and a follow-up in a community-based cohort. Attachment avoidance (but not attachment anxiety) was associated with lower accuracy for facts about childhood sexual abuse (e.g., frequency and extent of the abuse).

Memory Content

A minority of studies examined the types of events retrieved, and found associations between dismissing/preoccupied attachment and increased number of memories about relationships and family (Elnick et al., 1999); fearful/profound-trust attachment and self-defining, life-threatening memories (Goldner & Scharf, 2017); and avoidant attachment and more negative memories involving caretakers (Haggerty et al., 2010).

Which Factors are Likely to Influence the Associations between Attachment Patterns and AEM Functioning?

The distinct profiles of AEM phenomenology by attachment patterns (Figure 4) seem to also depend on additional factors, one being the characteristics of the event. For instance, attachment patterns have been linked with recall of affect experienced only for events involving positive, interpersonal, daily events experienced as adults (Gentzler & Kerns, 2006) or with recall of memory intensity involving only negative (anxious/sad) events in childhood (Mikulincer & Orbach, 1995). Furthermore, attachment avoidance was related to decreased memory intensity when recalling negative memories only

involving caretakers but not memories involving non-attachment figures (Haggerty et al., 2010). It is possible that attachment-related biases in memory are primarily heightened when recalling affect-laden and interpersonal events.

Personal characteristics could also play an important role. A study in older Chinese adults (Y. Wang et al., 2016) suggested that there may be a stronger effect of attachment avoidance on AEM functioning (e.g., detail) in older than younger adults, relative to the effect of attachment anxiety, because attachment anxiety decreases with ageing (Cusimano & Riggs, 2013), although another study found that older age does not always influence attachment effects (Cao et al., 2018). Gender may shape the content of the memories retrieved: men (but not women) with lower attachment avoidance retrieved fewer memories of relationship-maintaining events (e.g., anniversaries and reunions) whereas women (but not men) with higher attachment anxiety retrieved more between-couple events (Y. Wang et al., 2016). Such gender effects were derived from a study in Chinese participants and may instead also reflect cultural differences in AEM functioning. Individuals also vary in how they use mental imagery – a key component of AEM functioning (Conway & Pleydell-Pearce, 2000). Preliminary evidence indicates that those with generally weaker imagery ability (of imagining everyday scenarios) may benefit less from generating a compassion-focused image (Naismith et al., 2018). These findings tentatively suggest that demographics and psychological features could amplify and/or weaken attachment-related biases in memory processing.

What Potential Mechanisms Underpin the Associations Between Attachment Patterns and AEM Functioning?

What are the specific stages of memory processing being affected? Using structural equation modelling to test hypothesised links between different processes, Öner and Gülgöz (2016) found that attachment avoidance may involve dampening

down of the personal relevance of intimacy-related events in romantic relationships from the initial experience (i.e., encoding), which can have knock on effects on all subsequent memory stages, resulting in reduced rehearsal (i.e., consolidation) of such events and subsequently less intensive and vivid memories (i.e., retrieval). Edelstein et al. (2005) suggested that attachment avoidance involves talking to others to a lesser extent about previous incidents of childhood sexual abuse (possibly affecting rehearsal) which in turn contributes to reduced memory accuracy. These ideas are consistent with the hypothesis (not yet directly tested) put forward by Mikulincer & Orbach (1995), whereby attachment avoidance reduces relational memory accessibility by influencing emotional regulation processes, specifically recruiting "repressive defensiveness' – the ability to selectively suppress painful attachment-related information (Dykas & Cassidy, 2011).

Öner and Gülgöz (2016) also found that attachment anxiety may increase rehearsal (but not increased encoding) of negative memories, further enhancing retrieval of those memories. This finding is in line with the notion of schema-consistent processing (also not yet directly tested) whereby information-processing is skewed by IWMs in a manner that is self-reinforcing (Dykas & Cassidy, 2011), such that anxiously-attached individuals may see others in a negative-biased manner (e.g., unreliable or unpredictable).

Are Attachment Patterns Linked to Mental Health Outcomes Through Their Effects on AEM Functioning?

Only four studies considered mental health outcomes. Sutin and Gillath (2009) directly tested the hypothesis that attachment patterns influence anxiety/depression through AEM functioning. They found that reduced memory details (Studies 1 & 2) and memory intensity (Study 2) partially mediated the association between attachment

avoidance and more depressive symptoms (Study 1). Increased frequency of negative memories (Study 2) mediated the association between attachment anxiety and more depressive symptoms. Unlike depressive symptoms, attachment patterns did not appear to be associated with anxiety symptoms via AEMs.

Regarding PTSD, Ogle et al. (2015) found that increased physical reactions, voluntary rehearsal and involuntary recall (but not emotional intensity) mediated the link between attachment anxiety and more PTSD symptoms. Importantly, involuntary recall appeared to play a unique role in development psychopathology as it is the only feature of trauma memory that mediated the relationship between attachment anxiety and more PTSD symptoms in individuals with experiences of childhood traumas. Another study set out to explore the links between attachment patterns and PTSD (and the possible mediating role of memory fragmentation) but found no associations between attachment and fragmentation (Quinn et al., 2015).

Two studies included measures of processes that are thought to play a role in psychopathology (although mental health was not assessed). Attachment anxiety was linked to increased perception of a transgression memory (involving a romantic partner) as having happened closer in time which fuelled "kitchen thinking" – the tendency to bring up past relational memories even in a new and unrelated context (Cortes & Wilson, 2016). This thinking pattern has conceptual overlaps with rumination thinking in depression (Nolen-Hoeksema et al., 2008). Anxiously-attached adults, unlike their securely-attached or avoidantly-attached counterparts, failed to report positive mood change after positive (vs. neutral) AEM retrieval and were worse at problem solving (Mikulincer & Sheffi, 2000; Study 1), another common challenge in depression (Williams et al., 2007).

Overall, an emerging picture indicates that attachment-related biases in AEM functioning exist, and these biases could also have a knock-on effect on mental health and associated risk processes.

Do Attachment Patterns Influence the Effects of AEM-Based Manipulations?

Several studies have suggested that the effects of AEM-based interventions could depend on attachment patterns. Anxiously-attached (relative to avoidantly-attached) adults failed to experience changes in positive affect following positive memory retrieval (Mikulincer & Sheffi, 2000; Study 1). Likewise, the use of nostalgic memory was associated with more recovery from sadness and more increases in happiness in securely-attached relative to insecurely-attached adults (Cavanagh et al., 2015). Possibly, insecurely-attached adults spontaneously interpret those memories in ways that impede their beneficial effects.

Access to memories of negative experiences with attachment figures was reduced for individuals with higher attachment avoidance, yet this effect could be "corrected" by asking the same individuals to perform a concurrent demanding task (i.e., a controlled writing task) intended to disrupt self-regulatory processes (Kohn et al., 2012). This represents a possible strategy for avoidantly-attached adults to access aversive memories for further processing.

Some interventions have the potential to cause harm. A distinction is typically made between imagery through a first-person perspective (i.e., seeing the memory through their own eyes) versus through a third-person perspective (i.e., seeing themselves as outsiders in the memory), with the latter thought to facilitate adaptive emotional distancing (Kross & Ayduk, 2017). However, when visualising a relationship-based memory (of a transgression involving the partner) from third-person (vs. first-person) perspective, individuals with high attachment anxiety made *less*

positive evaluations of their relationship, whereas individuals with low attachment anxiety made more positive evaluations and also reported less distress (Marigold et al., 2014). Third-person imagery may more readily activate and amplify pre-existing conceptual beliefs (e.g., of the self and others) which are likely to be negative in insecurely-attached adults (Libby & Eibach, 2011). A study on spouses (of military members who were deployed) also found that retrieving relational memories resulted in lower negative emotions in individuals with low attachment avoidance but *higher* negative emotions in those with high attachment avoidance (Borelli et al., 2014). Overall, some ways of recalling attachment memories may not always bring positive consequences in insecurely-attached individuals.

Attachment patterns did not influence the benefit of interventions recruiting positive attachment memories, including a compassion-focused imagery intervention (Naismith et al., 2018) or a secure priming intervention (Sutin & Gillath, 2009; Study 2) where an attachment figure is visualised to offer comfort and increase "felt security" for the individual.

In sum, an individual's pre-existing attachment pattern may be relevant to revealing the effects of some manipulations that capitalise on AEMs, including enhanced benefits and potential harms.

Discussion

We reviewed the literature on attachment patterns and AEM in adults (from aged 16) to explore its relevance for clinical psychological science and practice. Our eligible studies (Table 1) spanned across psychology subdisciplines (e.g., social, clinical, developmental, educational, cognitive, psychoanalytic, etc.), underscoring the topic's broad relevance. Work directly examining mental health outcomes in this area remains

scarce, despite the well-established links between AEM and psychopathology transdiagnostically (Dalgleish & Brewin, 2007; Hitchcock et al., 2017; Williams et al., 2007). Below we present an overview of key findings, and consider theoretical, clinical, and methodological issues to bridge the sciences of attachment, memory, and emotion for treatment innovation.

Overview of Findings

Compared to securely-attached adults, avoidantly-attached adults appeared to demonstrate a relatively stable profile of AEM biases with decreased accessibility to attachment-relevant information across a range AEM properties. Recalling (negative) attachment memories in avoidantly-attached adults can be *less* intensive, detailed, coherent and slower (Figure 4). For anxiously-attached individuals, some evidence indicates that recalling comparable memories can be *more* intense and faster (Figure 4).

A complex set of mediating and moderating factors seems to characterise the link between attachment and AEM. At least some of the attachment-related memory biases can be explained by emotional regulation and self-relevant processing and influenced by both event (e.g., valence and interpersonal nature) and personal characteristics (e.g., age and trait imagery). Tentatively, attachment patterns and mental health outcomes and processes are linked through key AEM properties (e.g., intensity), particularly for depression and PTSD. Finally, the benefits of at least some emerging AEM-based therapeutic techniques may depend on attachment patterns.

Theoretical Implications

We have drawn up a schematic model (Figure 5). Focusing on the first link from attachment to memory, our findings broadly accord with Dykas & Cassidy (2011)'s dual process model. For example, avoidantly-attached individuals underactive their

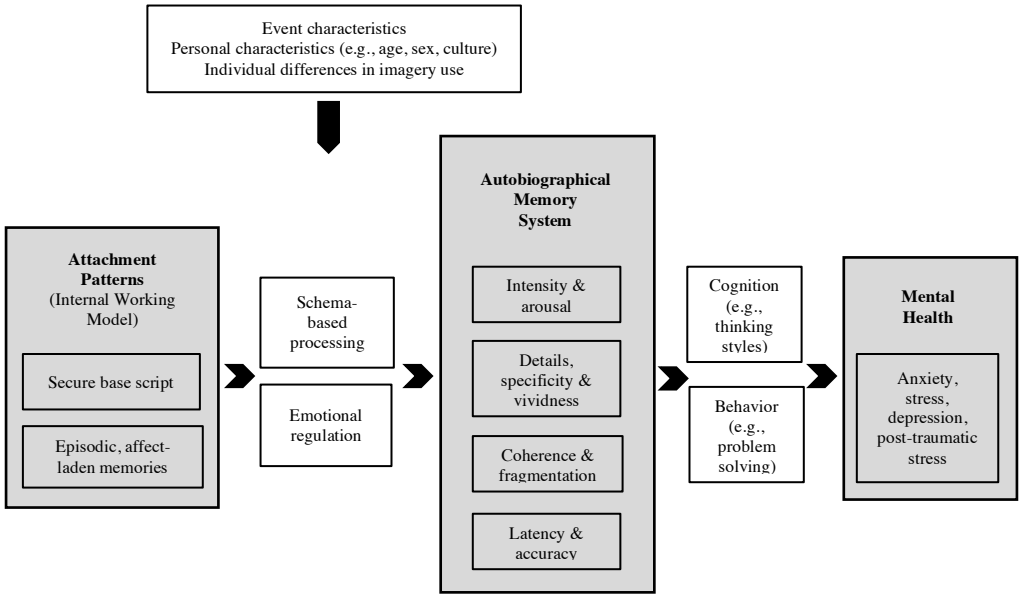
attachment memories (e.g., reduce intensity or details) through downregulation to possibly avoid emotional pain, although this "blocking" may also limit the benefits from such memories (e.g., from AEM-based interventions). If attachment-related memories are accessed and processed, then these are likely to be consistent with pre-existing self-images (Conway, 2005; Conway & Pleydell-Pearce, 2000), so for example anxiously-attached individuals show more sensitivity to negative attachment memories (e.g., with negative self-views). Despite long-standing proposals that emotion regulation and schema-relevant processing jointly play key roles mediating attachment and cognition (Dykas & Cassidy, 2011), these had not been directly tested in any of the studies reviewed.

Turning to the second link linking memory and mental health, attachment-related memory biases impact on established aspects of cognition (e.g., thinking styles) and behaviour (e.g., problem solving) highlighted in cognitive-behavioural models of emotional disorder maintenance (Harvey et al., 2004), while other levels of analyses (e.g., biology and sociality) remain under-investigated. Recent frameworks have further specified mechanisms impacted by attachment – negative expectancies, interpretation biases and defensive strategies (Kobak & Bosmans, 2019) – which are likely to dynamically impact intra- and interpersonal processes.

While some memory properties (e.g., specificity and fragmentation) have well-known theoretical and/or empirical links to psychopathology, causality between other properties (e.g., intensity and latency/accuracy) and mental health remains to be established. There are likely to be multiple mechanisms depending on the specific aspect of AEM in consideration.

Figure 5

A Schematic Model of Mechanistic Processes Connecting Attachment, Autobiographical Memory, and Mental Health



Note. Internal working models (IWM) represent hypothetical cognitive structures underpinning individual differences in attachment patterns (e.g., secure, anxious and avoidant attachment) in adulthood; IWM are derived from semantic and episodic aspects of autobiographical memories (AMs); IWM, through two key information-processing routes (emotion regulation and schema-based processing), also influence AM functioning including its phenomenological qualities; AMs in turn shape cognitive-behavioural processes involved in the mental health and emotional

Clinical Implications

The cognitive literature reveals that at least some of the AEM properties are amenable to modification (Hitchcock et al., 2017). To address memory intensity/arousal, well-established and effective CBT techniques are already available such as imaginal exposure (Foa et al., 2007), cognitive restructuring within reliving (Grey et al., 2002) and imagery rescripting (Arntz, 2012). The latter is a recognised approach for addressing salient memories of childhood trauma – often involving attachment figure(s) (Arntz & Weertman, 1999) – and holds promise as brief, stand-alone approaches to address a range of emotional disorders (Arntz, 2012). Experimental psychology has also provided innovative early-stage techniques to modify memory features. One line of development harnesses repeated retrieval practices to enhance memory specificity/detail, including Memory Specificity Training (Barry et al., 2019), Episodic Specificity Induction (Jing et al., 2016), Memory Flexibility Training (Hitchcock et al., 2018; Moradi et al., 2014). Another emerging approach is the use of (visuospatial) competing task techniques to reduce memory vividness (Engelhard et al., 2010) and involuntary recall (Iyadurai et al., 2020). Experimental approaches to change memory fragmentation or latency/accuracy are currently underexplored.

AEM's malleability opens exciting therapeutic opportunities to improve mental health in insecurely-attached individuals. Various cognitive-behavioural models increasingly incorporate attachment ideas more explicitly (Gilbert, 2014; Kellogg & Young, 2006; Maccallum & Bryant, 2013), but have yet to fully harness the full range of possibilities for modifying AEMs. The effectiveness of current psychological treatments for them may be enhanced through an augmented focus on AEM. For example, current CBT protocols could be enriched with AEM-based techniques, as done for social anxiety (Wild et al., 2008) or bipolar disorder (Holmes et al., 2019), albeit

here also matched to patients' attachment patterns. For instance, conventional CBT techniques (e.g., changing core beliefs) may be aided by increasing memory specificity to facilitate access to a broader range of evidence or by decreasing intensity of distressing memories to support emotional regulation. Novel intervention protocols could also consider targeting multiple AEM foci simultaneously (Holmes et al., 2019; Pile et al., 2020). Critically, the development of new AEM-based techniques (e.g., varying imagery perspective in relational memories) shall consider whether their effectiveness – including the possibility of harm – depends on pre-existing attachment patterns.

AEM-based approaches hold relevance to help prevent mental health problems in populations where attachment insecurity is prevalent, for example in the context of childhood maltreatment (Boroujerdi et al., 2019) and autism spectrum (Gallitto & Leth-Steensen, 2015), and thus where lifelong psychopathology risk is high. Prevention work can embrace digital mediums (as explored in many experimental psychology techniques) for wider and global reach. Given that not every insecurely-attached individual would need an intervention, work on identifying those at "most" risk is warranted. For this we need to weave in data about possible moderators and mediators (Figure 5), which remain a scientific gap.

Finally, attachment patterns can both persist and change across the lifespan (Fraley, 2019). A tantalizing yet underexplored possibility is whether modifying attachment-related memories can create long-lasting changes in attachment pattern. While attachment styles are thought to stabilise in adulthood, recent neuroscientific accounts posit that memories may be rendered labile again under certain boundary conditions (Visser et al., 2018). Accordingly, adults' attachment appear to change with psychological treatments even within CBT – where the theoretical focus is not explicitly

on changing attachment (Taylor et al., 2015). The success of changing attachment styles may depend on the varying degree to which (intentionally or incidentally) the autobiographical memory system is engaged across treatments. Attending to AEM-based images specifically underpinning one's attachment pattern (e.g., with a caregivers or partners) could more effectively modify one's attachment more generally. This cognitive malleability is also likely to be potentiated during adolescence and young adulthood (Lau & Waters, 2017), which we can leverage as an optimal time window for changing attachment insecurity.

Within the framework of cognitive therapy, an AEM-based approach with attachment memories also has clinical potential to impact on core beliefs (about the self, others and the future) which are notoriously difficult to change (James & Barton, 2004). Attachment and core beliefs are proposed to overlap with autobiographical memory serving as the critical bridge (e.g., Platts et al., 2002). However, for core belief work, memory- and imagery-based techniques remain underutilised (Stopa, 2009) and their benefits on symptom relief underexamined (Çili & Stopa, 2015). Tuning into attachment-related memory biases could more readily evoke encapsulated core beliefs and render them more amenable to modification.

Methodological Issues

The vast number of studies using correlational designs (Table 2) highlights the need for further longitudinal and appropriately-powered studies with multiple assessment timepoints to provide more robust tests of causality from attachment/IWMs to AEM functioning, and in turn to mental health. A truly developmentally-sensitive approach would track younger to older adulthood, include genetically-informative design features to tease apart the relative contributions of genes and environment

(Fearon et al., 2014), explore a global and diverse perspective (Bauer, 2019), and embrace robustness and transparency (Munafò et al., 2017).

AEM phenomenology comprises a range of features but most studies focused exclusively on single features, thus we lack an understanding of their interrelationships. Crucially, despite the centrality of involuntary retrieval in AEM functioning (Berntsen, 2009) and psychopathology (Ogle et al., 2015), only a few studies considered intrusive images/memories.

Different measurements of attachment may reflect different aspects of attachment. The AAI is an interview that assesses one's "state of mind" with regard to attachment with early caregivers followed with subsequent standardised coding yielding discrete classifications (George et al., 1996), whereas self-reported measures such as the ECR (Brennan et al., 1998) typically assess attachment in the context of general adult relationships yielding continuous measures. It remains to be explored whether attachment-related biases in memory are influenced by the attachment contexts and relationship foci.

Conclusion

Unlike the more common approach of adapting successful therapeutic models in adults to developmental populations (Benjamin et al., 2011), developmental science could improve cognitive approaches in adults too, here with the rapidly expanding work connecting attachment, memories, and emotions. Attachment insecurity has been a long-established transdiagnostic risk factor for later psychopathology but the underlying mechanisms have remained elusive. The focus on a key cognitive, causal, and modifiable factor – autobiographical memory – opens the door for exciting future opportunities (Figure 6). Mechanistically-informed interventions (Barlow et al., 2013; Holmes et al., 2018) harnessing psychological sciences hold promise for reducing the

mental health burden in the area of attachment insecurity across a range of clinical populations.

Figure 6

Outstanding Questions for Clinical Psychological Science Bridging Attachment, Autobiographical Memories and Psychopathology

Questions Box

- Which autobiographical memory features lie in the causal pathway between attachment patterns and emotional disorders (and for which specifically)?
- What are the overlapping and distinct autobiographical memory profiles between different forms of insecure attachment (e.g., avoidant vs. anxious)?
- How could we best assess attachment-related biases in autobiographical memory in clinical settings to inform treatment selection?
- Would treatment effectiveness for insecurely-attached individuals – across psychiatric diagnoses – improve with an added/renewed focus on autobiographical memory?
- How do we best proceed with prevention work for insecurely-attached individuals that takes into account latent vulnerabilities in autobiographical memory?
- Can we harness the malleability of autobiographical memories to create long-lasting changes in internal working models (and thus attachment)?

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Service Improvement Project

Assessment of Digital Risks in Child and Adolescent Mental Health Services: A Mixed-Method, Theory-Driven Study of Clinicians' Experiences and Perspectives

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Abstract

Children and adolescents in the UK spend increasingly more time in the digital world, raising societal fears about digital risks in this age group. Professionals are not always aware of the ever-developing research or guidance available around digital safety. This gap underscores the need to understand current experiences and determinants of digital risk assessment, including clinicians' views on barriers and facilitators. A mixed-method design was used. Fifty-three clinicians working in child and adolescent mental health services (CAMHS) in South England took part in a survey; of these 12 took part in semi-structured interviews. A psychological model of behavioural change (COM-B: capabilities, opportunities, motivation, and behaviour) guided the analyses. Survey data revealed that clinicians showed awareness and concerns for several digital risk issues but there appeared to be gaps in their knowledge and practice. Interview data revealed different factors influencing staff enquiry about digital risks in CAMHS. These included aspects of capabilities (knowledge and skills), opportunities (resources, organisational context, and empowerment of youth), and motivations (habit change, emotional experiences, and professional identity/role). Targeting both staff-level and organisation-level barriers to digital risk assessments in CAMHS is crucial. This study informs service improvement to ensure that children and young people safely navigate the digital world.

Keywords: digital risk, online safety, social media, CAMHS, COM-B, youth mental health

Introduction

The Internet plays an important role in young people's lives. The majority of children and adolescents in the UK have their own tablets or smartphones and they also spend increasingly more time online (Ofcom, 2020), raising societal fears about digital risks in this age group (Odgers & Jensen, 2020; UNICEF, 2017). Currently, firm conclusions about the negative effects of screen-based activities on young people's socio-emotional developmental and mental health are hampered by methodological issues within research (Dickson et al., 2018), including for controversial areas such as screen time (Orben, 2020). Nevertheless, practitioners understandably remain concerned by the emerging evidence (Dickson et al., 2018), particularly in areas associated with high levels of clinical risks, including self-harm (Biernesser et al., 2020), cyberbullying (Bottino et al., 2015), and problematic sexual attitudes and behaviours (Horvath et al., 2013).

Several UK-based authoritative bodies have recently issued guidance on digital risks in youth (Livingstone et al., 2017; NSPCC, 2019; Viner et al., 2019), all of which point to a critical need for professionals to understand the emerging evidence base within their practice. Most research on digital risks is on the impact on youth. Research on clinicians thus far has been largely restricted to their views on digital interventions (Cliffe et al., 2020), digital consultations (Bhardwaj et al., 2021), and internet safety education (Moreno et al., 2013) but not on digital risk assessments, despite their active role in prevention, intervention and safeguarding.

In this rapidly developing field, we note that several terms are used interchangeably, including – but not limited to – digital risk (OECD, 2021), digital dangers (Palmer, 2015), online risk (Livingstone et al., 2020), online safety (NSPCC, 2019), online harm (Woodhouse, 2021), Internet safety (Livingstone et al., 2017),

cybersecurity (Quayyum et al., 2021), and so forth. Our rationale for choosing "digital risk" was pragmatic: "risk" is the language used by clinicians to denote common forms of harm to patients (e.g., risk of suicide or neglect) and "digital" is a more encompassing term that covers both online and offline activities (i.e., using digital devices). Terminology and definitions are likely to consolidate with further intersectoral collaboration spanning science, law, health, education, and technology.

Local Context

Oxford Health is an NHS Foundation Trust in South England looking to develop guidance on digital risks for working with young people. Child and adolescent mental health services (CAMHS) in the UK are expected to offer advice and consultation around appropriate support when online behaviours can be detrimental to a young person's development.

Professionals, parents, and young people, however, are not always aware of the ever-developing research or guidance available around digital safety. Anecdotal accounts suggest a lack of confidence given the generational gap between clinicians and young people. It is also unclear whether online activity is appropriately covered in routine risk assessments. This gap underscores the need to identify current experiences and determinants of digital risk assessment, including clinicians' views on barriers and facilitators.

While our focus is on one organisation, clinical experience and discussions with colleagues indicate that this is a topical area that holds relevance nationally (and internationally) and across statutory and tertiary sectors.

A Behaviour Change Approach

Psychological theories play an important role in understanding and informing behavioural changes to guide the development of high-quality interventions. An elegant pan-theoretical model (Michie et al., 2011) posits that components associated with capabilities (C), opportunities (O) and motivations (M) are necessary for behaviour (B) to occur (Supplemental Materials 1). A "diagnosis" of the determinants of the behaviour following this COM-B model can be made to identify intervention targets. Capabilities include internal factors such as knowledge and skills; opportunities include external factors such as physical (e.g., infrastructures) and social possibilities (e.g., organisational culture and implementation climate); and motivations include automatic (e.g., habit and emotions) as well as deliberate processes (e.g., beliefs and intentions) that would energise behaviour. Such components are informed by psychological constructs synthesized across 19 major behaviour-change theories, an approach coined as the Theoretical Domain Framework or TDF (Atkins et al., 2017). See Supplemental Materials 2 for details.

The COM-B analysis can also help identify corresponding intervention and policy approaches to support the desired behavioural changes (Supplemental Materials 1). For example, a lack of skills identified could be targeted via training, with regulation flagging this training up as compulsory; habit formation could be targeted with environmental restructuring to add reminder cues, which can be further enhanced with regular communication promoting this desired habit; the lack of social influences could be targeted by making role models more available, further supported by a widely disseminated professional guidance.

The COM-B model is increasingly used in healthcare research. This model has informed clinical practice to change clinicians' behaviours in areas such as risk

communication (Bonner et al., 2014), health promotion (McDonagh et al., 2018), health assessments (Alexander et al., 2014), use of evidence base (De Leo et al., 2021), and improved use of clinical resources (Jenkins et al., 2018). We are, however, unaware of research applying COM-B to understand what is needed for clinicians to perform risk assessments more effectively.

Aim and Questions

Our overarching aim is to understand clinicians' experiences and perspectives in relation to digital risk assessment in CAMHS in Oxford Health and to inform service development in this area. This research is guided by the COM-B (and TDF) approach with emphasis on mapping determinants of behaviour.

Our specific questions were as follows:

1) What areas of digital risks in children and young people are clinicians concerned about and what areas are being assessed by clinicians?

2) What clinicians' characteristics (demographic and professional factors) are associated with their concerns, assessments, and knowledge of digital risks?

3) What are the barriers and facilitators for clinicians in assessing digital risks?

4) What recommendations (e.g., intervention and policy approaches) can be drawn for service developments?

Methods

General Design

A mixed-method design was used. Two studies were conducted. In Study 1, an online survey was devised to map out clinicians' views and experiences on digital risks and to explore the associations with participants' characteristics. In Study 2, a subsample of clinicians was followed-up with interviews to explore their views on

barriers and facilitators for assessing digital risks in CAMHS. Participation was voluntary and all participants provided informed consent. The project was approved and registered by Oxford Health NHS Foundation Trust Quality and Audit Team as service evaluation, and thus no ethical approval was needed.

Additional method details can also be found on Supplemental Materials 3.

Study 1

Participants

All team managers in CAMHS within Oxford Health were contacted to invite clinicians within their teams to take part in a short online survey. Survey data were collected between September and December 2020.

Design and Procedure

An online survey (Supplemental Materials 4) was designed using the Joint Information Systems Committee (JISC) Online Survey tool. Participants were told that their individual responses would remain confidential and that the survey would take approximately 15 min to complete. The survey questions were devised by the authors in consultation with clinicians and researcher working in youth mental health.

Survey questions were divided into three main sets. The first set asked about demographics and professional characteristics. The second set asked about concerns and assessment on key areas of digital risk with four response options (never, seldom, sometimes, and often). For all these areas, clinicians were asked about their own frequency of concerns as well as their perception of both young people's and parents'/caregivers' frequencies of concerns. The third set was intended as a brief test of knowledge on the issue of digital risks. Clinicians were asked whether they were aware of any guidelines on the topic and whether they knew of eight apps (used by young people) which pose some level of risks according to NSPCC (National Society for the

Prevention of Cruelty to Children). Finally, a link to resources on online safety by NSPCC was included.

Analysis

Descriptive statistics were used to summarise demographics and professional characteristics. Frequencies of concern and frequency of assessments per area of digital risks were totalled across clinicians. Knowledge was assessed as whether clinicians were aware of guidelines on digital risks; the number of apps that clinicians were able to correctly identify; and the number of apps that clinicians were able to recognise as somewhat risky for young people. Frequency responses indicating "often" and "sometimes" were grouped into "high" frequency and "seldom" and "never" into "low" frequency.

Fisher's exact tests were used to explore associations between digital risk concern/assessment/knowledge and participant characteristics. The Benjamini-Hochberg procedure to control for false rate discovery ($q < .05$) was applied given the large number of tests. All statistical analyses were performed using SPSS version 25 (IBM, 2017).

Study 2

Participants

Clinicians who completed Study 1 were invited to leave their contact details if they wished to be interviewed. Participants were told that the findings will help develop strategies to better identify and manage digital risks in CAMHS. Interviews took place between November 2020 and January 2021.

Design and Procedure

A topic guide (Supplemental Materials 5) was jointly developed and piloted by the study authors and subsequently reviewed based on feedback from clinicians working

in CAMHS. We began with a broad definition of "digital risks" as "*behaviours involving the use of digital devices, the Internet and/or social media that pose potential harm to self, to others, or from others, in young people that you work with*". Interview questions explored clinicians' experiences of assessing digital risks with young people; factors (personal and professional) perceived as influencing their experiences/views of assessing digital risks; and recommendations for service improvement. All interviews took place individually by videoconferencing. Each interview was between 30-60 min.

Analysis

Interviews were audiotaped and transcribed. Transcripts were subsequently analysed with thematic analysis (Braun & Clarke, 2006) using NVivo 12 (International QSR, 1999). The lead author (ALZ) read each transcript several times to ensure familiarization and then conducted the initial coding and provisional (sub)theme generation. All authors reviewed the final (sub)themes and interpretation of the data to ensure credibility and coherence.

Results

Study 1

Participant Characteristics

Fifty-three clinicians responded to the online survey (see Supplemental Materials 6 for full details on demographics and professional characteristics). Respondents were primarily female, White and working full-time. There was an even split between parents and non-parents.

A wide range of work experiences were reported as indicated by the number of years since core qualification and number of years working for Oxford Health (ranging from less than a year to over 30 years). All core professions within CAMHS in the UK

were represented (with the majority identifying as psychologists or nurses). All CAMHS services within Oxford Health in Oxfordshire were also represented. The majority of clinicians worked within local, generalist CAMHS and a county-wide specialist neurodevelopmental service. Most clinicians reported having a weekly caseload of 4-9 direct or indirect cases (i.e., working through families, schools, or other professionals).

Digital Risk Concerns and Assessment

Six areas of digital risks were rated by clinicians as of "high" concern (i.e., with at least 50% of clinicians endorsing "often" or "sometimes"). These were time spent; meeting strangers; sexting; cyberbullying; suicide/self-harm; and body image (Figure 1). The remaining areas not rated as such were addictions, sexual materials (e.g., pornography), media trauma, and the dark web. Clinicians' frequency of concerns was significantly associated with their frequency of assessments of all digital risk areas, except for media trauma (see Supplemental Materials 7 for detailed results).

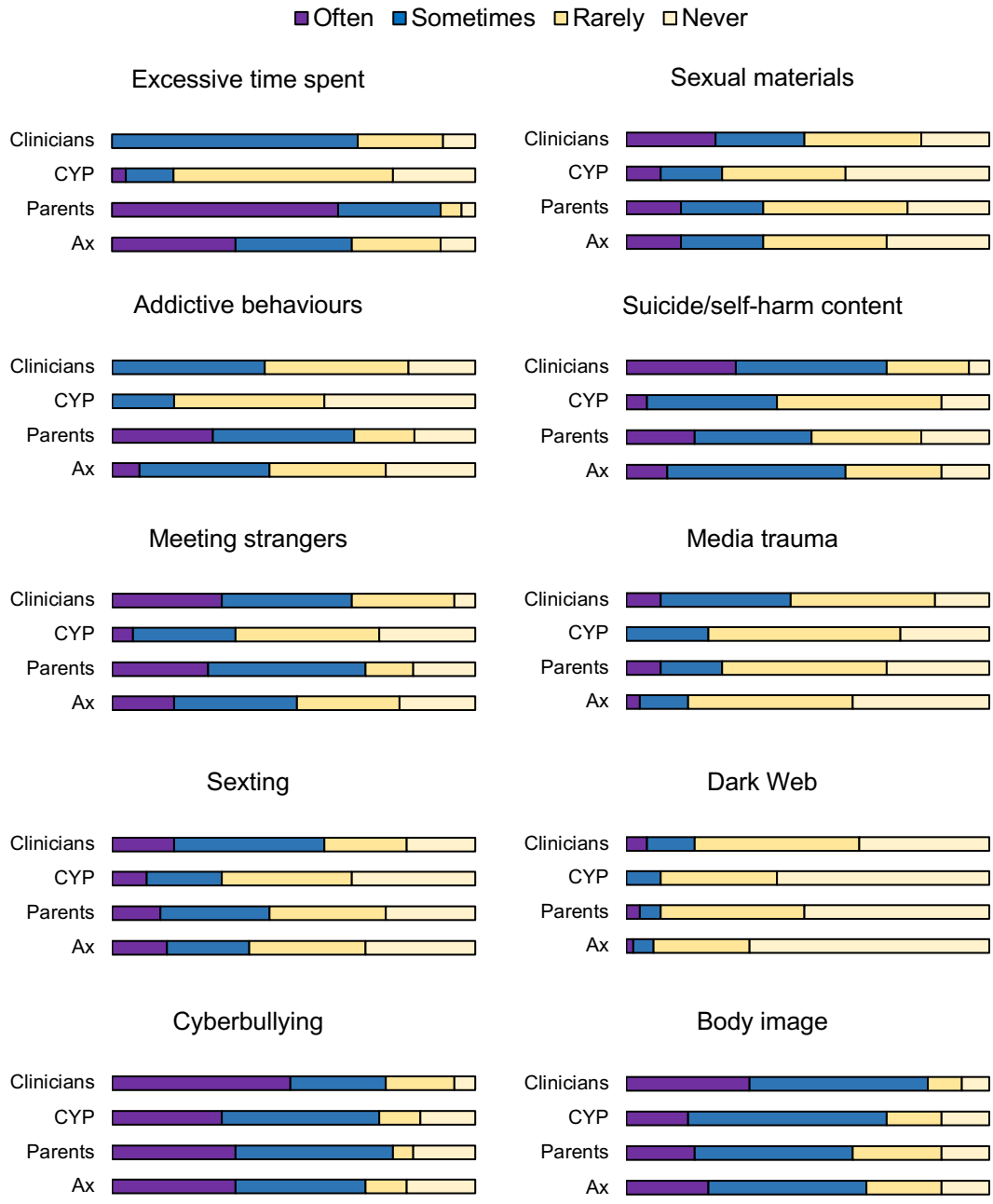
Clinicians' frequency of digital risk concerns was significantly associated with their perception of young people's concerns in all areas except for three (time spent, meeting strangers and addiction). Clinicians' frequency of concerns was significantly associated (accorded) with their perception of parents/caregivers' concerns in all areas.

Brief Test of Clinicians' Knowledge

Only one-third of clinicians (n = 19; 35.8%) reported being aware of any existing guidelines. While clinicians on average identified most of the 8 apps correctly (M = 6.17; SD = 1.82), they recognised only approximately half of these as somewhat risky (M = 3.74; SD = 2.03).

Figure 1

Frequency of Concerns on Key Areas of Digital Risks as Reported by Clinicians



Note. Clinicians = how often *clinicians* are concerned about this area of digital risk; CYP = how often clinicians perceive that *children and young people* are concerned about this area of digital risk; parents = how often clinicians perceive that *parents/caregivers* are concerned about this area of digital risk; ax = how often do clinicians *assess* this area of digital risk

Associations between Clinicians' Characteristics and Clinicians' Digital Risk Concerns, Assessments and Knowledge

Digital risk *concerns* showed mostly no significant associations with any clinicians' characteristics, with two exceptions. More *years qualified* was significantly associated with more clinicians' concerns about sexting and sexual materials. Working in services with *Tier 4* provision was also significantly associated with more concerns about sexting (Tier 4 services in the UK CAMHS system are typically funded to offer more specialist, county-wide support, and have closer links to youth justice and exploitation services). No significant associations were found with any other areas of digital risks. No significant associations were found with age or parenthood.

Digital risk *assessments* showed a significant association with only one clinicians' characteristic. Specifically, more *years qualified* was significantly associated with more assessments of time spent, sexting; exposure to sexual materials; body image; suicide/self-harm; and meeting strangers. No significant associations were found with any other area of digital risks. No significant associations were found with age, parenthood, or CAMHS tiers.

Finally, awareness of guidelines was significantly associated with more *years qualified* and with *being a parent*. No significant associations were found with age or CAMHS tiers or with knowledge about risky apps.

See Supplemental Materials 7 for detailed results.

Study 2

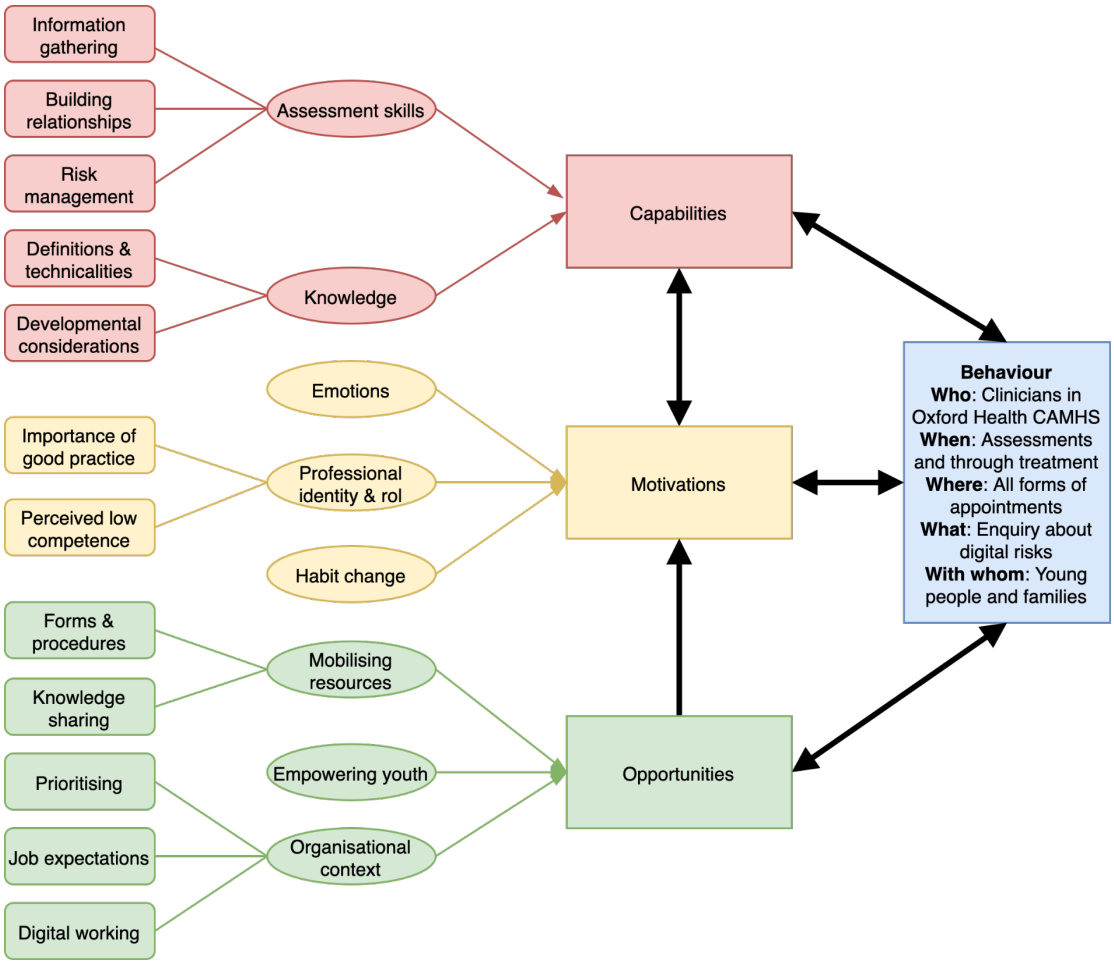
Participant Characteristics

Twelve clinicians took part in the interviews. Nine identified as female and the rest as male. A range of professions were represented: five clinical psychologists, a forensic psychologist, a forensic psychiatrist, a child and adolescent psychiatrist, a

nurse, a social worker, an educational wellbeing practitioner, and an assistant psychologist. There was an equal split in those working in CAMHS services with and without Tier 4 provision.

Figure 2

Schematic of Themes and Subthemes following the COM-B Model



Note. A generic COM-B model (Michie et al., 2011) was expanded with current themes and subthemes

Themes and Subthemes

Eight themes and 13 subthemes were identified, which corresponded to two capability components, three opportunity components and three motivational components within the COM-B model (Figure 2). A more detailed summary of the

relationships between COM-B components (and corresponding TDF domains linked to specific theory-driven psychological constructs) can be found in Supplemental Materials 8. Additional illustrative quotes can be found in Supplemental Materials 9.

Assessment Skills (Capability). Clinicians described an approach to *information gathering* that needed to be both narrow and broad. While some clinicians waited for a concern before exploring further, the need for direct question was also raised: "you just can't pick it up…asking the question 150 times until you get one 'yes'… that's worth asking the question" (participant 10). The use of formulation was raised as a guide to assessment, placing emphasis on the broader context, including school and family factors and areas of strengths. Thus, sensitively involving parents was highlighted as a key issue. Overall, a semi-structure approach was favoured that included general enquiries followed by prompts. Given the potential sensitive nature of this topic, an emphasis was placed on *building relationships* with the young person and getting to know the young person (participant 3). Finally, clinicians wanted to be skilled in *risk management* beyond assessments, as the former is perceived as harder (participant 8). Clinicians often expressed feeling unable to provide adequate advice for young people in making changes and for parents in supporting these changes.

Knowledge (Capability). Clinicians described gaps in their knowledge of *definitions and technicalities*. Many expressed not knowing the whole "spectrum of risks", including areas they never thought they would ask about (participant 2). Lack of knowledge was described about the specifics of how an app works – "bamboozled by the technical side of it" (participant 6). Potential ambiguities were also highlighted regarding the umbrella term "digital risks". Clinicians expressed the need to be thoughtful of *developmental considerations*. Clinicians would like to know more about the general prevalence of digital risks (participant 12) and what falls within normative

risk-taking (participant 2). There is a desire for an overarching framework including typology/principles rather than just learning technicalities, as these can change rapidly (participant 6), as well as better understanding vulnerability and maintenance factors (participant 11).

Professional Identity and Role (Motivation). Clinicians described the *importance of good practice*. Considering digital risks was seen as "due diligence" (participant 3) – "it won't take long 'cause it's not relevant or it will take long and it will be a bloody good job that we've done it" (participant 1). Unanimously, the need for education, training and regular updates was stressed, as it is about "practice catching up with the world outside" (participant 6). Many also raised a sense of *perceived low competency* and generally "not feeling equipped" (participant 12). There is also a perceived "generational gap" – "I'm at an age now where I think 'oh, God, do I need to know anymore?'...their knowledge … it's more embedded…whereas mine on the outskirts?" (participant 8).

Habit Change (Motivation). Clinicians explained challenges associated with "moving from 'oh this is a good idea' to…actually put something in place" (participant 1). Clinicians explained that it can be easy to forget because "there's so many things to remember that it can be really hard to remember all of them" (participant 2). Suggestions proposed included the role of practice (participant 2) and having reminders (participant 5).

Emotional Experience (Motivation). The issue of digital risks brought up a range of emotions – the "speed of things…. I find so daunting" (participant 8). "Taboo" subjects, especially those involving sex, seem to bring up anxieties (participant 12). Feelings of helplessness and frustration were described when not knowing how to

manage risks (participant 9). Several clinicians wondered if a "big incident" is needed to prompt further awareness of digital risks as "motivation is emotional" (participant 1).

Mobilising Resources (Opportunity). A range of suggested improvements for *forms and procedures* were made. A lack of standardised "formal template" where digital risks are included was mentioned (participant 11), either in paperwork or within CareNotes (an electronic recording system). A clinician commented that the electronic system presents "an adult risk assessment that didn't really make sense for young people", for example, with issues such as risk of falls (participant 5). A "simple checklist" (participant 6) or a "short and compact screening" form (participant 4) with "little prompts" (participant 1) was suggested to aid digital risk assessments. Suggestions were also made for improving *knowledge sharing*. They wanted more "joint-up thinking about what's currently going on" (participant 3). These included using of existing structures such as team meetings to share information, with some clinicians preferring "regular" and "practical" training (participant 8) while others just "brief" updates (participant 2). Many wanted clarity around "where to go to" for help (participant 6), including safeguarding teams, nominated digital risk champions and/or clinical supervisors.

Organisational Context (Opportunity). Issues around *prioritising* were discussed, with senior managers "being on board" seen as critical (participant 9). Clinicians pointed out some gaps in the organisation as a whole on this topic, for example, the lack of digital risks in induction/current training or broader conversations on this topic beyond CAMHS. However, some caveats were raised, for instance, that "it can be a more of a corporate thing... kind of top down or like someone's hobbyhorse" (participant 1), alongside competing demands – "there were so many things we could add in… it's hard" (participant 5). There was also a desire for clarity on *professional*

expectations. Clinicians commented on "a lack of "national/cross-agency agenda" and "professional practice guidance" (participant 6), leading to variability in practice. Recent Organisation-level uptake in *digital working*, due to the safety restrictions imposed by the COVID-19 pandemic, has meant that there is now more "awareness" of digital risks (participant 8) and opportunities to use young people's "language" (participant 7).

Empowering Youth (Opportunity). Clinicians expressed the need to put young people's views and experiences at the centre of this topic. Understanding young people's views on digital risk assessments was seen as critical, for instance asking, "if you were coming to CAMHS, how would it be if someone asked you about your social media usage?" (participant 3). Challenges were discussed around how to best enable young people to share, as they often "don't feel being understood by parents" (participant 12) and needed to be "brave" to share (participant 2). Some suggested for "a questionnaire that the young person fills out while they're in the waiting room…just like other routine outcome measures" (participant 11). A more active role within a broader service-user engagement strategy was proposed, because it is a "…whole world that young people know a lot more about than older people, and its often older people planning and organising services and less involved in social media". Suggestions were made for young people to be involved in training/educating clinicians to create a genuine sense of "constant conversation back and forth" that "could potentially have more impact" (participant 5).

Discussion

Key Findings

Overall, survey data provided a quantitative snapshot of clinicians' views and experiences on digital risks, overall showing variability in practice, and interview data further revealed a theory-driven core set of behavioural determinants (by identifying themes) of current practices in digital risk assessments (as perceived by clinicians).

Here we summarise the key results as brief answers to each of our four research questions (see *Aim and Questions*) in turn:

1) Clinicians showed concerns and assessed for a range of digital risks areas (Figure 1) although with some gaps (i.e., gaming and Internet addiction, pornography, media trauma and the dark web); they also showed awareness of common apps used by young people but not of all possible risks associated or of existing guidelines; and their concerns were in line with parents' concerns but not always with young people's concerns;

2) Very few associations were found with clinicians' characteristics, including age and parenthood, suggesting that these individual characteristics may play less of a role in clinicians' practices on digital risks than it is assumed by the perceived "generational gap";

3) Factors in all domains of capabilities, opportunities, and motivations (Figure 2) were found as relevant for clinicians, most of which represented barriers to routine enquiry of digital risks in CAMHS;

4) These factors represent potential targets for behavioural-change interventions and policy approaches (Michie et al., 2011), which we elaborate below (also see Supplemental Materials 10).

Implications for Service Improvement

Intervention Functions

Interview data echoed survey results in the need for interventions targeting multiple factors and at multiple levels. Clinicians have suggested a wide range of potential behavioural-change techniques for intervention development (details which can be found in Supplemental Materials 8). At the staff level, there is a role for *education* and *training* to increase capabilities (knowledge and skills) and motivations (e.g., confidence). This is likely to produce maximal impact when it is responsive to staff and service needs (i.e., considering each subtheme identified) while bearing in mind that a one-off "tick box exercise" is unlikely to cover the breadth and evolving nature of the issues. Interventions taking the form of *environmental restructuring* (e.g., new assessment resources and processes) and *modelling* (e.g., knowledge sharing with supervisors and colleagues) can play important roles in engaging more "automatic" or "unconscious" processes driven by external factors (Marteau et al., 2012), especially when "reflective" or "conscious" motivations are limited in fully driving behavioural change. For instance, clinicians showed conscious awareness of issues – it was perceived as important for their professional identity – but they still identified significant barriers and gaps in their practice of digital risk assessments.

Beyond staff-targeted interventions, clinicians suggested the need for broader systemic changes through services as well as the whole Trust. Implementation science theories stress the importance of concurrently targeting staff and organisational-level determinants (Williams & Beidas, 2019). The limited benefits of training-only approaches on *behavioural change* – by just targeting staff – can be illustrated by the popular yet ineffective use of unconscious bias training, which typically consists of one-off, stand-alone educational programs delivered to individuals to increase awareness of

unconscious biases that impact minoritised groups based on ethnicity, disability, and so forth (Forscher et al., 2019). In addition to the approaches already described, a shift in organizational culture is needed for *enablement*, including leadership and managers that encourage attention to digital risks (e.g., adding to the business agenda and promoting meaningful service-user participation). While changes in healthcare systems are typically perceived as slow, we have also witnessed how NHS services in the UK have continued to swiftly adapt to a worldwide pandemic through concerted efforts throughout organisations.

Policy Categories

While some clinicians were aware of guidelines on digital risks, there is a clear need for developing *guidance* as an organisation to ensure consistent and best evidence-based practice for individual staff, teams, and services as well as for sustainable mutual learning. In the absence of a national, cross-sector guideline, recent guidelines developed by authoritative bodies (Livingstone et al., 2017; NSPCC, 2019; Viner et al., 2019) will be most informative. There is also a role of *regulation* to monitor and audit assessment practices and thus help evaluate the uptake of best practice and identify areas of challenge. *Environmental planning* would be crucial to ensure that forms, procedures, and electronic systems facilitate timely information gathering and recording on digital risks. Regular *communication* to staff and teams should reflect priorities on digital risks while embedding them within a broader digital strategy. We note that Oxford Health has been recently named "Mental Health Global Digital Exemplar" (NHS England, 2021) based on its digital innovations. Associated funding and partnerships could be harnessed for further work in considering digital risks in clinical practice.

Strengths and Limitations

A key methodological strength of the study is the use of a psychological model to guide data analysis and interpretation, thus harnessing a theory-driven approach to behavioural change for maximal impact. The mixed methodology combining surveys with interviews helped develop a more comprehensive understanding of clinicians' experiences and perspectives than either method only would have allowed. Professionals were closely consulted in the methodology to ensure the relevance of the questions. A wide range of key CAMHS professional backgrounds and service types were included.

Key limitations must also be noted. The sample may have been biased by clinicians who are already interested in the topic so it is possible that a different pattern of results holds for those who did not participate, although making participation compulsory can raise ethical complexities. The sample size was modest for a survey study but standard for an interview study using thematic analysis for a rich dataset. Other potential areas of digital risks (e.g., radicalisation) were not included. It is possible that reports of "less concerns" by clinicians in the survey were conflated with lack of knowledge/awareness (as subsequently described in the interviews), at least for some areas of digital risks. This issue could be disentangled in future with additional ways of gauging existing knowledge on each areas of digital risks, which could in turn inform tailoring of content for education/training. Additional work is required to test whether the current findings generalise to other contexts, including CAMHS settings in other areas, services outside the UK and non-healthcare sectors. Crucially, not all stakeholders' views were included, and in particular young people's views of reporting on digital risks should be sought.

Conclusion

What is needed for clinicians in CAMHS to embed routine enquiry of young people's digital risks into their practice? We have summarised a key practitioner message (Figure 3). A behavioural change program that targets both staff-level and organisation-level barriers to digital risk assessments in CAMHS is crucial. Interventions and policies to support such programs should embrace psychological theories of behavioural change. This study informs service improvement and research – within healthcare systems and beyond – to ensure that children and young people safely navigate the ever-changing digital world. See Supplemental Materials 11 for an account of the service response from Oxford Health CAMHS.

Figure 3

Key Practitioner Message

- Professionals are not always aware of the ever-developing research or guidance available around digital safety.
- Clinicians' confidence and competence in this area is variable.
- Clinicians show awareness of digital risks in their practice but there are a range of barriers to routine enquiry of these risks in CAMHS.
- Organisations need to consider behavioural change models and target both staff- and organisation-level factors, rather than just relying on training-based approaches (e.g., awareness provision to staff).
- Behavioural change ideas include interventions to increase capabilities (e.g., skills), opportunities (e.g., resources and prioritising), and motivations (e.g., habit formation).

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Main Research Project

Specificity of Episodic Future Thinking in Adolescents: Comparing Autism Spectrum, Childhood Maltreatment, and Typical Development

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Abstract

Autism and maltreatment are associated with seemingly overlapping difficulties across functional domains (e.g., social, emotional, and sensory) as well as high rates of psychiatric problems. A cognitive approach focussing on affect-laden cognition, such as episodic future thinking (FT), may inform the differentiation of these developmental differences and treatment innovations in mental health in these presentations. Three groups of adolescents aged 10-16 completed a newly adapted Autobiographical Future Thinking Test in an online written format. The groups were i) autism, ii) maltreatment, and iii) typical development (TD), matched in age, sex, and socioeconomic status. The maltreatment group generated fewer specific future events relative to the TD group, while FT specificity in the autism group did not significantly differ from the other groups. Lower FT specificity was associated with more depressive (but not anxiety symptoms), particularly in the autism group. Overall, these findings shed light on the cognitive profiles of both autism and maltreatment and indicate potential novel intervention targets for mental health. Our study also lays the foundation for future studies comparing these two development presentations with improved designs and a broader set of cognitive and clinical domains.

Keywords: autism, maltreatment, future thinking, episodic simulation, autobiographical memory, attachment.

Introduction

There is increasing clinical and scientific interest in disentangling whether the presenting difficulties in a child result from maltreatment or are manifestations of autism (Coughlan et al., 2021; Davidson et al., 2022; Minnis et al., 2020; Moran, 2010)[1]. This dilemma is complicated by high co-occurrence between autism and maltreatment (Dinkler et al., 2017; Green et al., 2016; Hoover, 2015; McDonnell et al., 2019). Autism Spectrum Disorder (ASD) is a lifelong neurodevelopmental condition with a strong genetic basis (Tick et al., 2016) characterised by difficulties with social communication/interaction, need for sameness, and sensory differences (APA; American Psychiatric Association, 2013). Childhood maltreatment includes abuse and neglect typically by someone in a position of responsibility or power (May-Chahal & Cawson, 2005) often resulting in attachment difficulties (Cyr et al., 2010). Both autism and maltreatment are associated with multiple physical, socioemotional, and educational needs, which can require highly-specialist, multidisciplinary and multi-agency input (Cicchetti & Toth, 2005; Lord et al., 2018).

Despite the distinct aetiologies, overlapping difficulties have been reported in several functional domains in autistic and maltreated young people (YP). For example, both autistic and maltreated YP can show difficulties in social interactions; struggle with emotional regulation; and present with hypersensitivities to sensory information (Davidson et al., 2015; Rutter et al., 2007). These seemingly overlapping clinical profiles complicate developmental differentiation for practitioners (Moran, 2010). Accurate differentiation is important for tailoring (trauma-informed and/or

[1] We will use the term "autistic" as the autism community prefers identity-first language over person-first language such as "with autism" (Kenny et al., 2016); and the term "maltreated" is in line with its current usage in the literature as it captures experiences directly relevant to abuse/neglect (Cicchetti & Toth, 2005) without over-including other adversities such as poverty, discrimination, and bullying.

neurodevelopmentally-sensitive) support to YP, their families and the wider support networks.

Additionally, both autistic and maltreated youth have high rates of co-occurring mental-health problems including depression and anxiety disorders (Gilbert et al., 2009; Lai et al., 2019). Treating such disorders in these developmental contexts is associated with limited gains from gold-standard interventions (Lippard & Nemeroff, 2020; Weston et al., 2016). Developing more effective interventions for emotional psychopathology in these populations is crucial.

Cognitive science offers tools to examine mental processes to understand developmental differences (Frith, 2001) and improve mental health ((Harvey et al., 2004). Yet direct comparisons between autism and maltreatment have focused primarily on clinical observations (Moran, 2010) or symptom reports (Coughlan et al., 2021; Minnis et al., 2020), while neglecting cognition. The one exception is a study by Davidson et al. (2015) who found that autistic but not maltreated youth were more likely to display an uneven cognitive profile characterised by marked discrepancies between verbal and non-verbal IQ. However, these intriguing findings map more closely onto "cold" (emotion-independent) rather than "hot" forms of (emotion-laden) cognition (Roiser & Sahakian, 2013). "Hot" cognition involves affect-charged and self-relevant information-processing biases – most critical to emotional psychopathology (Harvey et al., 2004) that are highly prevalent in autistic (Lai et al., 2019) and maltreated individuals (Gilbert et al., 2009). Nevertheless, we lack direct comparisons of any aspect of "hot" cognition between these developmental presentations.

Future thinking (FT) is a form of "hot" cognition that has received increasing attention in the last decade. Episodic FT refers to the process of simulating and "pre-experiencing" the future, often recruiting mental imagery (Schacter et al., 2017) which

can potentiate emotions (Holmes et al., 2008). FT is central to planning, problem solving, identity formation, social bonding, and emotional regulation (Szpunar et al., 2014), all of which can be compromised in autistic and maltreated individuals (McKenzie & Dallos, 2017; Moran, 2010). In typically-developing adults, difficulties in generating specific (temporally- and spatially-bound) mental representations that involves the self in the future have been reported across psychiatric disorders, particularly depression (Gamble et al., 2019; Hallford et al., 2018). FT appears to develop during adolescence when many begin to envision their future selves in terms of education, careers, relationships, and so forth (Johnson et al., 2014). Characterising FT in autistic and maltreatment individuals, especially during adolescence, may help understand their difficulties across domains including mental health.

Episodic memory provides important initial clues for understanding future simulations (in autism and maltreatment) given these two processes share a neurocognitive system (Schacter & Addis, 2007). Autobiographical memories appear to be less specific in autistic youth and adults relative to typically-developing peers (McDonnell et al., 2017). Similarly, emerging studies have begun to show that autistic adults are less specific in tests that probe for FT using word cues (Feller et al., 2021) or specific time periods (Lind & Bowler, 2010), but not in a test using sentence completion (Crane et al., 2013). FT *specificity* has not been examined in autistic adolescents (<17 years old) yet, but there is some evidence of reduced FT *details* in autistic youth (Ciaramelli et al., 2018; Lind et al., 2014; Terrett et al., 2013). Mechanistically, reduced memory specificity in autism is thought to be driven by reduced executive functioning (e.g. indexed by verbal fluency and cognitive flexibility), which likely impairs one's ability to (re)construct a specific event in mind by joining multiple sensory details (McDonnell et al., 2017). It is not clear if this mechanism applies to FT in autism.

Childhood maltreatment has also been linked to reduced autobiographical memory specificity in similar tests (Kuyken et al., 2006; McCrory et al., 2017; Valentino et al., 2009). Similarly, FT appears to be less specific in trauma-exposed adults with post-traumatic stress disorder (PTSD; Brown et al., 2013; Kleim et al., 2014) or complicated grief (Maccallum & Bryant, 2011; Robinaugh & McNally, 2013). It remains unclear if this applies to trauma-exposed youth and in the absence of clinical diagnoses. Moreover, prior research has been criticised for relying on adult self-reports of trauma history which can be biased by ongoing psychopathology (Moore & Zoellner, 2007), underscoring the need for more objective multi-informant assessment of maltreatment. Mechanistically, reduced memory specificity in trauma-exposed individuals is thought to represent a form of affect regulation to avoid painful memory details resulting over time in an overgeneral cognitive style (Hitchcock et al., 2017). It is unclear if this mechanism extends to FT too.

In sum, the cognitive profiles of FT – a key domain of emotional information-processing – remain little understood in autistic and maltreated individuals. Here we provide a first direct comparison between three groups of adolescents (aged 10-16) with: i) autism diagnosis, ii) maltreatment history, and iii) typical development (TD), using a novel test of FT specificity adapted from a well-established autobiographical memory paradigm (Heron et al., 2012; Williams et al., 1996). Our rationale for a focus on adolescence is threefold: i) the dilemmas about the autism versus maltreatment "overlap" are increasingly raised by practitioners working with YP (Minnis, 2013; Moran, 2010)[2]; ii) adolescence coincides with the emergence of most mental-health disorders (Lau & Waters, 2017), which are highly prevalent in autistic and maltreated

[2] We note an increasing interest in this area in adult services too (Cox et al., 2019)

individuals; iii) adolescence coincides with marked development in FT, which relates to key developmental tasks of identify and sociability (Johnson et al., 2014). Our primary aim was to test levels of FT specificity in autistic/maltreated adolescents relative to typically-developing peers. We predicted that both autistic and maltreated adolescents will generate fewer specific future events relative to typically-developing peers.

Our secondary aims were to investigate cognitive/clinical correlates of FT specificity in adolescents. This enabled us to explore if the groups differed in the potential underlying mechanisms driving any effect found in testing the primary aim. Specifically, we tested the association between FT and avoidant coping in maltreated adolescents, and with executive functioning in autistic adolescents. We also explored links between reduced FT specificity and mental health outcomes (anxiety, depression, and PTSD) within and across groups. The latter might help build evidence for FT as a potential modifiable target for mental health in the autistic/maltreated group – a key priority for YP and their families (Richardson & Lelliott, 2003; Roche et al., 2021).

Method

Participants

A total of 85 adolescents aged 10-16 years took part. Two adolescents were additionally recruited (autism = 1; TD = 1) but did not complete the FT specificity test so were excluded from subsequent analyses. Both the adolescent and a caregiver had to be willing to take part. Written consent was obtained from adolescents aged 16 and from the caregiver or legal guardian for adolescents aged below 16, who also provided written assent. There was no financial renumeration but a small donation (£2) was given to a youth charity for each adolescent taking part. Ethics approval was obtained from West Midlands - Solihull Research Ethics Committee (21/WM/0125).

Sample size was determined using alpha = .05, power = .80, and two-tailed tests. Based on a large effect size (Cohen *d* = 0.79) from a prior study on memory specificity in autistic youth (Goddard et al., 2014), and moderate-to-large effect sizes (i.e., Cohen *d* = .50-.80) from a review on memory specificity in trauma-exposed youth (Hitchcock et al., 2014), a minimum of 26-27 per group was needed to detect significant differences between the autism/maltreatment and TD groups. We recruited at least *n* = 28 per group.

The autism group (*n* = 29) was recruited via local child and adolescent mental health services (CAMHS; *n* = 14) and community advertisements such as charities (*n* = 15). All adolescents had a diagnosis of ASD based on established criteria in the Diagnostic and Statistical Manual (DSM) 4th (APA, 1994) or 5th editions (APA; 2013), or the International Classification of Diseases (ICD) 10th (WHO; World Health Organization, 2016) or 11th editions (WHO; 2019), as confirmed by referring keyworkers (who had access to clinical records) or caregiver (who provided written evidence, if needed). Keyworkers/caregivers also confirmed the adolescents did not have a history of maltreatment nor prior social service contact with the family due to the child's quality of care.

The maltreatment group (*n* = 28) was recruited via local children's social services (*n* = 23) and CAMHS (*n* = 5) with documented history of maltreatment, which was confirmed by keyworkers who had access to health or social care records. Maltreatment was defined as sexual abuse (*n* = 6), physical abuse (*n* = 9), emotional abuse (*n* = 15) and/or neglect (*n* = 23), informed by established descriptors (Kaufman et al., 1994). Many experienced more than one form of maltreatment (*n* = 19). Keyworkers established that maltreated adolescents neither had an ASD diagnosis nor were there questions about the child potentially having ASD (e.g., an ASD assessment was being

considered). Caregivers confirmed the adolescents did not have first-/second-degree relatives with ASD.

The TD group (n = 28) was recruited via community advertisements (e.g., social media and University-wide advertisement) and word of mouth (e.g., asking families to share information). Caregivers confirmed that typically-developing adolescents did not have an ASD diagnosis nor were being considered for it; first/second-degree relatives with ASD; a history of abuse/neglect; or prior social service contact.

Exclusion criteria for all adolescents were: 1) not reading English; 2) an organic brain condition (e.g., brain injury); 3) a history of psychotic episodes; 4) a diagnosis of learning disability or known IQ < 70; 4) actively suicidal; 5) sensory impediments that would impede task completion (e.g., difficulties with screen exposure > 15 min).

Measures

Separate online surveys were created for adolescents and caregivers. Median completion time was 25 min for adolescents and 15 min for caregivers.

Autobiographical Future Thinking Test

The Autobiographical Future Thinking Test was adapted from the Autobiographical Memory Test (AMT) used in adolescents ((Kuyken et al., 2006; Valentino et al., 2009; Vrielynck et al., 2007), which was in turn adapted from the original version developed for adults (Williams et al., 1996). Ten word cues (5 positive and 5 negative) were included and previously used with depressed, autistic, or maltreated youth (Goddard et al., 2014; Kuyken et al., 2006; Valentino et al., 2009). Instructions were adapted to i) probe for "future events", ii) use simpler language, iii) be completed in a written format (Heron et al., 2012). The instructions and format were reviewed by autistic and maltreated adolescents, their caregivers, and practitioners, for understanding and feasibility. Adolescents were asked to describe "an event that could

happen to you in the future" such as "tomorrow, in a few days or weeks from now, or even when you are much older". A time constraint was not imposed. Future events were coded as *specific* if the event generated would occur on a particular day, time, and place, and *overgeneral* if the event would occur over two days or more or referred to a category of events. Specificity scores were the total number of specific events generated. Coding was performed by the first author with participants' responses blinded to group membership. A subset of the responses (20%) was double-coded (by another rater also blinded to the group membership) with strong agreement, Cohen's kappa = 0.83 (Altman, 1991).

Questionnaires

See *Supplemental Materials* for more detailed descriptions.

For adolescents. The Revised Children's Anxiety and Depression Scale – 11 items (RCADS-11; Radez et al., 2021) was used to measure symptoms of anxiety and depression. The suggested cut-off scores vary by boys (anxiety: ≥ 5; depression: ≥ 8; total: ≥ 9) and girls (anxiety: ≥ 9; depression: ≥ 9; total: ≥ 14), with sensitivity/specificity > .70 (Radez et al., 2021).

The Children's Revised Impact of Event Scale (CRIES; Perrin et al., 2005) was used to measure PTSD symptoms yielding separate subscales for intrusion and avoidance symptoms (the latter serving as an index of avoidant coping). The cut-off score is ≥ 17 for probable PTSD, with sensitivity of .94 and specificity of .59 in clinical samples (Perrin et al., 2005).

The Abbreviated 9-item form of the Raven's Standard Progressive Matrices Test (RSPMT-9; Bilker et al., 2012) was used as a proxy for general cognitive ability (GCA; Pind et al., 2003). This version is highly predictive of the original 60-item form (Raven,

2000) and has recently been used with adolescents (e.g., Bone et al., 2021; Morin et al., 2019).

For caregivers. The RCADS-47 was used to measure adolescents' anxiety and depressive symptoms (Chorpita et al., 2005). Total scores are converted to *t*-scores based on normative data with a clinical cut-off of t ≥ 70 and with sensitivity/specificity > .70 (Chorpita et al., 2000).

The Child and Adolescent Trauma Screen (CATS; Sachser et al., 2017) was used to measure adolescents' number of previous traumatic events and PTSD symptoms based on DSM-5 criteria (APA; 2013). The cut-off score is ≥ 21 for probable PTSD, with sensitivity of .86 and specificity of .74 (Nilsson et al., 2020).

The Social Communication Questionnaire – Current version (SCQ; Rutter et al., 2003) was used to measure adolescents' autistic traits. The cut-off score of ≥ 15 suggests the need for further assessment of ASD, with sensitivity/specificity > .70 (Chesnut et al., 2017).

The Dysexecutive Questionnaire – Children (DEX-C; Emslie et al., 2003) was used to measure adolescents' executive functioning skills in everyday contexts.

Caregivers also provided information on adolescents' demographic details, known diagnoses, and parental/caregiver highest educational level as a proxy for socioeconomic status (SES; Liberatos et al., 1988).

Statistical Analyses

Normality was inspected visually with histograms. For normally-distributed continuous variables, overall differences across the three groups were assessed with one-way ANOVAs and follow-up independent-sample t-tests where indicated. Homogeneity of variance was assessed using the Levene's statistic. The primary outcome (specificity scores) was non-normal and thus the overall group difference was

assessed with Kruskal-Wallis tests and Mann-Whitney tests for pairwise contrasts where indicated. For the latter, effect sizes were calculated using r = z/sqrt(N): 0.10 as small, 0.30 as medium and 0.50 as large (Fritz et al., 2012). For categorical variables, group differences were assessed with Chi-square tests. A two-tailed alpha level of .05 was used (unless specified otherwise). Associations between specificity scores and other variables (e.g., mental health) used Spearman's rank correlation tests. To minimise the number of correlations performed, principal component analyses (varimax rotation and eigen value > 1) were used to extra a common "depression" and "anxiety" components combining the adolescent and caregiver versions of the RCADS. Sizes of correlations were compared with Fisher's tests. All analyses were conducted in SPSS version 27 (IBM, 2020).

Results

Demographic and Clinical Characteristics

Descriptive statistics on key background variables are shown in Table 1 (including information on missing data). The groups did not significantly differ in age, sex, and SES. Ethnicity was described as White significantly more often in the autism group. The maltreatment group scored lowest on a measure of GCA. As expected, the autism group reported the highest number of autistic traits, and the maltreatment group reported the highest number of previous traumas. Relative to the TD group, the autism group also reported more previous traumas and the maltreatment group also reported more autistic traits.

Table 1

Background Variables including Demographics and Clinical Measures

	Autism (n = 29)	Maltreatment (n = 28)	TD (n = 28)	Group comparisons[d]
Age, years: mean (SD)	12.52 (1.99)	13.57 (2.08)	12.89 (2.01)	$p = .146$
Sex (at birth)[e]: females (%)	13 (45%) *	17 (61%)	14 (50%)	$p = .474$
Ethnicity; White (%)	27 (93%)[a]	19 (68%)[b]	17 (61%)[b]	$p = .013$
Diagnoses of neurodevelopmental disorders (others)[f]: *n* (%)	13 (45%)[a]	2 (7%)[b]	0[b]	$p < .001$
Diagnoses of emotional disorders[g]: *n* (%)	8 (28%)[a]	2 (7%)[b]	0[b]	$p = .004$
Medication, yes: *n* (%)	13 (45%)[a]	1 (4%)[b]	0[b]	$p < .001$
Talking therapy, yes: *n* (%)	13 (45%)[a]	18 (64%)[a]	0[b]	$p < .001$
Socioeconomic status (SES), parental education: *n* (%) at university level	20 (69%)	13 (54%)	18 (67%)	$p = .498$
General cognitive ability (GCA), RSPMT-9[h]: mean (SD)	4.85 (2.16)[a]	3.37 (1.50)[b]	5.29 (2.05)[a]	$p = .001$
AS traits, SCQ[h]: mean (SD); n > clinical cut-off	18.03 (5.77)[a]; 20 (69%)	10.77 (4.74)[b]; 7 (27%)	4.75 (3.24)[c]; 0	$p < .001$
Trauma history; lifetime n of DSM-5 traumatic events (CATS[h]): mdn	1[a]	3[b]	0[c]	$p < .001$
PTSD symptoms (parent report), CATS[i]: mean (SD); n > clinical cut-off	21.00 (12.21)[a]; 7 (24%)	26.60 (18.10)[a]; 11 (41%)	6.00 (5.33)[b]; 0	$p = .020$
PTSD symptoms (child report), CRIES[h] total score: mean (SD); n > clinical cut-off	19.21 (12.18)[a]; 16 (55%)	19.07 (13.44)[a]; 15 (54%)	12.46 (10.43)[b]; 9 (36%)	$p = .063$
Anxiety symptoms (parent report), RCADS-47 *t*-scores: mean (SD); n > clinical cut-off	74.34 (11.99)[a]; 16 (55%)	67.00 (15.84)[a]; 8 (29%)	49.03 (9.55)[b]; 1 (4%)	$p < .001$
Anxiety symptoms (child report, RCADS-11 total score: mean (SD); n > clinical cut-off	7.66 (4.86)[a]; 16 (55%)	7.00 (5.18)[a]; 13 (46%)	4.64 (2.79)[b]; 10 (36%)	$p = .030$
Depression symptoms (parent report), RCADS- 47 *t*-scores: mean (SD); n > clinical cut-off	77.28 (18.14)[a]; 17 (59%)	68.39 (15.28)[b]; 12 (43%)	47.44 (6.97)[c]; 0	$p < .001$
Depression symptoms (child report), RCADS-11 total score: mean (SD); n > clinical cut-off	5.69 (4.09)[a]; 6 (21%)	6.00 (4.24)[a]; 8 (29%)	3.75 (2.32)[b]; 1 (4%)	$p = .050$

Note. TD; typical development; RSPMT-9 = Raven's Standard Progressive Matrices Test 9-Items Short Form; DEX-C = Dysexecutive Questionnaire Child Version; SCQ = Social Communication Questionnaire Current Version; PTSD = Post-traumatic Stress Disorder; CATS = Child and Adolescent Trauma Screen; CRIES = Child Revised Impact of Events Scale; RCADS = Revised Child Anxiety and Depression Scale

[a, b, c] These are used to denote significant pairwise differences with independent sample *t*-tests for continuous variables and chi-square tests for categorical variables.

[d] Overall group comparisons (i.e., across the three groups) were done using chi-square tests for categorical variables and with one-way ANOVA for continuous variables

[e] One participant in the autism group (female at birth) identified as transgender

[f] Diagnoses of neurodevelopmental disorders included ADHD, Tourette's syndrome, dyspraxia, dyscalculia, dyslexia, and sensory processing disorder

[g] Diagnoses of emotional disorders included post-traumatic stress disorder, obsessive compulsive disorder, body dysmorphic disorder, depressive disorder, generalised anxiety disorder

[h] Missing data were as follows: SES (maltreatment: $n = 4$; TD: $n = 1$); RSPMT-9 (autism: $n = 2$, maltreatment: $n = 1$); DEX-C (autism: $n = 1$, maltreatment: $n = 2$); SCQ (maltreatment: $n = 2$); CATS (autism: $n = 1$; maltreatment: $n = 2$); CRIES (autism: $n = 1$):

[i] PTSD in CATS (scores calculated only when a DSM-5 traumatic event was indicated as an index event) (autism: $n = 14$; maltreatment: $n = 20$; TD: $n = 6$)

Caregivers in the autism group reported more formal diagnoses of emotional (e.g., anxiety disorders & major depressive disorder) and other neurodevelopmental disorders (e.g., attention-deficit hyperactivity disorder or dyslexia) in their adolescents relative to caregivers in the other groups. Both the autism and maltreatment groups had more anxiety and PTSD symptoms, relative to the TD group (indexed by both self- and caregiver reports). Both the autism and maltreatment groups also had more depressive symptoms indexed by caregiver reports. The autism group self-reported more depressive symptoms than the maltreatment group, which in turn self-reported more depressive symptoms than the TD group. Overall caregiver symptom reports were above clinical cut-off for anxiety, depression and PTSD in both the autism and maltreatment groups but not in the TD group.

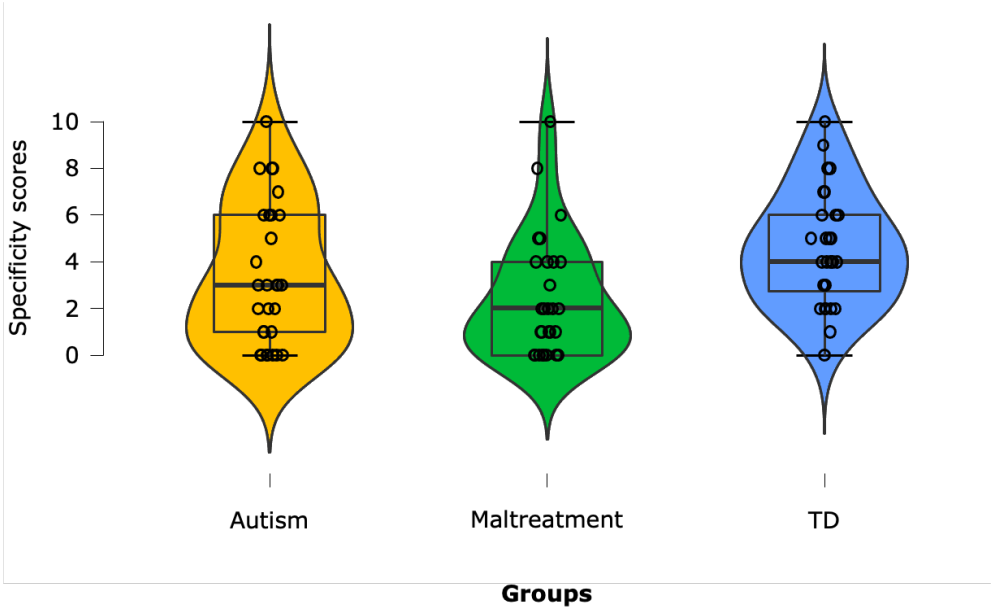
No significant correlations were found between FT specificity and age, sex, ethnicity, $r(83)$'s = -0.18 to 0.05, p's >.094. FT specificity was significantly and positively correlated with SES, $r(78) = 0.23$, $p = .040$, and GCA, $r(80) = 0.24$, $p = .034$.

Group Comparisons on Future Thinking Specificity

The FT specificity data are presented in Figure 1. Examples of events generated are presented in Table 2. We hypothesised that both the autism and maltreatment groups would report reduced FT specificity relative to the TD group. There was a significant overall group difference, $H = 9.52$, $df = 2$, $p = .009$. Planned contrasts revealed that the maltreatment group generated significantly fewer specific events relative to the TD group, $U = 199.50$, $z = 3.18$, $p = .001$, $r = 0.42$. However, there were no significant differences between the autism and TD groups, $U = 309.00$, $z = 1.69$, $p = .092$, $r = 0.22$, nor between the maltreatment and autism groups, $U = 333.50$, $z = 1.17$, $p = .241$, $r = 0.15$.

Figure 1

Specificity Scores in Three Groups of Adolescents: Autism, Maltreatment, and Typical Development (TD)



Note. Specific score is the number of specific future events generated in the Autobiographical Future Thinking Test. Each group is represented with jittered raw data, probability density of the data, and boxplot with median and interquartile range.

The same pattern was found even when separating the specificity scores by cue type (positive and negative words). We also explored the overall group difference in the number of *overgeneral* (categorical plus extended) events, as this has been a key outcome in some studies (Sumner et al., 2010), but this was not significant, $H = 2.67$, $df = 2$, $p = .263$. As SES (e.g., Wiley et al., 1998) and GCA (e.g., Heron et al., 2012) have been previously linked to autobiographical memory and are here correlated with specificity scores, we reran the main planned contrasts regressing out SES and GCA. The pattern of results remained the same. For details, see *Supplemental Materials*.

Table 2

Example of Events Generated in the Autobiographical Future Thinking Test

	Examples
Specific	*Getting a distinction in my ballet exam*
	Me tripping and scraping my knee
	I'm going to a party
Extended	*I will feel interested in what I am learning in school over the next few years*
	Having friends who will care about me
	Earning lots of money
Categorical	*Doing something wrong*
	Achieving something
	I will be angry if I miss future opportunities due to exams.

Sensitivity Analyses

The primary planned contrasts were rerun to account for additional variables (see *Supplemental Materials* for detailed results). To test for the role of known comorbidities, adolescents declaring other diagnoses (Table 1) were excluded. Given the high number of adolescents meeting thresholds in clinical measures (Table 1), we excluded adolescents meeting clinical thresholds for overall depression and anxiety (RCADS-47 or RCADS-11) and PTSD (CATS or CRIES) in separate analyses. To test for the possibility of group "misallocation", we excluded participants in the autism group who scored below the cut-off for autism on the SCQ, and participants in the maltreatment group who scored above the cut-off. Finally, to rule out the possibility of reduced motivation to complete the test, we excluded participants who did not generate any specific events. Despite these excluding procedures reducing the sample size (over half of the autism and/or maltreatment groups in some analyses), the different analyses yielded a similar pattern of findings, with the maltreatment (but not autism) group showing reduced specificity relative to the TD group.

Exploratory Analyses

Potential Mechanisms for Future Thinking Specificity

In the maltreatment group, specificity scores were *positively* and significantly correlated with scores on the CRIES avoidance subscale, $r(26) = 0.54$, $p = .003$ but not with the intrusion subscale, $r(26) = 0.30$, $p = .116$, suggesting that more avoidant coping was associated with *more* specificity (rather than with *less* specificity as predicted). To understand this intriguing finding, we explored the same relationship in the other groups. In both the autism and TD groups, specificity scores were *negatively* and significantly correlated with both CRIES subscales, r's = -0.31 to -0.44, p's < .042. The correlation between specificity and avoidant coping was significantly bigger in the maltreatment group compared to the other two groups (Z's > 3.62, p's < .001). This correlation in the maltreatment group was no longer significant when using SES- and GCA-regressed specificity scores, $r(21) = 0.32$, $p = .134$, despite the moderate effect size and potentially due to the loss of power with some missing data on SES/GCA.

In the autism group, specificity scores were not significantly correlated with executive functioning (DEX-C), $r(26) = -0.14$, $p = .485$, nor was this the case in the other groups, r's = -0.11 to 0.05, p's > .593. The pattern of results remained the same using SES- and GCA-regressed specificity scores.

Associations between Future Thinking Specificity and Mental Health

Across the three groups, less specificity was significantly correlated with more symptoms of depression, $r(83) = -0.23$, $p = .033$, but not of anxiety, $r(83) = -0.17$, $p = .129$. When split by group, depression was significantly correlated with specificity scores in the autism group, $r(27) = -0.39$, $p = .037$, but not in the other two groups, $r(26)$'s = -0.04 to 0.11, p's > .583. This correlation was significantly bigger (one-tailed) in the autism group compared to the maltreatment group (Z = 1.08, $p = .062$) but not to

the TD group ($Z = 1.33$, $p = .183$). The pattern of results remained the same with SES- and GCA-regressed specificity scores.

Discussion

FT is important for a range of functional domains including planning, problem solving, identity formation, social bonding, and emotional regulation (Szpunar et al., 2014). Characterising FT in both autistic and maltreated youth could improve understanding of their difficulties in these domains, inform differential assessment, and drive innovations for mental health. We compared autistic, maltreated, and typically-developing adolescents in their ability to generate specific self-relevant future events. Our work is the first that i) directly compares a form of "hot" cognition (Gamble et al., 2019; Hallford et al., 2018) between autism and maltreatment; ii) examines FT in maltreated youth; iii) extends current work on FT in autism to explore event *specificity*; and iv) adapts an online written test for this purpose (Heron et al., 2012).

For our primary aim, we found that maltreated adolescents generated fewer specific future events compared to typically-developing peers, whereas there were no significant differences between autism and the other groups. These patterns of findings remained after running a series of sensitivity analyses (to account for SES, GCA, comorbid psychopathology and low motivation). For our secondary aims, we found that FT specificity was associated with avoidant coping (with opposite directions for the autism/TD groups versus the maltreatment group) but not with executive functioning. FT specificity was also associated with symptoms of depression, particularly in the autism group. Below we discuss these findings and highlight clinical implications.

We provide a first demonstration that reduced FT specificity extends from trauma-exposed adults (Brown et al., 2013; Kleim et al., 2014; Maccallum & Bryant, 2011;

Robinaugh & McNally, 2013) to maltreated youth. This finding parallels prior work on reduced *memory* specificity in maltreated youth (McCrory et al., 2017; Valentino et al., 2009). Keyworkers ascertained maltreatment history with multi-informant data, reducing inherent retrospective biases in adult self-reports (Moore & Zoellner, 2007). The absence of an autism-related reduction in FT specificity contradicts the memory literature (McDonnell et al., 2017) and recent studies in autistic adults (Feller et al., 2021; Lind & Bowler, 2010). As previously argued by Crane et al. (2013), it is possible that a written/online test format minimises social anxiety that could often be driving performance disadvantages in autistic people (Spain et al., 2018) by removing direct interactions with a researcher. Alternatively, FT specificity may be reduced in both developmental presentations but perhaps more profoundly in maltreated than autistic adolescents, which could inform differential assessment. This requires further testing with large samples to detect smaller effects (possibly present in autism) and comparing the impact of different testing formats.

Avoidant coping – assessed with a subscale of the CRIES – refers to cognitive-behavioural strategies to avoid distressing trauma-related information (Perrin et al., 2005). More avoidant coping was associated with *less* specificity in the autism/TD group, consistent with the hypothesis that specificity reflects a cognitive style for dampening painful details (Dalgleish et al., 2008; Hitchcock et al., 2017). Surprisingly more avoidant coping was associated instead with *more* specificity in the maltreatment group. A closer inspection of the literature reveals that this puzzling finding is not unprecedented. More avoidant coping has also been associated with *more* memory specificity in individuals with trauma histories (Kuyken et al., 2006) and high self-harm risks (Startup et al., 2001). Avoidant coping may represent a maladaptive strategy (and therefore reduces specificity) for individuals whose experiences of (non-maltreatment)

adversity fall on a continuum in the general population (as with the autism/TD groups). However, it could be somewhat adaptive as a (short-term) coping strategy for those with experiences of complex/extreme adversities requiring social care input (as many did in our maltreatment sample). Replications are needed to ascertain that avoidant coping indeed plays different roles in maltreated versus non-maltreated youth. Measurement longitudinally will also aid to determine if the maltreatment group switches to reduced specificity over time.

Executive functioning did not appear to underpin FT specificity in autism. Previous work has used established cognitive tests (e.g., verbal fluency; Dalgleish et al., 2007), whereas we used a questionnaire of behavioural difficulties (DEX-C) which conflate multiple aspects of EF (Miyake et al., 2000), not all of which are necessarily linked to FT. To fully test the EF hypothesis, future studies should consider cognitive tests tapping multiple EF domains.

We found promising associations between FT specificity and depression but not anxiety, in line with work on typically-developing adults (Du et al., 2022; Gamble et al., 2019), and here extended for the first time to an autistic population. If generating specific future scenarios is impaired, then it can be difficult to envision an optimistic "picture" of the future or to make accurate judgements of future negative outcomes without catastrophising. Clinically, FT specificity could be relevant for autistic individuals as both a vulnerability marker for prevention strategies and an intervention target for depression, especially during adolescence when cognitive malleability is likely heightened (Lau & Waters, 2017). Mental-health innovations in autism could benefit from emerging therapeutics to "re-train" the specificity of autobiographical thinking with initial promising benefits (Hitchcock et al., 2017; Jing et al., 2016), which so far have been tested in typically-developing individuals. Furthermore, the lack of

such significant associations in maltreated/TD adolescents could be due to lack of power here for smaller effects. Alternatively, FT specificity may not be as relevant for their mental health as for autistic youth.

We note some limitations. Given the resource and time limitations, gold-standard assessments were not performed to confirm and fully rule out co-occurring conditions (e.g., autism, learning disability, mental disorders). We lacked information on the presence of attachment disorders/styles, which have been considered to be a key source of overlap between maltreatment and autism (Davidson et al., 2015; Moran, 2010)[3]. To minimise burden to keyworkers, comprehensive details on maltreatment (e.g., chronicity and severity) were not collected beyond presence/type, and which could better inform mechanistic studies (Smith & Pollak, 2021). A "co-occurring" group with both autism and maltreatment was not included so it remains unclear if their cognitive profile would be consistent with a "double whammy" (Dinkler et al., 2017). We could not establish the relative importance of memory versus FT specificity. Improved designs could incorporate larger and better-powered samples to detect smaller effects alongside longitudinal follow-ups. These will illuminate at least two key issues of heterogeneity. First, variations and unevenness in the cognitive profiles within the autism spectrum (Happé & Frith, 2020) may influence the level of FT difficulties. For example, lower verbal reasoning in some autistic individuals could hamper performance on measures of FT that rely on producing linguistic descriptions. Second, individual differences in FT

[3] We have focused on *maltreated* youth (rather than selecting them based on attachment profile) as a comparator to autistic youth because the initial formulation of the "overlap" (Moran, 2010) refers to attachment difficulties more broadly rather than Reactive Attachment Disorder or RAD (APA; 2013). Our clinical experiences also indicated that diagnosing RAD or assessing attachment style formally is not part of routine practice in the UK, which would have made recruitment based on this diagnosis impractical. We deemed the selection based on maltreatment status was appropriate in this first study as maltreated youth often develop attachment difficulties (Cyr et al., 2010) and maltreatment is a diagnostic requisite for RAD. Furthermore, our focus on maltreated youth provided more consistency with the cognitive literature informing our predictions on FT (McCrory et al., 2017; Valentino et al., 2009).

functioning may increase further for older adolescents (e.g., age 16) relative to our sample of mostly younger teens (on average aged 13; Table 1), given that FT becomes more pertinent with increasing age due to continuing development of executive functions (Best & Miller, 2010) and social pressures to setting future goals (Nurmi, 1991). Overall, we have laid a firm foundation for some critical next steps in disentangling autism and maltreatment when testing a broader set of cognitive and clinical domains.

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Executive Summary

Exploring Differences in Imagery of the Future in Young People: Findings Report

Why were we interested in "future thinking"?

- Future thinking helps us plan, solve problems, and form our identity. It is also important for adolescents as they grow up and begin to think about their future lives, including education, career, and relationships.
- Future thinking is key to emotions and mental health. Imagining a positive outcome in the future (e.g., picturing yourself doing well in an exam or enjoying a holiday) can motivate us to achieve our goals. But imagining things going wrong can be distressing and deflating (e.g., failing an exam or having holiday plans disrupted).

Why were we interested in autism and "developmental trauma"?

- Young people (YP) on the autism spectrum and YP with experiences of early adversity (sometimes called "developmental trauma" or "childhood maltreatment") can experience many challenges in life (e.g., social interactions, learning, emotions, etc.) often needing extra support.
- These YP are also vulnerable to mental health difficulties (e.g., depression & anxiety).
- Professionals can find it difficult to tease apart challenges due to autism or to "developmental trauma".
- Understanding future thinking could help us select and design better support for them (e.g., mental-health interventions).

What did we do?

- We recruited three groups of YP aged 10-16: i) autistic YP (without developmental trauma); ii) YP with developmental trauma (without autism); iii) typically-developing YP (with neither autism nor developmental trauma).

- We recruited them from NHS, social care, and the community (e.g., social media).
- YP (and one of their caregivers) completed an online survey that included measures of future thinking and mental health.

What did we find?

- YP with developmental trauma had difficulties with future thinking: they generated fewer specific future events compared to typically-developing YP.
- Autistic YP did not differ from the other two groups in this aspect of future thinking.
- YP who were less able to be specific about the future were also more likely to report depression symptoms (particularly autistic YP).

What are the real-world implications?

- Professionals may find it helpful to assess future thinking in YP with developmental trauma, as this can help better understand a wide range of their difficulties.
- Professionals may be able to distinguish the impact of developmental trauma from the impact of autism by assessing difficulties with future thinking (although this research is still at early stage).
- Improve future thinking in these YP (particularly in autistic YP) may help alleviate difficulties with depression.

What are some limitations of our study?

- We did not have a group of YP with both autism *and* developmental trauma.
- We need a bigger sample size to detect potentially subtler difficulties with future thinking in autistic YP.
- We cannot confirm depression causes difficulties with future thinking.

Connecting Narrative

This portfolio consists of three interlinked projects that represent my developing interests in youth mental health through clinical psychology training. I aimed to bring together several strands within psychology (e.g., clinical, cognitive, and developmental) to inform clinical psychology theory and practice, including assessment and intervention developments. The projects are broadly concerned with better mapping and understanding the impact of early adversities, which include nonnormative stressful experiences often associated with poor mental health outcomes across the lifespan. A special interest is on how adversity enacts its detrimental effects potentially through cognitive processes (mental imagery) with downstream consequences for emotional health. These projects are also enriched with a developmental perspective in both their theorisation and execution. Below I will expand on these overlapping themes.

The Far-Reaching Impact of Early Adversities

A detrimental form of childhood adversity is maltreatment, comprising abuse and/or neglect often from someone in a position of care, responsibility and/or power. Maltreatment can impact on a wide range of functional domains, including social communication, emotional regulation, and mental health. In my MRP, I aimed to improve characterisation of maltreatment's cognitive and emotional sequalae by distinguishing it to developmental differences associated with autism. There is currently a momentum in improving understanding of this overlap among youth practitioners, with some empirical data just beginning to emerge. As young people's everyday lives occur often in the digital world, so do their experiences of maltreatment and other adversities. My SIP concerned this topical area for practitioners who often report feeling underconfident in assessing "digital risks". Finally, my CLR focused on a common psychological consequence following maltreatment which increases risks for later

psychopathology – the developmental of attachment insecurity. This manifests as the overactivation and/or the underactivation of attachment strategies especially in the context of relationship distress. Overall, my different explorations of "adversity" in relation to maltreatment, attachment and risks hold relevance for trauma-informed practice.

Cognitive Science of Emotional Imagery

The projects took inspiration from cognitive science, especially the role that mental imagery plays in the developmental and maintenance of emotional psychopathology. Mental imagery consists of internal and multi-sensory experiences in the absence of direct percept. As an important component of autobiographical thinking, imagery is arguably a key mechanism that facilitates "as-if-real" experiences. This unique property of imagery allows us to perform "mental time travel" – to past events, which is the focus of my CLR; and to future scenarios, which is the focus of my MRP. Because autobiographical memory disruptions are reported across emotional disorders, they represent important cognitive risks for refining prevention and treatment approaches. Problematic mental images often result following direct exposure to real-life (visual) images, a hallmark case being media-based exposure to traumatic events. This served as the springboard for my SIP, which explored online exposure to harmful content in areas of self-harm, suicidality, body image, and media trauma in the public domain, among other digitally-mediated risks. The science of emotional imagery has primarily focused on adults so far, and thus my research critically extends this to youth.

A Developmental Lens

I also infused a developmental perspective throughout the portfolio. A major focus here is adolescence, a critical developmental window for mental health given that one in 5 young people (YP) have a probable mental health disorder and up to 75% of

mental disorders begin in this period. Adolescence is also a crucial timepoint where novel solutions are paramount given that mainstream services are unable to meet the mental health needs of these YP, both in the UK and globally. The portfolio embraces the intersections between adolescence and complexities related to adversity/neurodiversity (MRP) and the digital realm (SIP). Lifespan insights are also central to a developmental view, and thus my CLR examined the relevance of attachment – a concept with historical roots in infant development – for subsequent psychopathology in (young and older) adulthood. Beyond consulting with YP (MRP), I embraced a systems approach crucial to understanding developmental issues, incorporating views from caregivers/parents (MRP) and practitioners (SIP) alongside intersectoral collaborations, which spanned NHS, social care, and the charitable sector (MRP).

A Journey Towards Research and Clinical Synergy

The interlinked projects provided me a platform to build on my prior research in imagery and memory, while making novel theoretical and clinical connections to a breadth of topics in developmental psychopathology. Autism, adversity, and attachment are often complicating factors in clinical formulations and intervention delivery. Through realising this ambition, I gained deeper insights into key ingredients for youth mental health research: framing scientific questions based on work "on the ground" (MRP, SIP); marrying these with the local context (MRP, SIP); flexibility and creativity in the face of uncertainty (e.g., a global pandemic; SIP, MRP); meaningful inclusion of voices from YP and their support system (MRP); joining perspectives from multiple professions (SIP, MRP), and agencies (MRP), and disciplines (CRL, MRP) to maximise the relevance of the resultant work across stakeholders. This intellectually stimulating research experience had complementarity with my journey as a mental-health

practitioner. My training experiences of working in the NHS (Anxiety & Depression Pathway in Berkshire CAMHS) and social care (ATTACH team in Oxfordshire County Council) have helped me discover my affinity for working with YP. This synergy encouraged timely and ongoing dialogues about both short- and long-term relevance of the research areas explored. I hope that this portfolio's eclectic work at the interface between cognitive, developmental, and clinical psychology, and the novel scientific directions suggested, will add much-needed theoretical and clinical value for youth mental health.

Acknowledgements

I am deeply grateful to:

My team of research supervisors: I was privileged to learn from top clinical academics in cognitive models of adult psychopathology (Myra Cooper and Craig Steel) with local clinical experts in Oxford Health CAMHS in the areas of trauma (Carmen Chan), autism (James Stacey), attachment (Fin Williams), risks (Mat Lister), and complexities (Ciorsdan Anderson).

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Consultants and contributors to study designs/execution: Oxford Health CAMHS clinicians (SIP, MRP); young people and their support system (MRP); special thanks to my double coders: Daisy Gibson (MRP) and Alice Melin (CLR);

Participating young people (MRP), families (MRP), clinicians (SIP): for your time and enthusiasm, which were crucial to study completion through the challenging time of a global pandemic;

Course tutor Kathryn Evans: for your support in critical times during training and your encouragement to keep systemic thinking alive;

DClinPsy 2019 Cohort: for your passion and compassion, and the truly once-in-a-lifetime experience;

& Josh – for the journey of mutual learning before, during, and beyond.

Appendices

APPENDIX A: CLR Journal Submission Guide

Behaviour Research and Therapy – Guide for Authors

Introduction

The major focus of *Behaviour Research and Therapy* is an experimental psychopathology approach to understanding emotional and behavioral disorders and their prevention and treatment, using cognitive, behavioral, 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.

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Reference to a book:
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Reference to software:
Coon, E., Berndt, M., Jan, A., Svyatsky, D., Atchley, A., Kikinzon, E., Harp, D., Manzini, G., Shelef, E., Lipnikov, K., Garimella, R., Xu, C., Moulton, D., Karra, S., Painter, S., Jafarov, E., & Molins, S. (2020, March 25). *Advanced Terrestrial Simulator (ATS) v0.88 (Version 0.88)*. Zenodo. https://doi.org/10.5281/zenodo.3727209.

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APPENDIX B: SIP Journal Submission Guide

Clinical Child Psychology and Psychiatry - Manuscript Submission Guidelines

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  These submissions are reviewed in two stages. In Stage 1, a study proposal is considered for publication prior to data collection. Stage 1 submissions should include the complete Introduction, Method, and Proposed Analyses. High-quality proposals will be accepted in principle before data collection commences. Once the study is completed, the author will finish the article including Results and Discussion sections (Stage 2). Publication of Stage 2 submissions is guaranteed as long as the approved Stage 1 protocol is followed and conclusions are appropriate. Full details can be found here.

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All parties who have made a substantive contribution to the article should be listed as authors. Principal authorship, authorship order, and other publication credits should be based on the relative scientific or professional contributions of the individuals involved, regardless of their status. A student is usually listed as principal author on any multiple-authored publication that substantially derives from the student's dissertation or thesis.
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- Identify any entities that paid for this assistance
- Confirm that the listed authors have authorized the submission of their manuscript via third party and approved any statements or declarations, e.g. conflicting interests, funding, etc.

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For research articles, authors are also required to state in the methods section whether participants provided informed consent and whether the consent was written or verbal. Information on informed consent to report individual cases or case series should be included in the manuscript text. A statement is required regarding whether written informed consent for patient information and images to be published was provided by the patient(s) or a legally authorized representative.

Please also refer to the ICMJE Recommendations for the Protection of Research Participants

3. Publishing Policies

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If you would like to discuss your paper prior to submission, please refer to the contact details below

Arpita Bhattacharya: arpita.bhattacharya@sagepub.in

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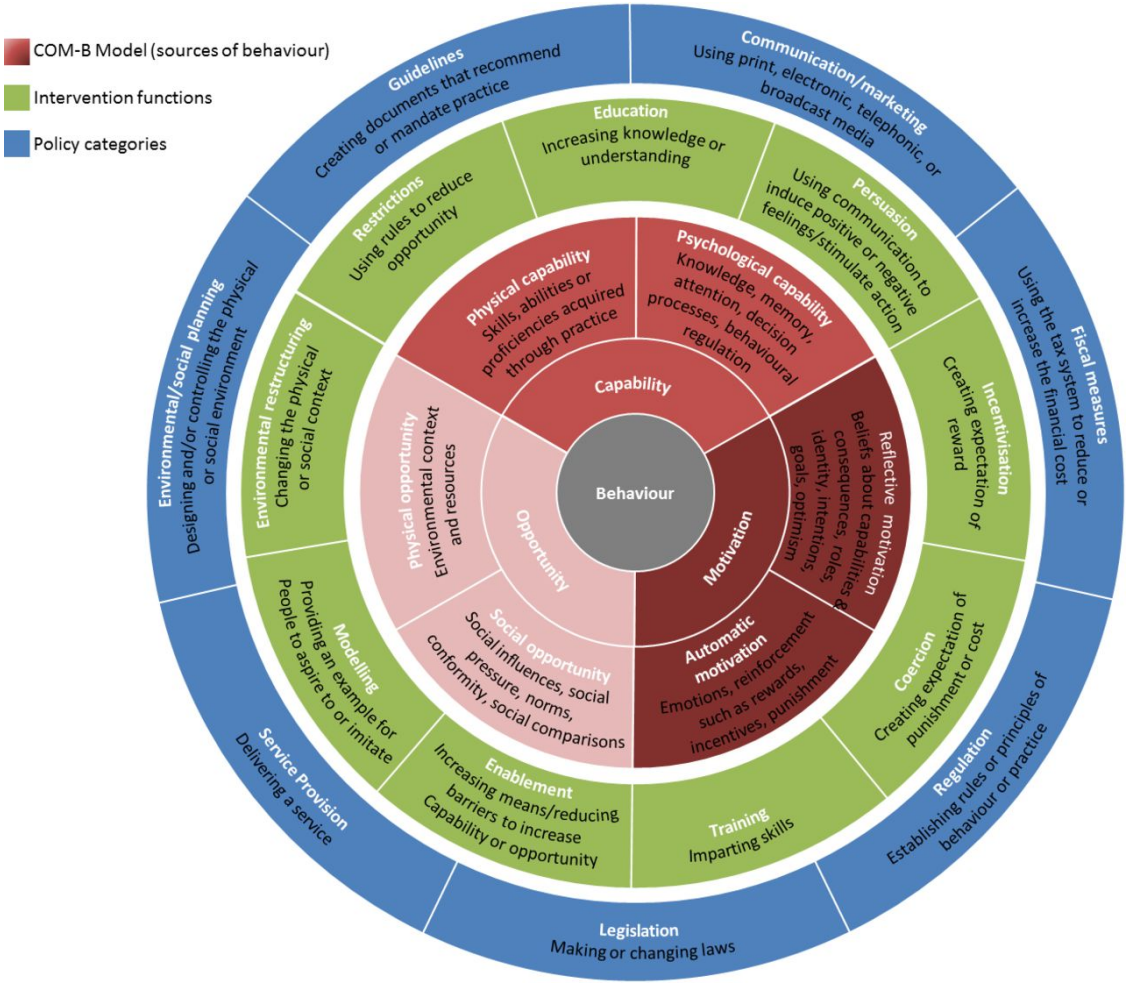
Prof. Deborah Christie, Editor, email: deborah.christie2@nhs.net

APPENDIX C: SIP Supplemental Materials

Supplemental Materials 1

Figure S1

The Capability-Opportunity-Motivation-Behaviour (COM-B) Model at the Centre of the Behavioural Change Wheel



Note. The COM-B model is depicted with associated interventions and policy categories, each with a brief description. Reproduced from McDonagh et al. (2020) which was adapted from Michie et al. (2010).

Supplemental Materials 2

Table S1

Theoretical Domain Framework (TDF)

COM-B component	TDF domain *(definition)*	Constructs
Capability	Knowledge* *(An awareness of the existence of something)*	Knowledge (including knowledge of condition /scientific rationale); procedural knowledge; knowledge of task environment
	Skills* *(An ability or proficiency acquired through practice)*	Skills; skills development; competence; ability; interpersonal skills; practice; skill assessment
	Memory, attention and decision processes *(The ability to retain information, focus selectively on aspects of the environment and choose between two or more alternatives)*	Memory; attention; attention control; decision making; cognitive overload / tiredness
	Behavioural regulation *(Anything aimed at managing or changing objectively observed or measured actions)*	Self-monitoring; breaking habit; action planning
Opportunity	Environmental context and resources* *(Any circumstance of a person's situation or environment that discourages or encourages the development of skills and abilities, independence, social competence, and adaptive behaviour)*	Environmental stressors; resources / material resources; organizational culture /climate; salient events / critical incidents; person x environment interaction; barriers and facilitators
	Social influences* *(Those interpersonal processes that can cause individuals to change their thoughts, feelings, or behaviours)*	Social pressure; social norms; group conformity; social comparisons; group norms; social support; power; intergroup conflict; alienation; group identity; modelling
Motivation	Social/professional role & identity* *(A coherent set of behaviours and displayed personal qualities of an individual in a social or work setting)*	Professional identity; professional role; social identity; identity; professional boundaries; professional confidence; group identity; leadership; organizational commitment
	Beliefs about capabilities* *(Acceptance of the truth, reality, or validity about an ability, talent, or facility that a person can put to constructive use)*	Self-confidence; perceived competence; self-efficacy; perceived behavioral control; beliefs; self-esteem; empowerment; professional confidence
	Beliefs about consequences *(Acceptance of the truth, reality, or validity about outcomes of a behaviour in a given situation)*	Beliefs; outcome expectancies; characteristics of outcome expectancies; anticipated regret; consequents
	Optimism *(The confidence that things will happen for the best or that desired goals will be attained)*	Optimism; pessimism; unrealistic optimism; identity
	Intentions *(A conscious decision to perform a behaviour or a resolve to act in a certain way)*	Stability of intentions; stages of change model; transtheoretical model and stages of change
	Goals *(Mental representations of outcomes or end states that an individual wants to achieve)*	Goals (distal / proximal); goal priority; goal / target setting; goals (autonomous / controlled); action planning; implementation intention
	Reinforcement* *(Increasing the probability of a response by arranging a dependent relationship, or contingency, between the response and a given stimulus)*	Rewards (proximal / distal, valued / not valued, probable / improbable); incentives; punishment; consequents; reinforcement; contingencies; sanctions
	Emotion* *(A complex reaction pattern, involving experiential, behavioral, and physiological elements, by which the individual attempts to deal with a personally significant matter or event)*	Fear; anxiety; affect; stress; depression; positive / negative affect; burn-out

Note. The domains of the TDF are defined, mapped onto COM-B model, and specified in terms of associated psychological constructs. Adapted from Atkins et al. (2017). *Domains considered in the thematic analysis.

Supplemental Materials 3

Additional Methods

Study 1

Reminder emails to each team lead were sent twice. Psychological therapists were also emailed directly from a mailing list.

The survey questions were initially devised by ML and CA who have over 15 years of clinical experience in CAMHS in the UK, and by ALZ who has postdoctoral research experience in youth mental health. The survey was reviewed by clinicians and researchers working with youth and subsequently revised based on their feedback.

Ten key areas of digital risks were identified through the above consultation process: 1) excessive time spent online or on social media; 2) addictive behaviours (e.g., gaming, gambling); 3) meeting strangers online; 4) sexting; 5) abusive messages, cyberbullying or trolling; 6) exposure to sexual materials (e.g., pornography); 7) suicide or self-harm content (e.g., forums, images); 8) media traumas (e.g., viewing gruesome details of horrific events); 9) the dark web (e.g., buying illegal drugs); and 10) body image (e.g., exposure unrealistic standards and using forums/chats).

Some variables were recoded/dichotomised for this purpose. Age was recoded as "40 and below (millennials)" versus "above 40 (non-millennials)" based on the definition of millennials who experienced the "Internet explosion" (Pew Research Centre, 2019). Years qualified and number of correct apps identified were dichotomised based on median-splits.

Associations with gender and ethnicity were not explored, as the majority were identified as female and white. Missing data were not possible, as the survey used forced responses.

Study 2

Interviews were conducted individually by ALZ (a non-White, male clinical psychologist in training with over a decade of experience conducting research/clinical interviews).

The analytical approach can be described as deductive, semantic and essentialist/realist because coding was primarily informed by theoretical frameworks of behavioural change (COM-B and TDF); meaning extracted was at the explicit level; and our primary interest was in clinicians' perception of reality.

Supplemental Materials 4

Online Survey

INFORMATION SHEET AND CONSENT

Assessing digital risks in young people: Staff experiences and views

We invite you to take part in an audit exploring clinical staff experiences and views of assessing potential digital risks in young people. This is conducted in CAMHS services across Oxford Health Foundation Trust. The results will help us design strategies to improve the ways we identify and manage these types of risks.

By "digital risks" we mean behaviours involving the use of the Internet and/or social media that poses potential risks to self or others in young people that you work with.

This audit is anonymous and individual responses would remain confidential and not shared in any form.

The audit will take around 15 minutes to complete.

If you have any questions about this audit, please contact the investigators involved:
Dr Alex Lau-Zhu, trainee clinical psychologist (alex.lauzhu@oxfordhealth.nhs.uk)
Dr Mat Lister, consultant clinical psychologist (matthew.lister@oxfordhealth.nhs.uk).

If you are interested in taking part in the next stage of this audit (e.g., interviews/focus groups; in person or remotely via teams/telephone), there will be an opportunity to leave your contact details at the end.

Please proceed to the next page to begin this survey.

SECTION I

Demographics
What is your age?
What is your gender? (Male/Female/Other/Prefer not to say)
What is your ethnic group? (Asian or Asian British [Includes any Asian background, for example, Bangladeshi, Chinese, Indian, Pakistani]/Black, African, Black British or Caribbean [Includes any Black background]/Mixed or multiple ethnic groups [Includes any Mixed background]/White [Includes any White background]/Another ethnic group [Includes any other ethnic group, for example, Arab]/Prefer not to say

Parenthood
Are you a parent? (Yes/No/Prefer not to say)
How many children do you have? (1/2/3/4/More than 4)
Please state the age(s) of your child/children:

Professional profile
What is your core professional background? (Psychiatrist/Psychologist [clinical, counselling]/ Psychotherapist/CBT therapist/CWP or EWP/Nursing/Speech and language therapist/Social worker/Occupational therapist/Other)
How many years do you have since you qualified in your core profession (0 if you have not qualified yet)?
What is your work status? (Full-time/Part-time)
What CAMHS service do you work in? (Getting Help/Getting More Help/Eating disorders/SPA/NDC/Learning and disability/Horizon/CAHBS/Forensic CAMHS/Outreach/DBT/Crisis)
How many years have you been employed in the Oxford Health Foundation Trust?

Caseload Audit

In your current role, how many direct contacts with children/young people do you do on average per week (face-to-face/digital)? (0/1-3/4-9/10-12/13-15/more than 15)
In your current role, how many contacts via family members, schools and/or team consultations do you do on average per week (face-to-face/digital)? (0/1-3/4-9/10-12/13-15/more than 15)

SECTION II

Assessment of Potential Digital Risks

In the next few pages please answer some questions about your experience on each of the 10 issues relevant to digital risks in children/young people.

Issue 1: Excessive time spent online or in social media
Issue 2: Addictive behaviours (e.g., gaming, gambling)
Issue 3: Meeting strangers online (including then meeting in the real-world)
Issue 4: Sexting
Issue 5: Abusive messages, cyberbullying or trolling
Issue 6: Exposure to sexual materials (e.g., pornography)
Issue 7: Content related to suicide or self-harm (e.g., forums, images)
Issue 8: Media traumas (e.g., viewing gruesome details of horrific events via the media)
Issue 9: Dark web (e.g., to buy illegal drugs)
Issue 10: Body image (e.g., unrealistic standards)

[Questions repeat for each issue]

How often are parents/caregivers concerned about this issue?
(Often/Sometimes/Seldom/Never)
How often are the children/young people themselves concerned about this issue?
(Often/Sometimes/Seldom/Never)
How often are you as a clinician concerned? (Often/Sometimes/Seldom/Never)
How often have you assessed this issue in a child/young person's (direct or indirectly via families, schools or team consultations)? (Often/Sometimes/Seldom/Never)

SECTION III

Are you aware of any resources for considering, assessing or managing digital risks in young people? (Yes/No)
If yes, from within or outside the Trust? (Within/Outside/Which one?)
In the following pages, you will see 10 different logos for a range of apps which pose varying levels of risks for children/young people. Please select the answer that best match your degree of knowledge for this app.

“Reddit”
“Kik”
“Snapchat”
“Tellonym”
"Tinder"
"Roblox"
"TikTok"
"Grindr"

[Questions are repeated for each app]

I use this personally
I have heard of it/seen it and I understand how it works
I have heard of it/seen it but I do not understand how it works
I have never heard of it or seen it
Prefer not to say
Does this app pose any risk to young people [Yes/Maybe/Don’t know]

FINAL

Next Steps

We would like to conduct interviews/focus groups in order to understand in more detail some of your views/experiences. This would greatly help us in shaping a strategy to improve how we assess and manage digital risks in children/young people across the Trust. This will not be linked to your responses in this initial survey. If you are interested, please type your email:

End

Thank you - this is the end of the survey. This following link provides a useful and up-to-date guide to digital safety for children/young people: https://www.net-aware.org.uk/

If you have any questions about this audit, please contact the investigators involved: Dr Alex Lau-Zhu, trainee clinical psychologist (alex.lauzhu@oxfordhealth.nhs.uk) or Dr Mat Lister, consultant clinical psychologist (matthew.lister@oxfordhealth.nhs.uk).

Supplemental Materials 5

Interview Topic Guide

Introductions and Warm up

- Setting up the scene: 1) Purpose: Explore in more detail your experiences and views on digital risks in young people; 2) Confidential and anonymous; non-identifiable use of potential quotes; 3) Duration: between 30-50min
- Introducing interviewer: Where do you work? what is your role? What brought you to working with young people?
- How "digital" would you say you are? (e.g., time spent; on what)

Core Questions

- Definition of digital risk: behaviours involving the use of digital devices, the Internet and/or social media that pose potential harm to self, to others, or from others, in young people that you work with.
- What forms of digital risks are most relevant for the young people you work with?
- Whenever you had concerns about some form of digital risk. Prompts:
  - How did you address them?
  - What influenced what you did ask?
  - What influenced what you didn't ask?
  - Did you always assess it? Why?
  - Any factors related to 1) yourself; 2) young people; 3) parents and carers, 4) your team; 5) the Trust?
- Do you think there is room for improvement for assessing digital risks? Prompts:
  - What kind of improvements?
  - What needs to change?
  - 1) Yourself as clinician? 2) Team? 3) Trust?
  - What would you want/need?
  - What would enable you to assess digital risks?
  - Is there anything that is in the way? What?
- Do you think assessments of digital risks should be part of routine risk assessments in CAMHS? Prompts:
  - Why? Or why not?
  - If yes: How?
  - What is gonna take for you to make this routine?
  - Are there things that would get in the way?
- Have there been any experiences that inform your views on digital risks? Prompts:
  - Professional experiences?
  - Personal experiences?

Closing

- Any issues we haven't covered which you think it is important to share or discuss further?
- Do you have any questions?

Supplemental Materials 6

Table S2

Demographics and Professional Characteristics of Clinicians Surveyed (N=53)

Age (SD; range)	37.02 (10.11; 23-61)
Gender	
Female	45 (84.9%)
Male	8 (15.1%)
Ethnicity	
Asian or Asian British	3 (5.7%)
Mixed or multiple ethnic groups	1 (1.9%)
White	47 (88.7%)
Another ethnic group	1 (1.9%)
Are you a parent?	
Yes	26 (49.1%)
No	26 (49.1%)
Prefer not to say	1 (1.9%)
Parent of children aged 12 and under	
Yes	16 (30.2%)
No	36 (67.9%)
Parent of children aged 13-18	
Yes	10 (18.9%)
No	42 (79.2%)
Core professional background	
Psychologist (Clinical, Counselling or Forensic)	21 (39.6%)
Nurse	11 (20.8%)
CWP or EWP	5 (9.4%)
Psychiatrist	4 (7.5%)
Social worker	4 (7.5%)
CBT therapist	3 (5.7%)
Occupational therapist	1 (1.9%)
Psychotherapist	1 (1.9%)
Other	3 (5.7%)
Years qualified since core profession (SD; range)	8.77 (10.65; 0-39)
Work status	
Full-time	43 (81.1%)
Part-time	10 (18.9%)

CAMHS team[1]	
Mental health support teams (Tier 2)	3
Getting help (Tier 2)	5
Getting more help (Tier 3)	14
Eating disorders (Tier 4)	5
Neurodevelopmental conditions (Tier 4)	13
Learning disability (Tier 4)	2
Young people affected by sexual harm (Horizon) (Tier 4)	4
Harmful behaviours (Tier 4)	3
Forensic (Tier 4)	4
Outreach (Tier 4)	3
DBT (Tier 4)	2
Crisis (Tier 4)	1
Others	5
Direct clinical contact per week	
0	4 (7.5%)
1-3	17 (32.1%)
4-9	19 (35.8%)
10-12	8 (15.1%)
13-15	4 (7.5%)
More than 15	1 (1.9%)
Indirect clinical contact per week	
0	4 (7.5%)
1-3	17 (32.1%)
4-9	20 (37.7%)
10-12	6 (11.3%)
13-15	3 (5.7%)
More than 15	3 (5.7%)
Years employed by Oxford Health (SD; range)	6.57 (7.20; 0-31)

Note. CAMHS = Children and Adolescent Mental Health Service; CWP = Children's Wellbeing Practitioner; EWP = Educational Wellbeing Practitioner; DBT= Dialectical Behavioural Therapy.

[1] CAMHS in the UK are organised in a tiered system including tier 2 (early help and targeted services), tier 3 (local, specialist mental health services) and tier 4 (county-wide services working with complex youth). Some clinicians work in more than one team

Supplemental Materials 7

Table S3

Exploring Associations Between Frequency of Concerns Between Clinicians, Young People and Parents/Caregivers per Digital Risk Area

Association in frequency of concerns between…	Clinicians and young people	Clinicians and parents	Parents and young people
time	.665	<.001*	.574
addiction	.277	<.001*	.242
strangers	.072	.010*	<.001*
sexting	.001*	<.001*	.001*
cyberbullying	<.001*	<.001*	<.001*
porn	<.001*	<.001*	<.001*
suicide	.013*	.001*	.002*
media	<.001*	<.001*	.001*
Dark web	.003*	<.001*	.064
body	.011*	.019*	<.001

Note. * Significant after applying Benjamini-Hochberg procedure for controlling false discovery rate (q<.05)

Table S4

Exploring Associations Between Frequency of Assessments and Frequency of Concerns in Clinicians per Digital Risk Area

Association in clinicians' frequency of assessment & concerns from…	Clinicians
time	.004*
addiction	<.001*
strangers	.004*
sexting	<.001*
cyberbullying	.012*
porn	<.001*
suicide	<.001*
media	.062
Dark web	.018*
body	.005*

Note. * Significant after applying Benjamini-Hochberg procedure for controlling false discovery rate (q<.05)

Table S5

Exploring Associations Between Clinicians' Personal Characteristics and Clinicians' Frequency of Concern per Digital Risk Area

	Age	Parent	Children under 12	Children 13-18	Years qualified	Tiers
time	.482	.499	1.00	.668	.175	.503
addiction	.065	.160	1.00	.488	.782	.144
strangers	1.00	.382	1.00	.462	.148	.014
sexting	.544	.023	.064	.174	.002*	.003*
bullying	.736	.523	.730	1.00	.054	.187
porn	.135	.095	.551	.492	.006*	.023
suicide	.737	.541	.580	.704	1.00	.359
media	.547	.093	.365	.015	.586	.247
dark web	.442	.075	.251	.085	.175	.072
body	.252	1.00	.704	.670	.467	.708

Note. * Significant after applying Benjamini-Hochberg procedure for controlling false discovery rate (q<.05)

Table S6

Exploring Associations Between Clinicians' Personal Characteristics and Clinicians' Frequency of Assessment per Digital Risk Area

	Age	Parent	Children under 12	Children 13-18	Years qualified	Tiers
time	.539	.075	.055	.467	.001*	.032
addiction	.218	.264	.763	.734	.412	.247
strangers	.544	.025	.138	.296	.025*	.043
sexting	1.00	.153	.356	.156	<.001*	.017
bullying	.342	1.00	1.00	1.00	.135	1.00
porn	.209	.153	.759	.480	.001*	.240
suicide	.118	.153	1.00	.068	.024*	.771
media	.418	.140	.018	.349	.728	.458
dark web	.568	.110	.081	1.00	.051	.284
body	.539	.017	.055	.137	.008*	.360

Note. * Significant after applying Benjamini-Hochberg procedure for controlling false discovery rate (q<.05)

Table S7

Exploring Associations Between Clinicians' Personal Characteristics and Clinicians' Knowledge

	Age	Parent	Children under 12	Children 13-18	Years qualified	Tiers
guidelines	.351	.020*	.065	.729	.047*	.134
apps – correctly identified	.547	.781	.769	.483	.586	1.00
apps – recognised as risky	.372	.406	.132	.726	.414	.565

Note. * Significant after applying Benjamini-Hochberg procedure for controlling false discovery rate (q<.05)

Supplemental Materials 8

Table S8

Themes and Subthemes and Correspondence with COM-B Components and TDF Constructs

Themes	Subthemes	COM-B component	TDF	Interventions suggested by clinicians
1) Assessment skills	Information gathering	Capability (psychological)	Skills	Asking directly and plainly Fit questions to age Asking awkward questions Semi-structured approach Use of prompts Ecological model Consider protective factors Overall risks assessment Assess broader context Assess general functioning Curious and open Use formulation to guide Handling discrepancies in reports Sensitive to over-questioning
	Building relationships	Capability (psychological)	Skills	Asking engaging questions Using humour Take time to get to know YP Knowing about technology
	Risk management	Capability (psychological)	Skills	Understanding legalities Advice to parents Clear risk protocol Supporting digital changes Educating parents Handling discrepancies in reports Educating parents Supporting parents with management
2) Knowledge	Definitions and technicalities	Capability (psychological)	Knowledge	Knowing all risks Knowing mechanics Knowing apps
	Developmental considerations	Capability (psychological)	Knowledge	Developmental norms Risks mechanisms Signs of vulnerability Typology of risks
3) Mobilising resources	Forms and procedures	Opportunities (physical)	Environmental context and resources	Formal template Include in routine reports Collecting data pre assessment Risk protocol Add to Carenotes Information accessible to clinicians Information guide Diagrams and flowcharts

Themes	Subthemes	COM-B component	TDF	Interventions suggested by clinicians
3) Mobilising resources	Knowledge sharing	Opportunities (physical and social)	Environmental context and resources; social influences	Brief updates Safeguarding alerts Share knowledge across teams Share knowledge within teams Training from specialist teams Teaching during team meetings Use business meetings Yearly updates Beware of training fatigue Email communication Expert but empathic trainer Upskilling via consultations
4) Organizational context	Prioritising	Opportunities (social)	Social influences	Agreement from management Avoid top-down approach Deprioritising other issues Digital awareness week Induction package Awareness outside of CAMHS Training staff on cybersecurity Whole CAMHS on board Embed in team discussions Use of supervision Digital champion Clarity about where to go for help
	Professional expectations	Opportunities (social)	Social influences	National guidance Professional guidance Strategic framework Knowing colleagues' practices Ensuring everyone asks
	Digital working	Opportunities (physical and social)	Environmental context and resources; social influences	Continue with blended working
5) Empowering youth		Opportunities (physical and social)	Environmental context and resources	Educating young people Digital education in schools Clear language for young people Not rely on self-report Help young people to be brave to share Risk checklist for young people Young people's views on being assessed for digital risks Involve young people in training Broader communication about youth patient engagement
6) Professional role and identity	Importance of good practice	Motivation (reflective)	Social/professional role and identity	Promote interest in topic Use evidence base Regular updates/education

Themes	Subthemes	COM-B component	TDF	Interventions suggested by clinicians
6) Professional role and identity	Perceived low competence	Motivation (reflective)	Social/professional role and identity	Address generational confidence Recognise differences in experiences Regular updates/education
7) Habit change		Motivation (automatic)	Reinforcement	Hep build habit Standardisation Implement try out period
8) Emotional experience		Motivation (automatic)	Emotion	Stories of big incidents Address taboo of sexual topics Address fear of not knowing Address helplessness/frustrations

Note. COM-B = Capabilities, Opportunities, Motivations and Behaviour Model; TDF = Theoretical Domain Framework.

Supplemental Materials 9

Illustrative Quotes for Themes/Subthemes

Theme 1: Assessment skills

Information gathering

And so that's made me realise you just you can't pick it up. Normally, you've got to ask direct questions. So I've got enough clinical experience to know that asking the question 150 times until you get one Yes, that's worth asking the question for so I think culturally, I believe in that. (participant 10)

And as part of that process we go through in kind of really methodical way. So we talk about family and family experiences, and what else is this family managing and what are the other difficulties and areas of concern for that family, then how they're getting on at school, which is the biggest part of their, usually their week, when they're away from families in school, so how is school going, what's going on there for them, and then look at the behaviour that they're exhibiting which can be not just assigned to harmful sexual behaviour. (participant 12)

Building relationships

But then some of the stuff it's hard cause you wouldn't say like, I don't routinely ask people about pornography use, for example. So that only came up because the young person had been brave enough to mention it. I guess had I asked about it earlier on, I may or may not have found it, you know, so he was somebody who we've worked probably 10 or 15 sessions together, and it came out at that point. (participant 2)

You know, one particular person would be continuously refusing to come out because they were on Fortnight talking to friends, or would be trying to access it. So a lot of our conversations were about these things, because it was a barrier to the work. No, actually, you had to be really open and really interested in talking about some of those difficult conversations with them about …why you'd want to look at this. So you'd want to look at that, “I wonder why”, Perhaps “your carer doesn't think that that's such a good idea, rather than you shouldn't”. It's about being really curious, isn't it? (participant 3)

Risk management

So that knowing what to do in the future would be good. Apart from just the standards things to younger, "no, but you don't have to reply". I think I did in sessions say to her, like, "don't feel that you do have to, it's okay not to" but she's not just gonna trust me, you know, when all her friends are doing that and expecting that of her? (participant 9)

So professionals sometimes don't realise that actually, the level of verification that they need is not at the very... doesn't need to be at the very highest level...And that's pretty significant. So you frequently get teachers or social workers or whatever saying “Oh, well, he's not going to be charged, therefore, it's not a problem”. You see? it could be saying the risk here is still high on the balance of probabilities, and we still need to be doing something. (participant 6)

Theme 2: Knowledge

Definitions and technicalities

Yeah, I mean, that's very broad, isn't it? Like I suppose that would encompass things that I wouldn't, that wouldn't naturally come to my mind with digital risk, like using the internet to buy drugs and alcohol, which is definitely something that kind of young people I've worked with have done. But I interestingly wouldn't put that in like a digital risk category. (participant 1)

You can do more with "Oh, well, I know this is something you use; how are you using it? …using it in this way or that way?" Whereas if we only know for example, Snapchat, where they send pictures, but actually there's a lot more to Snapchat than just sending pictures, there is time limited, there is location things. So there's posing risks within the different apps as well. Yeah, I think so. For me, it'd be training but also some sort of interaction on how to do that or how to know about them as well. (participant 3)

Developmental considerations

I wouldn't say … that I think it's an okay thing, or that I necessarily think all of it is developmentally appropriate. But I suppose I do think some of it probably falls into the kind of experimenting, taking risk side of things that perhaps, you know, before the advent of the digital stuff we would have done in other ways, you know, teenagers or but, you know, it's just sort of translated there. And so it doesn't mean that it's okay, or that I would be accepting of it. But it would be perhaps less surprised. (participant 2)

I feel like I would have to come up with like, maybe a couple of different definitions, and depending on the age of the young person … I might need a slightly more simple. And it might be necessary to like, give some examples. So at the moment, I wouldn't be able to just give that…with some time, and … some research of my own, I could probably come up with ways to describe that. (participant 9)

Theme 3: Mobilising resources

Forms and procedures

I think unless, yeah, the fact that we don't really ask about it, or at least I don't really ask about it until a risk comes up, and then you sort of check "Is it at home?", "Is it on the devices", with follow up questions? I think the fact that it's not sort of being asked routinely, and it's not standardised. I think there's definitely a lot of room for improvement. (participant 11)

I don't know, if you're familiar with our electronic notes system Carenotes? So the risk assessment that we use on there isn't really, probably better now. But you know, it doesn't include things like digital risks, it could be better focused on young people and what the risks might be. So having it added, having something added to Carenotes about digital risks within the risk assessment that is already there. (participant 5)

Knowledge sharing

I think when new areas of safeguarding concern [are] around, I guess, … that actually we're informed of it. I think the trickiness sometimes is closing that information loop…. there might be specific group of people who know better, but then that's not disseminated to the wider teams. So I guess it's how to make sure that communication is closed…so the awareness level continues. (participant 4)

There's a wonderful person in Oxfordshire Social Care, who has really good knowledge of everything to do with digital stuff. So understands the tech around it, understands what's going on, understands the new threats that may be there, and we kinda need that sort of person, but I don't understand that there's anyone like that in here in our Trust. (participant 12)

Theme 4: Organizational context

Prioritising

I think it's hard because I think for us as a team, it would need to be a priority of the team manager. But in order for it to be the team manager's priority, somebody ahead of her would need to have decided that it was a priority, if that makes sense, because she has lots of competing priorities and kind of information that she needs to share with us. (participant 2)

I think that there's pressure and time, on consideration of what else needs to be assessed. Obviously, in CAMHS, that initial stuff is about self-harm to self and managing risks that are associated with that. (participant 12)

Professional expectations

When you're doing other safeguarding stuff, for example, you're clear about what may or may not be needed and what, how that's thought about within a sort of strategic framework. Whereas I think it's less clear in this area, and I haven't, I mean, I'm sure it's there. but it's more piecemeal. And it's not as if it's everybody refers to one thing. (participant 6)

So if there's anything that I think we could potentially do more, is inquired more of it when we do our case consultations within our team meetings, or case discussions, 'cause we probably, within those cases, questions probably focus a bit more on the physical realm than the digital realm, hmm. So maybe in our teams' formulations, we could probably think a bit more about that as well. (participant 4)

Digital working

I think it's [remote working due to Covid] not a barrier, I think it's the opposing, is that we're very much more aware of what's going on and other people social media, so it would be updated as a team. And if something is going on Tik Tok, or if there's been a case of bullying online, so that we're more aware that that might be impacting on young people. So it's almost in the back of your mind to ask about it. (participant 3)

Well, I think there's been, it's not really around digital risk as such, but I think COVID has been a good opportunity for us to engage with young people in a preferred method for them, which is, you know, what, why would any teenager want to schlep all the way into one of our fairly grotty hospital bases, to sit in a room with a couple of other adults, when in fact, they can do it from the personal facility of their bedroom? Like they talk to their mates on a laptop…. it's far more engaging and doing things in a way that they're far more used to. It's like using their language rather than our language. (participant 7)

Theme 5: Empowering youth

I know that Trust does have patient engagement. But it's not really embedded in what we do or doesn't feel like it's in an everyday kind of way. So I know if we're doing a particular project, we can take things to patient participation. But it's not, you know, a constant conversation back and forth. And things like having that improved, might highlight things like digital risk, or what we're asking, what we're asking questions about and whether it's relevant because the young person might say, you don't ask too much about. Whereas we don't know that if we don't include children so much. And just how to structure service and so on. (participant 5)

There could be like a questionnaire that the young person fills out while they're in the waiting room, or the same with a routine outcome measure that asks about, I guess you

know. cyberbullying, when asked about use of social media asked if they feel like they're vulnerable, or if they're spoken to someone that they haven't ever met before. If they know how to sort of use the internet safely, if there was a form that would ask those questions that were sent out that the young person can answer in private... Yeah, I don't know. I think I mean, that's my opinion. I think that could be a good way to go. (participant 11)

Theme 6: Professional role and identity

Importance of good practice

I didn't regularly assess fire setting because it wasn't one of the kind of things and whereas now that is like, that's just one of my, you know, depending on the referral and the thing, I have an idea of like, here's a whole bunch of questions that may or may not be relevant to you, and I do my, like, hallucinations and overvalued ideas and psychosis kind of screens, and I do my just to check you don't like threaten to kill people or break things or set fire to things and stuff. Because it's the one time in 12 that you don't think there's anything like that gonna come up and someone goes, well, actually...! you think this is why we ask everybody these questions. (participant 1)

We need to kind of meet, and we need to know, we need to be up to date with everything, we need to be up to date with technology, and what's coming out. And how, you know, how vulnerable people are using that stuff. You know, and to be aware of that the risks and the pitfalls. (participant 8)

Perceived low competence

The only thing that has up until now, maybe stopped me from asking about it is lack of awareness, which is why I think the teaching is so important to not knowing about digital risks, not knowing what to ask or what to look out for. Yes, I think just sort of lack of awareness and lack of confidence. (participant 11)

Because when you come across, because in this day and age, particularly with teenagers, I think they're ahead of their parents, when digital stuff is concerned. Because …as quick as it comes out there, that they're there because of the way they're taught it, because they start so young. They're ahead of it. So, you know… working with young people is beyond me, sometimes the digital stuff that they come up with, and I'm like, I haven't got clue what you're talking about. And I'm fairly digital (participant 8)

Theme 7: Habit change

Because it is the inertia… nobody would say, well, that's a terrible idea, I don't want to do that. But it's moving from…. It's a bit like any kind of habit change in normal life. Isn't it moving from... "That's a good idea, like, yes, drink more water and eating more

fruits and vegetables. Those are good ideas. I should do that" to "I'm going to actually put something in place." That means that I do that on a regular basis, rather than like, yeah, January or like when it's mentioned in the referral form. (participant 1)

I think that is a barrier, potentially, that it's just another learning thing. And it gets to the back of your mind if you're not continually practising it or talking about. (participant 3)

Theme 8: Emotional experience

…a young person basically wrote this, like sort of speech to that school, and said that, you know, it was basically saying … that she felt that young people…we're so addicted to social media, and even though…everything that they teach in school is really important. … they don't teach that. And I remember, she wrote it to her teacher, and her teacher sent it to me, because he thought that I might be able to help, and I didn't know what to do. So that was an example where if I'd had some resources or something, I would have been able to help, but I just kind of didn't really know what to do. And I never been trained in like, how to how to help with that. … I guess that made me realise that I just didn't really know what to do about that. Yeah, made me feel helpless in that way. (participant 9)

People get very worried because that sort of taboo areas to some extent, they get very worried about making judgments on the basis of, of their own sense of something rather than on some sort of external, legal or other criteria. (participant 6)

Supplemental Materials 10

Table S9

Summary of Targets for Behavioural Change and Potential Approaches

Determinants	Intervention functions					Levels of intervention			Policy categories			
	Education	Training	Modelling	Environmental restructuring	Enablement	Staff	Teams	Organization	Guidance	Regulation	Communication	Environmental planning
Assessment skills (C)		X				X			X	X		
Knowledge (C)	X					X			X	X	X	
Mobilising resources (O)				X			X	X	X	X		X
Organisational context (O)			X		X			X		X	X	
Empowering youth (O)					X		X	X	X	X	X	
Habit change (M)		X			X	X	X			X	X	X
Emotional experience (M)		X	X		X	X	X				X	
Professional role & identity (M)	X		X			X	X		X	X	X	

Notes. C = capabilities; O = opportunities; M = motivations. See Supplemental Materials 1 for brief description of intervention functions and policy categories

Supplemental Materials 11

Service Response

Key findings were disseminated locally to inform service development within Oxford Health as well as regionally and nationally/internationally to share knowledge given that this is a topical area.

At a local level, feedback was given to Oxford Health CAMHS through two oral presentations. First, a presentation was given during a CAMHS Managers meeting in July 2021. This generated discussions on systemic barriers and opportunities to embed further digital thinking across services. However, the enthusiasm around this topic appeared to be variable between managers. It is important to note that the timing of this presentation coincided with an especially busy time in Oxford Health CAMHS, which was going multiple challenges. These included structural changes involving reconfiguration of teams; high levels of staff turnover; increasing demands and resulting long waiting lists following the impact of COVID-19. This highlighted the need to consider organisational-level factors in improving staff practice, particularly competing priorities, in line with the key findings.

Second, another presentation was given during a CAMHS Forensic team January 2022. This led to a lively discussion about the importance of embedding the voices of young people in this service development. Dr Carmen Chan and Dr Matthew Lister (external supervisor) will be leading on the next phase of this project with the development of a novel assessment tool for digital risks, co-produced by young people. There are ongoing plans for this tool to be piloted with clinicians across Oxford Health CAMHS.

At a regional level, key findings were disseminated by Dr Matthew Lister during a practitioner workshop (Digital Safety and Mental Health) in November 2021 (www.acamh.org/event/digital-safety). This was co-organised by me as a committee member of the regional branch of ACAMH at Oxfordshire and Reading. The workshop was well-received and attended by over 70 professionals working with children and adolescent in the areas of health, police, education, and social care.

Finally, at a national/international level, the project has recently been published in a peer-reviewed journal (Clinical Child Psychology and Psychiatry) as an open access paper and as part of a special issue (Social Media and its Influence on Young People) due to be released in September 2022. This will be co-edited by Dr Vincent McDarby (Crumlin Children's Hospital, Dublin) and Dr Charlotte Wilson (Trinity College Dublin). The findings have already sparked interest elsewhere - for example I was recently invited to present this talk to a research group led by Dr Amy Orben (University of Cambridge), who is an expert in digital technologies and adolescent mental health.

APPENDIX D: SIP Local Governance Approval

Title	Professional Guidance to assess Young Person's Online Activity		
Division	Forensic CAMHS	**Team / Ward / Unit**	Children and adolescent's harmful behaviour service
Name and Title of project lead(s)		Project Leads Dr Matthew Lister – Consultant Clinical psychologist Dr Charlotte Procter – Forensic Psychologist Dr Alex Lau-Zhu – Trainee Clinical Psychologist Dr Ciorsdan Anderson – Consultant Clinical Psychologist	
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Supervising Consultant / Service Manager		Louise Tohill	
Proposed start date		June	
Proposed finish date		August	
This project is a:			
☒ First audit/ service evaluation	☐ Re-audit/ repeat service evaluation If yes, date of last audit/ service evaluation _____		
Is this audit/ service evaluation on your local Divisions audit plan?	☐ Yes, it is on the local Divisions audit plan ☒ No, please add it to the Divisions audit plan ☐ Don't know		
Reason for audit or evaluation *(tick all that are applicable)*			
☐ National priority	☐ Trust priority	☐ Division priority	☐ CCG priority
☐ SIRI recommendation	☐ NICE guidance	☒ Other Staff Knowledge & Resources	
Background to Project			
The NSPCC has published research around the suitability and content of internet sites and apps which includes age guidance. As a service we have noted that professionals, parents and young people are not always aware of the research available around internet safety and usage. As a service we regularly give advice and consultation around what support to give if online behaviour may be having a detrimental effect on a young person's sexual development. The child and adolescent harmful behaviour service would like to audit staff knowledge across CAMHS services and then provide resources to share learning this will include 1) Internet usage 2) Internet safety 3) Harmful material. After the learning has been shared, we will then be able to identify gaps in provision and address potential training needs.			
Standard(s) for audit or Objective(s) for service evaluation			
Data Source for Standards/ Objectives eg NICE Guideline, Policy, Local Team protocol etc..			
(please list all the standards/ objectives which will be assessed) Local team protocol & policy			

Scope and Methodology for Project

Participants

The study will use opportunity sampling across CAMHS services within Oxford Health NHS foundation trust. All participants will be working professionals.

Materials

The audit will be based on a questionnaire to assess whether or not professionals are asking young people about their online activity. The questionnaire will be distributed through survey monkey and will include quantitative and qualitative questions (time 1). This will be completed with some focus groups/interviews (likely online via e.g., Teams due to Covid-19). The initial questionnaire will include an option to opt in for the focus groups/interviews. We will aim for 3-5 focus groups, or 5-10 interviews (depending on staff preference and technical issues).

Resources will be distributed across the participating CAMHS teams upon completion of the time 1 questionnaire. This will include a professional guidance prompt sheet and an information booklet.

After 2 weeks the questionnaire will then be redistributed through survey monkey and will include quantitative and qualitative questions (time 2).

Staff teams will be identifiable through the questionnaires. The individual staff responses will be anonymous. This will be explained at the beginning of each questionnaire and consent will be sought.

Design

The audit will adopt a repeated measures design across two-time points and will use the same participating teams.

Procedure

Participating teams will receive an invitation explaining the background information to the audit and what is expected should they wish to contribute. This will include a commitment from team managers to complete T1 & T2 questionnaires for a minimum of 10 working professionals.

The questionnaires will be distributed using a survey monkey link which will automatically collect responses. The link will be sent using a secure email.

Resources will be distributed after the completion of the time 1 questionnaire.

Two weeks after the resources have been distributed the time 2 questionnaire will be distributed across participating teams in the same way.

There will be an opportunity for the participating teams to give feedback.

How are you going to collect the data *(tick all that are applicable)*

☐ Case notes (paper/ electronic)	☐ Observations	☒ Patient/ Staff Survey	☒ Other (please state) As above

Data Protection Act

Please tick to confirm "yes" you will comply with:

☒ All data collected will be anonymised ☒ No patient or staff identifiable data will be reported

Ethics Screening – If you answer yes to any of the questions please contact the Research and Development Team (01865 738530)

Gather any information about a patient beyond that collected in routine patient care ☐ Yes ☒ No

Pose any risk for or burden on a patient beyond those of his/her routine patient care ☐ Yes ☒ No

Infringe on any patient's rights ☐ Yes ☒ No

Risk breaching any patient's confidentiality or privacy ☐ Yes ☒ No

Involve the use of any untested clinical or systems intervention ☐ Yes ☒ No

Requested Support from the Quality and Audit Team *(tick all that are applicable)*

☐ Design data collection tool	☐ Data collection
☐ Data analysis	☐ Report writing
☐ Power point presentation design	☒ None

APPENDIX E: SIP Published Manuscript

Check for updates

Special Issue: Social Media and Mental Health

Assessment of digital risks in child and adolescent mental health services: A mixed-method, theory-driven study of clinicians' experiences and perspectives

Clinical Child Psychology and Psychiatry
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Abstract
Children and adolescents in the UK spend increasingly more time in the digital world, raising societal fears about digital risks in this age group. Professionals are not always aware of the ever-developing research or guidance available around digital safety. This gap underscores the need to understand current experiences and determinants of digital risk assessment, including clinicians' views on barriers and facilitators. A mixed-method design was used. Fifty-three clinicians working in child and adolescent mental health services (CAMHS) in South England took part in a survey; of these 12 took part in semi-structured interviews. A psychological model of behavioural change (COM-B: capabilities, opportunities, motivation and behaviour) guided the analyses. Survey data revealed that clinicians showed awareness and concerns for several digital risk issues but there appeared to be gaps in their knowledge and practice. Interview data revealed different factors influencing staff enquiry about digital risks in CAMHS. These included aspects of capabilities (knowledge and skills), opportunities (resources, organisational context and empowerment of youth), and motivations (habit change, emotional experiences, and professional identity/role). Targeting both staff-level and organisation-level barriers to digital risk assessments in CAMHS is crucial. This study informs service improvement to ensure that children and young people safely navigate the digital world.

Keywords
Digital risk, online safety, social media, child and adolescent mental health services, COM-B, youth mental health

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The Internet plays an important role in young people's lives. The majority of children and adolescents in the UK have their own tablets or smartphones and they also spend increasingly more time online (Ofcom, 2020), raising societal fears about digital risks in this age group (Odgers & Jensen, 2020; UNICEF, 2017). Currently, firm conclusions about the negative effects of screen-based activities on young people's socio-emotional developmental and mental health are hampered by methodological issues within research (Dickson et al., 2018), including for controversial areas such as screen time (Orben, 2020). Nevertheless, practitioners understandably remain concerned by the emerging evidence (Dickson et al., 2018), particularly in areas associated with high levels of clinical risks, including self-harm (Biernesser et al., 2020), cyberbullying (Bottino, Bottino, Regina, Correia, & Ribeiro, 2015), and problematic sexual attitudes and behaviours (Horvath et al., 2013).

Several UK-based authoritative bodies have recently issued guidance on digital risks in youth (Livingstone et al., 2017; NSPCC, 2019; Viner, Davie, & Firth, 2019), all of which point to a critical need for professionals to understand the emerging evidence base within their practice. Most research on digital risks is on the impact on youth. Research on clinicians thus far has been largely restricted to their views on digital interventions (Cliffe, Croker, Denne, & Stallard, 2020), digital consultations (Bhardwaj et al., 2021), and internet safety education (Moreno, Egan, Bare, Young, & Cox, 2013) but not on digital risk assessments, despite their active role in prevention, intervention and safeguarding.

In this rapidly developing field, we note that several terms are used interchangeably, including – but not limited to – digital risk (OECD, 2021), digital dangers (Palmer, 2015), online risk (Livingstone, Lievens, & Carr, 2020), online safety (NSPCC, 2019), online harm (Woodhouse, 2021), Internet safety (Livingstone et al., 2017), cybersecurity (Quayyum, Cruzes, & Jaccheri, 2021), and so forth. Our rationale for choosing "digital risk" was pragmatic: "risk" is the language used by clinicians to denote common forms of harm to patients (e.g., risk of suicide or neglect) and "digital" is a more encompassing term that covers both online and offline activities (i.e., using digital devices). Terminology and definitions are likely to consolidate with further intersectoral collaboration spanning science, law, health, education, and technology.

Local context

Oxford Health is an NHS Foundation Trust in South England looking to develop guidance on digital risks for working with young people. Child and adolescent mental health services (CAMHS) in the UK are expected to offer advice and consultation around appropriate support when online behaviours can be detrimental to a young person's development.

Professionals, parents and young people, however, are not always aware of the ever-developing research or guidance available around digital safety. Anecdotal accounts suggest a lack of confidence given the generational gap between clinicians and young people. It is also unclear whether online activity is appropriately covered in routine risk assessments. This gap underscores the need to identify current experiences and determinants of digital risk assessment, including clinicians' views on barriers and facilitators.

While our focus is on one organisation, clinical experience and discussions with colleagues indicate that this is a topical area that holds relevance nationally in the UK (and internationally) and across statutory and tertiary sectors.

A behaviour change approach

Psychological theories play an important role in understanding and informing behavioural changes to guide the development of high-quality interventions. An elegant pan-theoretical model (Michie,

van Stralen, & West, 2011) posits that components associated with capabilities (C), opportunities (O) and motivations (M) are necessary for behaviour (B) to occur (Supplementary Material 1). A "diagnosis" of the determinants of the behaviour following this COM-B model can be made to identify intervention targets. Capabilities include internal factors such as knowledge and skills; opportunities include external factors such as physical (e.g., infrastructures) and social possibilities (e.g., organisational culture and implementation climate); and motivations include automatic (e.g., habit and emotions) as well as deliberate processes (e.g., beliefs and intentions) that would energise behaviour. Such components are informed by psychological constructs synthesized across 19 major behaviour-change theories, an approach coined as the Theoretical Domain Framework (TDF) (Atkins et al., 2017) (Supplementary Material 2).

The COM-B analysis can also help identify corresponding intervention and policy approaches to support the desired behavioural changes (Supplementary Material 1). For example, a lack of skills identified could be targeted via training, with regulation flagging this training up as compulsory; habit formation could be targeted with environmental restructuring to add reminder cues, which can be further enhanced with regular communication promoting this desired habit; the lack of social influences could be targeted by making role models more available, further supported by a widely disseminated professional guidance.

The COM-B model is increasingly used in healthcare research. This model has informed clinical practice to change clinicians' behaviours in areas such as risk communication (Bonner et al., 2014), health promotion (McDonagh et al., 2018), health assessments (Alexander, Brijnath, & Mazza, 2014), use of evidence base (De Leo, Bayes, Bloxsome, & Butt, 2021), and improved use of clinical resources (Jenkins et al., 2018). We are, however, unaware of research applying COM-B to understand what is needed for clinicians to perform risk assessments more effectively.

Aim and questions

Our overarching aim is to understand clinicians' experiences and perspectives in relation to digital risk assessment in CAMHS in Oxford Health and to inform service development in this area. This research is guided by the COM-B (and TDF) approach with emphasis on mapping determinants of behaviour.

Our specific questions were as follows:

1. What areas of digital risks in children and young people are clinicians concerned about and what areas are being assessed by clinicians?
2. What clinicians' characteristics (demographic and professional factors) are associated with their concerns, assessments and knowledge of digital risks?
3. What are the barriers and facilitators for clinicians in assessing digital risks?
4. What recommendations (e.g., intervention and policy approaches) can be drawn for service developments?

Methods

General design

A mixed-method design was used. Two studies were conducted. In Study 1, an online survey was devised to map out clinicians' views and experiences on digital risks and to explore the associations with participants' characteristics. In Study 2, a subsample of clinicians was followed-up with

interviews to explore their views on barriers and facilitators for assessing digital risks in CAMHS. Participation was voluntary and all participants provided informed consent. The project was approved and registered by Oxford Health NHS Foundation Trust Quality and Audit Team as service evaluation, and thus no ethical approval was needed.

Additional method details can also be found on Supplementary Material 3.

Study 1

Participants. All team managers in CAMHS within Oxford Health were contacted to invite clinicians within their teams to take part in a short online survey. Survey data were collected between September and December 2020.

Design and procedure. An online survey (Supplementary Material 4) was designed using the Joint Information Systems Committee (JISC) Online Survey tool. Participants were told that their individual responses would remain confidential and that the survey would take approximately 15 min to complete. The survey questions were devised by the authors in consultation with clinicians and researcher working in youth mental health.

Survey questions were divided into three main sets. The first set asked about demographics and professional characteristics. The second set asked about concerns and assessment on key areas of digital risk with four response options (never, seldom, sometimes and often). For all these areas, clinicians were asked about their own frequency of concerns as well as their perception of both young people's and parents'/caregivers' frequencies of concerns. The third set was intended as a brief test of knowledge on the issue of digital risks. Clinicians were asked whether they were aware of any guidelines on the topic and whether they knew of eight apps (used by young people) which pose some level of risks according to NSPCC (National Society for the Prevention of Cruelty to Children). Finally, a link to resources on online safety by NSPCC was included.

Analysis. Descriptive statistics were used to summarise demographics and professional characteristics. Frequencies of concern and frequency of assessments per area of digital risks were totalled across clinicians. Knowledge was assessed as whether clinicians were aware of guidelines on digital risks; the number of apps that clinicians were able to correctly identify; and the number of apps that clinicians were able to recognise as somewhat risky for young people. Frequency responses indicating "often" and "sometimes" were grouped into "high" frequency and "seldom" and "never" into "low" frequency.

Fisher's exact tests were used to explore associations between digital risk concern/assessment/knowledge and participant characteristics. The Benjamini-Hochberg procedure to control for false rate discovery ($q < .05$) was applied given the large number of tests. All statistical analyses were performed using SPSS version 25 (IBM, 2017).

Study 2

Participants. Clinicians who completed Study 1 were invited to leave their contact details if they wished to be interviewed. Participants were told that the findings will help develop strategies to better identify and manage digital risks in CAMHS. Interviews took place between November 2020 and January 2021.

Design and procedure. A topic guide (Supplementary Material 5) was jointly developed and piloted by the study authors and subsequently reviewed based on feedback from clinicians working in CAMHS. We began with a broad definition of "digital risks" as "*behaviours involving the use of digital devices, the Internet and/or social media that pose potential harm to self, to others, or from others, in young people that you work with*". Interview questions explored clinicians' experiences of assessing digital risks with young people; factors (personal and professional) perceived as influencing their experiences/views of assessing digital risks; and recommendations for service improvement. All interviews took place individually by videoconferencing. Each interview was between 30–60 minutes.

Analysis. Interviews were audiotaped and transcribed. Transcripts were subsequently analysed with thematic analysis (Braun & Clarke, 2006) using NVivo 12 (International QSR, 1999). The lead author (ALZ) read each transcript several times to ensure familiarization and then conducted the initial coding and provisional (sub)theme generation. All authors reviewed the final (sub)themes and interpretation of the data to ensure credibility and coherence.

Results

Study 1

Participant characteristics. Fifty-three clinicians responded to the online survey (see Supplementary Material 6 for full details on demographics and professional characteristics). Respondents were primarily female, White and working full-time. There was an even split between parents and non-parents.

A wide range of work experiences were reported as indicated by the number of years since core qualification and number of years working for Oxford Health (ranging from less than a year to over 30 years). All core professions within CAMHS in the UK were represented (with the majority identifying as psychologists or nurses). All CAMHS services within Oxford Health in Oxfordshire were also represented. The majority of clinicians worked within local, generalist CAMHS and a county-wide specialist neurodevelopmental service. Most clinicians reported having a weekly caseload of 4–9 direct or indirect cases (i.e., working through families, schools or other professionals).

Digital risk concerns and assessment. Six areas of digital risks were rated by clinicians as of "high" concern (i.e., with at least 50% of clinicians endorsing "often" or "sometimes"). These were time spent; meeting strangers; sexting; cyberbullying; suicide/self-harm; and body image (Figure 1). The remaining areas not rated as such were addictions, sexual materials (e.g., pornography), media trauma, and the dark web. Clinicians' frequency of concerns was significantly associated with their frequency of assessments of all digital risk areas, except for media trauma (see Supplementary Material 7 for detailed results).

Clinicians' frequency of digital risk concerns was significantly associated with their perception of young people's concerns in all areas except for three (time spent, meeting strangers and addiction). Clinicians' frequency of concerns were significantly associated (accorded) with their perception of parents/caregivers' concerns in all areas.

Brief test of clinicians' knowledge. Only one third of clinicians ($n = 19$; 35.8%) reported being aware of any existing guidelines. While clinicians on average identified most of the eight apps correctly ($M =$

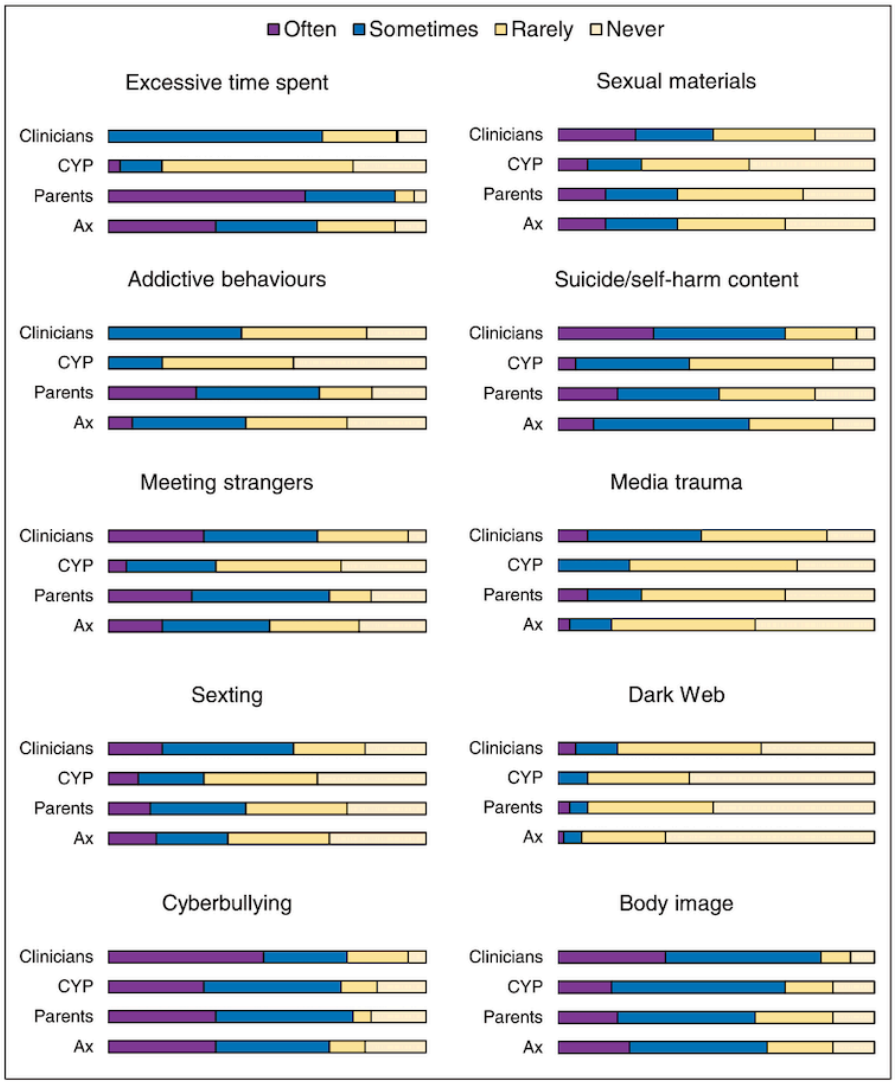


Figure 1. Frequency of concerns on key areas of digital risks as reported by clinicians. Note. Clinicians = how often *clinicians* are concerned about this area of digital risk; CYP = how often clinicians perceive that *children and young people* are concerned about this area of digital risk; parents = how often clinicians perceive that *parents/caregivers* are concerned about this area of digital risk; ax = how often do clinicians *assess* this area of digital risk.

6.17; *SD* = 1.82), they recognised only approximately half of these as somewhat risky (*M* = 3.74; *SD* = 2.03).

Associations between clinicians' characteristics and clinicians' digital risk concerns, assessments and knowledge. Digital risk *concerns* showed mostly no significant associations with any clinicians' characteristics, with two exceptions. More *years qualified* was significantly associated with more clinicians' concerns about sexting and sexual materials. Working in services with *Tier 4* provision was also significantly associated also with more concerns also about sexting (Tier 4 services in the UK CAMHS system typically funded to offer more specialist, county-wide support and have closer links to youth justice and exploitation services). No significant associations were found with any other areas of digital risks. No significant associations were found with age or parenthood.

Digital risk *assessments* showed a significant association with only one clinicians' characteristic. Specifically, more *years qualified* was significantly associated with more assessments of time spent, sexting; exposure to sexual materials; body image; suicide/self-harm; and meeting strangers. No significant associations were found with any other area of digital risks. No significant associations were found with age, parenthood, or CAMHS tiers.

Finally, awareness of guidelines was significantly associated with more *years qualified* and with *being a parent*. No significant associations were found with age or CAMHS tiers or with knowledge about risky apps.

See Supplementary Material 7 for detailed results.

Study 2

Participant characteristics. Twelve clinicians took part in the interviews. Nine identified as female and the rest as male. A range of professions were represented: five clinical psychologists, a forensic psychologist, a forensic psychiatrist, a child and adolescent psychiatrist, a nurse, a social worker, an educational wellbeing practitioner, and an assistant psychologist. There was an equal split in those working in CAMHS services with and without Tier 4 provision.

Themes and subthemes. Eight themes and 13 subthemes were identified, which corresponded to two capability components, three opportunity components and three motivational components within the COM-B model (Figure 2). A more detailed summary of the relationships between COM-B components (and corresponding TDF domains linked to specific theory-driven psychological constructs) can be found in Supplementary Material 8. Additional illustrative quotes can be found in Supplementary Material 9.

Assessment skills (capability). Clinicians described an approach to *information gathering* that needed to be both narrow and broad. While some clinicians waited for a concern before exploring further, the need for direct question was also raised: "you just can't pick it up … asking the question 150 times until you get one 'yes' … that's worth asking the question" (participant 10). The use of formulation was raised as a guide to assessment, placing emphasis on the broader context, including school and family factors and areas of strengths. Thus, sensitively involving parents was highlighted as a key issue. Overall, a semi-structure approach was favoured that included general enquiries followed by prompts. Given the potential sensitive nature of this topic, an emphasis was placed on *building relationships* with the young person, and getting to know the young person (participant 3). Finally, clinicians wanted to be skilled in *risk management* beyond assessments, as the former is

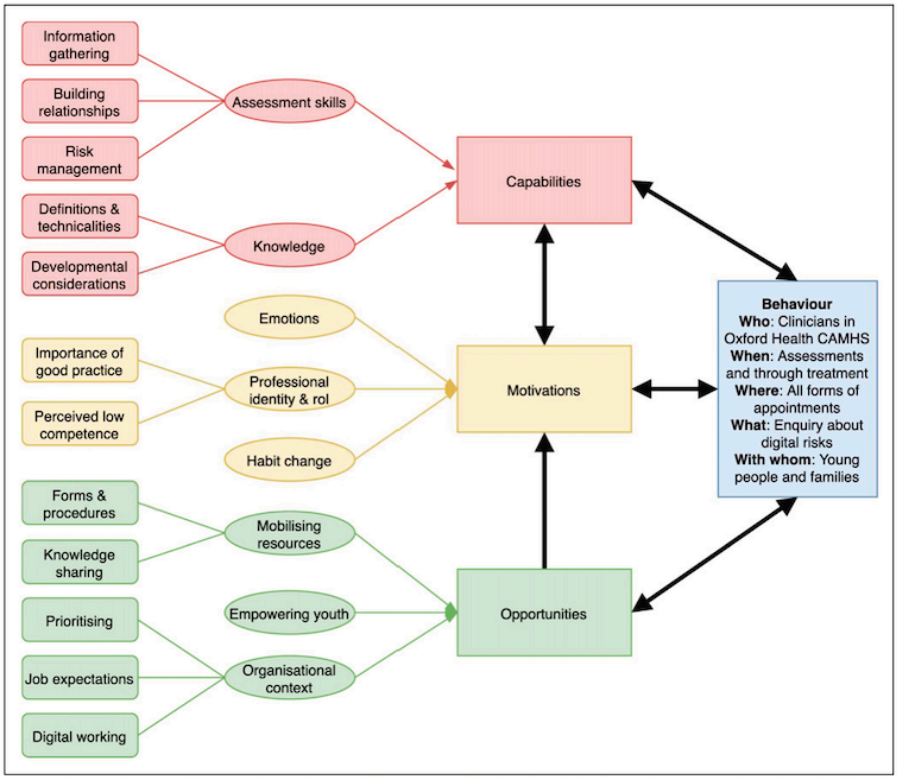


Figure 2. Schematic of Themes and Subthemes following the COM-B Model. Note. A generic COM-B model (Michie et al., 2011) was expanded with current themes and subthemes.

perceived as harder (participant 8). Clinicians often expressed feeling unable to provide adequate advice for young people in making changes and for parents in supporting these changes.

Knowledge (capability). Clinicians described gaps in their knowledge of *definitions and technicalities*. Many expressed not knowing the whole "spectrum of risks", including areas they never thought they would ask about (participant 2). Lack of knowledge was described about the specifics of how an app works – "bamboozled by the technical side of it" (participant 6). Potential ambiguities were also highlighted regarding the umbrella term "digital risks". Clinicians expressed the need to be thoughtful of *developmental considerations*. Clinicians would like to know more about the general prevalence of digital risks (participant 12) and what falls within normative risk-taking (participant 2). There is a desire for an overarching framework including typology/principles rather than just learning technicalities, as these can change rapidly (participant 6), as well as better understanding vulnerability and maintenance factors (participant 11).

Professional identity and role (motivation). Clinicians described the *importance of good practice*. Considering digital risks was seen as "due diligence" (participant 3) – "it won't take long 'cause it's

not relevant or it will take long and it will be a bloody good job that we've done it" (participant 1). Unanimously, the need for education, training and regular updates was stressed, as it is about "practice catching up with the world outside" (participant 6). Many also raised a sense of *perceived low competency* and generally "not feeling equipped" (participant 12). There is also a perceived "generational gap" – "I'm at an age now where I think 'oh, God, do I need to know anymore?' … their knowledge … it's more embedded … whereas mine on the outskirts?" (participant 8).

Habit change (motivation). Clinicians explained challenges associated with "moving from 'oh this is a good idea' to … actually put something in place" (participant 1). Clinicians explained that it can be easy to forget because "there's so many things to remember that it can be really hard to remember all of them" (participant 2). Suggestions proposed included the role of practice (participant 2) and having reminders (participant 5).

Emotional experience (motivation). The issue of digital risks brought up a range of emotions – the "speed of things ….I find so daunting" (participant 8). "Taboo" subjects, especially those involving sex, seem to bring up anxieties (participant 12). Feelings of helplessness and frustration were described when not knowing how to manage risks (participant 9). Several clinicians wondered if a "big incident" is needed to prompt further awareness of digital risks as "motivation is emotional" (participant 1).

Mobilising resources (opportunity). A range of suggested improvements for *forms and procedures* were made. A lack of standardised "formal template" where digital risks are included was mentioned (participant 11), either in paperwork or within CareNotes (an electronic recording system). A clinician commented that the electronic system presents "an adult risk assessment that didn't really make sense for young people", for example, with issues such as risk of falls (participant 5). A "simple checklist" (participant 6) or a "short and compact screening" form (participant 4) with "little prompts" (participant 1) was suggested to aid digital risk assessments. Suggestions were also made for improving *knowledge sharing.* They wanted more "joint-up thinking about what's currently going on" (participant 3). These included using of existing structures such as team meetings to share information, with some clinicians preferring "regular" and "practical" training (participant 8) while others just "brief" updates (participant 2). Many wanted clarity around "where to go to" for help (participant 6), including safeguarding teams, nominated digital risk champions and/or clinical supervisors.

Organisational context (opportunity). Issues around *prioritising* were discussed, with senior managers "being on board" seen as critical (participant 9). Clinicians pointed out some gaps in the organisation as a whole on this topic, for example, the lack of digital risks in induction/current training or broader conversations on this topic beyond CAMHS. However, some caveats were raised, for instance, that "it can be a more of a corporate thing … kind of top down or like someone's hobbyhorse" (participant 1), alongside competing demands – "there were so many things we could add in … it's hard" (participant 5). There was also a desire for clarity on *professional expectations*. Clinicians commented on "a lack of "national/cross-agency agenda" and "professional practice guidance" (participant 6), leading to variability in practice. Recent Organisation-level uptake in *digital working,* due to the safety restrictions imposed by the COVID-19 pandemic, has meant that there is now more "awareness" of digital risks (participant 8) and opportunities to use young people's "language" (participant 7).

Empowering youth (opportunity). Clinicians expressed the need to put young people's views and experiences at the centre of this topic. Understanding young people's views on digital risk assessments was seen as critical, for instance asking "if you were coming to CAMHS, how would it be if someone asked you about your social media usage?" (participant 3). Challenges were discussed around how to best enable young people to share, as they often "don't feel being understood by parents" (participant 12) and needed to be "brave" to share (participant 2). Some suggested for "a questionnaire that the young person fills out while they're in the waiting room…just like other routine outcome measures" (participant 11). A more active role within a broader service-user engagement strategy was proposed, because it is a"…whole world that young people know a lot more about than older people, and its often older people planning and organising services and less involved in social media". Suggestions were made for young people to be involved in training/educating clinicians to create a genuine sense of "constant conversation back and forth" that "could potentially have more impact" (participant 5).

Discussion

Key findings

Overall, survey data provided a quantitative snapshot of clinicians' views and experiences on digital risks showing variability in practice, and interview data further revealed a theory-driven core set of behavioural determinants (by identifying themes) of current practices in digital risk assessments (as perceived by clinicians).

Here we summarise the key results as brief answers to each of our four research questions (see *Aim and Questions*) in turn:

1. Clinicians showed concerns and assessed for a range of digital risks areas (Figure 1) although with some gaps (i.e., gaming and Internet addiction, pornography, media trauma and the dark web); they also showed awareness of common apps used by young people but not of all possible risks associated or of existing guidelines; and their concerns were in line with parents' concerns but not always with young people's concerns;
2. Very few associations were found with clinicians' characteristics, including age and parenthood, suggesting that these individual characteristics may play less of a role in clinicians' practices on digital risks than it is assumed by the perceived "generational gap";
3. Factors in all domains of capabilities, opportunities, and motivations (Figure 2) were found as relevant for clinicians, most of which represented barriers to routine enquiry of digital risks in CAMHS;
4. These factors represent potential targets for behavioural-change interventions and policy approaches (Michie et al., 2011), which we elaborate below (also see Supplementary Material 10).

Implications for service improvement

Intervention functions. Interview data echoed survey results in the need for interventions targeting multiple factors and at multiple levels. Clinicians have suggested a wide range of potential behavioural-change techniques for intervention development (details which can be found in Supplementary Material 8). At the staff level, there is a role for *education* and *training* to increase capabilities (knowledge and skills) and motivations (e.g., confidence). This is likely to produce

maximal impact when it is responsive to staff and service needs (i.e., considering each subtheme identified) while bearing in mind that a one-off "tick box exercise" is unlikely to cover the breadth and evolving nature of the issues. Interventions taking the form of *environmental restructuring* (e.g., new assessment resources and processes) and *modelling* (e.g., knowledge sharing with supervisors and colleagues) can play important roles in engaging more "automatic" or "unconscious" processes driven by external factors (Marteau, Hollands, & Fletcher, 2012), especially when "reflective" or "conscious" motivations are limited in fully driving behavioural change. For instance, clinicians showed conscious awareness of issues – it was perceived as important for their professional identity – but they still identified significant barriers and gaps in their practice of digital risk assessments.

Beyond staff-targeted interventions, clinicians suggested the need for broader systemic changes through services as well as the whole Trust. Implementation science theories stress the importance of concurrently targeting staff and organisational-level determinants (Williams & Beidas, 2019). The limited benefits of training-only approaches on *behavioural change* – by just targeting staff – can be illustrated by the popular yet ineffective use of unconscious bias training, which typically consists of one-off, stand-alone educational programs delivered to individuals to increase awareness of unconscious biases that impact minoritised groups based on ethnicity, disability, and so forth (Forscher et al., 2019). In addition to the approaches already described, a shift in organizational culture is needed for *enablement*, including leadership and managers that encourage attention to digital risks (e.g., adding to the business agenda and promoting meaningful service-user participation). While changes in healthcare systems are typically perceived as slow, we have also witnessed how NHS services in the UK have continued to swiftly adapt to a worldwide pandemic through concerted efforts throughout organisations.

Policy categories. While some clinicians were aware of guidelines on digital risks, there is a clear need for developing *guidance* as an organisation to ensure consistent and best evidence-based practice for individual staff, teams and services as well as for sustainable mutual learning. In the absence of a national, cross-sector guideline, recent guidelines developed by authoritative bodies (Livingstone et al., 2017; NSPCC, 2019; Viner et al., 2019) will be most informative. There is also a role of *regulation* to monitor and audit assessment practices and thus help evaluate the uptake of best practice and identify areas of challenge. *Environmental planning* would be crucial to ensure that forms, procedures and electronic systems facilitate timely information gathering and recording on digital risks. Regular *communication* to staff and teams should reflect priorities on digital risks while embedding them within a broader digital strategy. We note that Oxford Health has been recently named "Mental Health Global Digital Exemplar" (NHS England, 2021) based on its digital innovations. Associated funding and partnerships could be harnessed for further work in considering digital risks in clinical practice.

Strengths and limitations

A key methodological strength of the study is the use of a psychological model to guide data analysis and interpretation, thus harnessing a theory-driven approach to behavioural change for maximal impact. The mixed methodology combining surveys with interviews helped develop a more comprehensive understanding of clinicians' experiences and perspectives than either method only would have allowed. Professionals were closely consulted in the methodology to ensure the relevance of the questions. A wide range of key CAMHS professional backgrounds and service types were included.

- Professionals are not always aware of the ever-developing research or guidance available around digital safety.
- Clinicians' confidence and competence in this area is variable.
- Clinicians show awareness of digital risks in their practice but there are a range of barriers to routine enquiry of these risks in CAMHS.
- Organisations need to consider behavioural change models and target both staff- and organisation-level factors, rather than just relying on training-based approaches (e.g., awareness provision to staff).
- Behavioural change ideas include interventions to increase capabilities (e.g., skills), opportunities (e.g., resources and prioritising) , and motivations (e.g., habit formation).

Figure 3. Key practitioner message.

Limitations must also be noted. The sample may have been biased by clinicians who are already interested in the topic so it is possible that a different pattern of results holds for those who did not participate, although making participation compulsory can raise ethical complexities. The sample size was modest for a survey study but standard for an interview study using thematic analysis for a rich dataset. Other potential areas of digital risks (e.g., radicalisation) were not included. Additional work is required to test whether the current findings generalise to other contexts, including CAMHS settings in other areas, services outside the UK and non-healthcare sectors. Crucially, not all stakeholders' views were included, and in particular young people's views of reporting on digital risks should be sought.

Conclusion

What is needed for clinicians in CAMHS to embed routine enquiry of young people's digital risks into their practice? We have summarised a key practitioner message (Figure 3). A behavioural change program that targets both staff-level and organisation-level barriers to digital risk assessments in CAMHS is crucial. Interventions and policies to support such programs should embrace psychological theories of behavioural change. This study informs service improvement and research – within healthcare systems and beyond – to ensure that children and young people safely navigate the ever-changing digital world.

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Author contributions

ALZ was involved in conceptualisation, data curation, formal analysis, investigation, methodology, visualisation, & writing – original draft; CA & ML were involved in conceptualisation; methodology; supervision; & writing – review & editing.

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Supplemental Material

Supplemental material for this article is available online.

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Author Biography

Dr Alex Lau-Zhu is a trainee Clinical Psychologist and Cognitive Behavioural Therapist at the Oxford Institute of Clinical Psychology Training and Research. He has a clinical and research interest in psychological trauma, cognitive risk factors, and youth mental health. He has a PhD in Experimental Psychopathology and post-doctoral training in Developmental Psychopathology.Dr Ciorsdan Anderson is Consultant Clinical Psychologist and Clinical Tutor working at the Oxford Institute of Clinical Psychology Training and Research. She has worked in CAMHS services and Social Care and is currently the lead for supervision training. She has an interest in complex child trauma, looked-after children, attachment, challenging behaviours and social media.Dr Matthew Lister is Consultant Clinical Psychologist working in CAMHS services for Oxford Health NHS Foundation Trust. He has worked in forensic settings and is currently lead psychologist in the forensic service. He has an interest in the formulation and professional understanding of risk and related topics.

APPENDIX F: MRP Journal Submission Guide

Development and Psychopathology - Instructions for authors

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Abstract Page. Include (a) a full article title, (b) an abstract of no more than 200 words, and (c) up to five keywords for indexing and information retrieval.
Text. Use a standard paragraph indent. Do not hyphenate words at the ends of lines or justify right margins.
References. Bibliographic citations in the text must include the author's last name, date of publication, DOI and may include page references. Examples of in-text citation style are Cicchetti (2002), Durston (2008, pp. 1133–1135), Hunt and Thomas (2008), (Hunt & Thomas, 2008), (Posner, Rothbart, Sheese, & Tang, 2007), and subsequently (Posner et al., 2007). If more than one, citations must be in *alphabetical* order. Every in-text citation must be included in the reference section; every reference must be cited in the text. Examples of reference styles:
Journal Article
Haltigan, J., Roisman, G., & Fraley, R. (2013). The predictive significance of early caregiving experiences for symptoms of psychopathology through midadolescence: Enduring or transient effects? *Development and Psychopathology, 25*(1), 209-221. doi:10.1017/S0954579412000260
Book
Buss, A., & Plomin, R. (1984). *Temperament: Early developing personality traits*. Hillsdale, NJ: Erlbaum.
Chapter in an Edited Book
Gottlieb, G., & Willoughby, M. T. (2006). Probabilistic epigenesis of psychopathology. In D. Cicchetti & D. Cohen (Eds.), *Developmental psychopathology* (Vol. 1, 2nd ed., pp. 673–700). Hoboken, NJ: Wiley.
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APPENDIX G: MRP Supplemental Materials

Supplemental Materials 1

Additional Methods – Questionnaires

Revised Children's Anxiety and Depression Scale – Youth Report 11 items (RCADS-11; Radez et al., 2021)

This 11-item self-report questionnaire is based on the original RCADS-47 (Chorpita et al., 2005) and has been designed for screening clinically-significant anxiety and depression. The items are scored on a 4-point Likert scale (anchored by "never", "sometimes", "often", and "always"). Total scores range from 0-33, with higher scores indicating more severity. It has good convergent/divergent validity (Radez et al., 2021).

Children's Revised Impact of Event Scale (CRIES; Perrin et al., 2005)

This 8-item self-report questionnaire is a brief screening measure of post-traumatic stress disorder (PTSD) in young people aged 8-18. Each item is anchored by 4 response options ("not at all", "rarely", "sometimes", "often"). Total scores range 0-40, with higher scores indicating more PTSD symptoms. It has good test re-test reliability (Deeba et al., 2014; Verlinden et al., 2014), convergent validity (Deeba et al., 2014), and concurrent validity (Giannopoulou et al., 2006).

Revised Children's Anxiety and Depression Scale – Parent Report 47 items (Chorpita et al., 2005)

This 47-item questionnaire is designed for assessing symptoms of anxiety and depression in young people aged 8-18 based on parental/caregiver reports. It has six subscales: separation anxiety disorder, social phobia, generalized anxiety disorder, panic disorder, obsessive compulsive disorder, and low mood (major depressive disorder). The items are scored on a 4-point Likert scale (anchored by "never", "sometimes", "often", and "always"). It has good test-retest reliability (Chorpita et al., 2000), convergent validity (Esbjørn et al., 2012) and concurrent validity (Chorpita et al., 2005).

Child and Adolescent Trauma Screen – Caregiver (CATS; Sachser et al., 2017)

This questionnaire is designed for assessing symptoms of PTSD in young people aged 7-17 based on parental/caregiver reports. It has 15-items assessing potentially traumatic events and 20-items (response choices: "yes" or "no") measuring PTSD symptoms (response choices: 4-point Likert scale anchored by "never", "once in a while", "half the time" and "almost always), based on DSM-5 criteria. Total scores range 0-60, with higher scores indicating more PTSD symptoms. It has good convergent/discriminant validity, construct validity, and test re-test reliability (Sachser et al., 2017).

Social Communication Questionnaire – Current form (SCQ; Rutter et al., 2003)

This is a 40-item screening questionnaire for autism spectrum disorders (ASD) in childhood based on the Autism Diagnostic Interview-Revised (Lord et al., 1994). It contains questions regarding the child's social communication and language development over the most recent three-month period. This version was chosen rather the Lifetime form because we expected many caregivers (e.g., foster carers, adoptive families) of maltreated adolescents to not know in detail the adolescent's developmental history prior to coming into their care. Total scores range 0-39. This measure has good discriminant validity (Berument et al., 1999; Chandler et al., 2007).

Dyexecutive Questionnaire – Children (DEX-C; Emslie et al., 2003)

This is a 20-item questionnaire probing for four domains of difficulties associated with executive functioning: emotional/personality, motivational, behavioural, and cognitive. It is to be completed by an adult who knows the child well. The items are scored on a 5-point Likert scale with scores ranging 0-4 (from "never" to "very often"). DEX-C scores significantly correlate with test scores on the Behavioural Assessment of the Dyexecutive Syndrome in Children (Emslie et al., 2003).

Supplemental Materials 2

Additional Results – Primary Analyses

Restricting findings to *positive* cue words only, FT specificity scores were significantly lower in the maltreatment group compared to the typical development (TD) group ($U = 229.00, Z = 2.73, p = .006$). There were no significant differences between the autism and TD groups ($U = 321.00, Z = 1.28, p = .167$), or the autism and maltreatment groups ($U = 341.00, Z = 1.08, p = .282$). Similarly, restricting findings to *negative* cue words only, FT specificity scores were significantly lower in the maltreatment group compared to the TD group ($U = 231.00, Z = 2.72, p = .007$). There were no significant differences between the autism and TD groups ($U = 311.00, Z = 1.55, p = .121$), or the autism and maltreatment groups ($U = 341.00, Z = 1.09, p = .277$).

Using SES- and GCA-regressed scores, the remaining participants per group were autism ($n = 27$), maltreatment ($n = 23$), and TD ($n = 27$), due to missing data on SES/GCA. FT specificity scores were significantly lower in the maltreatment group compared to the TD group ($U = 209.00, Z = 1.98, p = .048$). There were no significant differences between the autism and TD groups ($U = 290.50, Z = 1.28, p = .200$), or the autism and maltreatment groups ($U = 280.50, Z = 0.58, p = .559$).

Additional Results – Sensitivity Analyses

Removing Adolescents with Declared Emotional Disorders

The remaining participants per group were autism ($n = 21$), maltreatment ($n = 26$), and TD ($n = 28$). FT specificity scores were significantly lower in the maltreatment group compared to the TD group ($U = 194.50, Z = 2.96, p = .003$). There were no significant differences between the autism and TD groups ($U = 204.00, Z = 1.83, p = .067$), or the autism and maltreatment groups ($U = 241.50, Z = 0.68, p = .485$).

Removing Adolescents with Declared Neurodevelopmental Disorders

The remaining participants per group were autism (n = 16), maltreatment (n = 26), and TD (n = 28). FT specificity scores were significantly lower in the maltreatment group compared to the TD group (U = 194.50, Z = 2.96, p = .003). There were no significant differences between the autism and TD groups (U = 178.00, Z = 1.13, p = .259), or the autism and maltreatment groups (U = 172.50, Z = 0.93, p = .351).

Removing Adolescents Meeting Clinical Cut-off in RCADS-47 Overall T-scores (Caregiver Reports)

The remaining participants per group were autism (n = 10), maltreatment (n = 11), and TD (n = 27). FT specificity scores were significantly lower (one-tailed) in the maltreatment group compared to the TD group (U = 95.50, Z = 1.72, p = .086). There were no significant differences between the autism and TD groups (U = 116.50, Z = 0.64, p = .524), or the autism and maltreatment groups (U = 44.50, Z = 0.75, p = .453).

Removing Adolescents Meeting Clinical Cut-off in RCADS-11 (Youth Self-reports)

The remaining participants per group were autism (n = 14), maltreatment (n = 12), and TD (n = 26). FT specificity scores were significantly lower in the maltreatment group compared to the TD group (U = 55.50, Z = 2.39, p = .017). There were no significant differences between the autism and TD groups (U = 132.00, Z = 0.04, p = .971), or the autism and maltreatment groups (U = 50.00, Z = 1.77, p = .077).

Removing Adolescents Meeting Clinical Cut-off in CATS (Caregiver Reports)

The remaining participants per group were autism (n = 22), maltreatment (n = 15), and TD (n = 28). FT specificity scores were significantly lower (one-tailed) in the maltreatment group compared to the TD group (U = 141.50, Z = 1.76, p = .079). There were no significant differences between the autism and TD groups (U = 233.50, Z = 1.47, p = .143), or the autism and maltreatment groups (U = 149.50, Z = 0.49, p = .627).

Removing Adolescents Meeting Clinical Cut-off in CRIES (Youth Self-reports)

The remaining participants per group were autism (n = 12), maltreatment (n = 13), and TD (n = 19). FT specificity scores were significantly lower in the maltreatment group compared to the TD group ($U = 37.50, Z = 2.39, p < .001$), and compared to the autism group ($U = 32.50, Z = 2.51, p = .012$). There were no significant differences between the autism and TD groups ($U = 112.50, Z = 0.06, p = .951$).

Removing Adolescents with "Inconsistent" SCQ scores

This involved removing those with SCQ scores below the cut-off in the autism group and above the cut-off in the maltreatment group. The remaining participants per group were autism (n = 20), maltreatment (n = 21), and TD (n = 28). FT specificity scores were significantly lower in the maltreatment group compared to the TD group ($U = 134.50, Z = 3.75, p = .001$). There were no significant differences between the autism and TD groups ($U = 199.00, Z = 1.71, p = .088$), or the autism and maltreatment groups ($U = 160.50, Z = 1.31, p = .190$).

Removing Adolescents who did not Generate any Specific Event

The remaining participants per group were autism (n = 22), maltreatment (n = 20), and TD (n = 27). FT specificity scores were significantly lower in the maltreatment group compared to the TD group ($U = 175.50, Z = 2.06, p = .040$). There were no significant differences between the autism and TD groups ($U = 112.50, Z = 0.06, p = .951$), or the autism and maltreatment groups ($U = 165.50, Z = 1.39, p = .165$).

Removing Maltreated Adolescents with Primarily Experiences of Neglect

We excluded participants in the maltreatment group who experienced primarily neglect rather than abuse (Sheridan & McLaughlin, 2014), as previous work has indicated that reduced specificity may be specific to abused children (Valentino et al., 2006). The remaining maltreatment group was n = 16. FT specificity scores were

significantly lower in the maltreatment group compared to the TD group ($U = 120.00, Z = 2.56, p = .010$). There were no significant differences between the maltreatment and autism groups ($U = 202.50, Z = 0.71, p = .479$).

Removing Maltreated Adolescents Recruited Outside of Social Services

As one may argue that maltreatment cases are not sufficiently "severe" unless seen within social services, we excluded participants in the maltreatment group who were *not* recruited from social services. The remaining maltreatment group was $n = 23$. FT specificity scores were significantly lower in the maltreatment group compared to the TD group ($U = 168.50, Z = 2.93, p = .003$). There were no significant differences between the maltreatment and autism groups ($U = 276.00, Z = 1.07, p = .283$).

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APPENDIX H: MRP Ethical Approval

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09 June 2021

Dear Dr Lau-Zhu

HRA and Health and Care Research Wales (HCRW) Approval Letter

Study title:	**EDIFY: Exploring Differences in Imagery of the Future in Young People**
IRAS project ID:	**289290**
REC reference:	**21/WM/0125**
Sponsor	**Oxford Health NHS Foundation Trust**

I am pleased to confirm that **HRA and Health and Care Research Wales (HCRW) Approval** has been given for the above referenced study, on the basis described in the application form, protocol, supporting documentation and any clarifications received. You should not expect to receive anything further relating to this application.

Please now work with participating NHS organisations to confirm capacity and capability, in line with the instructions provided in the "Information to support study set up" section towards the end of this letter.

How should I work with participating NHS/HSC organisations in Northern Ireland and Scotland?
HRA and HCRW Approval does not apply to NHS/HSC organisations within Northern Ireland and Scotland.

If you indicated in your IRAS form that you do have participating organisations in either of these devolved administrations, the final document set and the study wide governance report (including this letter) have been sent to the coordinating centre of each participating nation. The relevant national coordinating function/s will contact you as appropriate.

Please see IRAS Help for information on working with NHS/HSC organisations in Northern Ireland and Scotland.

How should I work with participating non-NHS organisations?
HRA and HCRW Approval does not apply to non-NHS organisations. You should work with your non-NHS organisations to obtain local agreement in accordance with their procedures.

What are my notification responsibilities during the study?

The standard conditions document "*After Ethical Review – guidance for sponsors and investigators*", issued with your REC favourable opinion, gives detailed guidance on reporting expectations for studies, including:

- Registration of research
- Notifying amendments
- Notifying the end of the study

The HRA website also provides guidance on these topics, and is updated in the light of changes in reporting expectations or procedures.

Who should I contact for further information?
Please do not hesitate to contact me for assistance with this application. My contact details are below.

Your IRAS project ID is **289290**. Please quote this on all correspondence.

Yours sincerely,
Rekha Keshvara

Approvals Manager

Email: approvals@hra.nhs.uk

Copy to: *Ms Brandy Coote, Oxford Health NHS Foundation Trust*

APPENDIX I: MRP Autobiographical Future Thinking Test

Written Instructions

You will now do a new exercise with words. We are interested in events happening in the future. You will see ten words. For each word you see, the word might make you think of an event that could happen to you in the future. This future event could happen tomorrow, in a few days or weeks from now, or even when you are much older. It might be something very important or something that's not very important. We are researching about what might happen further in the future, so please don't think of something from the past. So for example if you see the word "important" – it would not be OK to say "I will do something important" because this does not mention a specific event. But it would be OK to say, "I will give an important presentation in my class in front of my classmates next Friday". If you can think of a specific future event, then type in a brief description of the event in the space provided. If you can't think of a future event, just type "I cannot think of an event". Sometimes it's hard to think of an event in the future but that's OK. Not everyone can think of something for every word.

Word Cues (in order of appearance)

Happy, sorry, safe, angry, interested, clumsy, successful, hurt, surprised, lonely

Prompts (per Word)

What event in the future does this word make you think of? If you can't think of a future event, just type 'I cannot think of an event'.

Scoring Procedure

Coding Scheme

S: specific (a response that referred to an event which could occur on a particular day, at a particular time and place, for example ‘‘playing football with my friends next Saturday’’)
E: extended (a response that referred to an event which would occur over a period of 2 days or more, for example ‘‘an upcoming holiday trip to France’’)
C: categoric (a response that referred to a category of future events, ‘‘A-level exams’’)
A: associate (a semantic associate to the cue word, ‘‘school’’, ‘‘sad’’)
R: error (statement such as ‘‘I can’t remember’’ or statements that were incomprehensible or clearly past-oriented, e.g. ‘‘last week I saw my granny’’)
O: omissions (blanks)

General Rules

If you are uncertain between two categories give benefit of the doubt and score as a more specific future event.

In some future events, both categoric and extended information may be provided, e.g. “French lessons at when I start secondary school”: (“French lessons” – categoric; “When I start secondary school” – extended; if a “categoric” response is tied to a particular time frame in this way, then it is reasonable to code it as “extended”).

Use your judgement – imagining specific instances of future events can be based on previous repeated events (i.e., categorical memories).

Is it likely that this event, while having occurred repeatedly in the past for a child aged 10-16, would be one that the child is using as a specific future re-occurrence. If in doubt, give the benefit of the doubt and code as a more specific memory (e.g. - “Being yelled by my brother” – could be specific, could be categoric).

Further Notes with Examples for Cue Word "Happy"

Specific. Future events which refer to a discrete event which could be happening on one particular day. The time and day do not need to be specified.

Use your discretion to determine whether the occasion described would in reality have been or likely been confined to one particular day Examples – the following give examples of responses which are likely to refer to events occurring on a particular day, at a particular time and place (e.g., my next 13th birthday; when I go to see this concert; my first day in a new school).

Extended. Future events which refer to events which would occur over more extended periods of time. This could include longer events like holidays but could also include extended periods of time-boundaried in other ways e.g. "when I live on my own".

Sometimes it might not be obvious whether the person is referring to a specific day or the period of time around an event (e.g. "when I get a job", "when I go to France"). Give benefit of the doubt.

Categoric. These are future events which refer to categories of event, repeated events (events which have occurred at least twice). The definition of 'event' is quite loose and sometimes it is difficult to decide (e.g. 'when I don't have school to go to anymore", is this referring to particular times, or the absence of an event?). In these cases we go back to the "general rules" and give them the benefit of the doubt.

Sometimes people will describe a number of highly distinct unique events (e.g. "when my parents die") and it is probably that they are recalling possibly two specific events. In these cases we go back to the "general rules" and give them the benefit of the doubt.

Some events may seem to be "categoric" because these are likely to have happened to the child repeatedly in the past but could also refer to a specific future re-occurrence as it is expected that people will use the past to generate future thinking (e.g., when my little sister drops food down herself. She does this lot). When in doubt, give the benefit of the doubt and code the more specific category.

Code repeated event as category rather than specific when no information is available to help decide it could refer to a specific instance (e.g., being given something; feeling awkward when I meet new people).

Associates. These are usually phrases (e.g., nothing makes me feel safe) or nouns given as associations to the cue word. Occasionally the word may suggest that the person is really referring to a repeated event (e.g. verbs like 'going running'). In these cases a categoric code may be more appropriate.