Review

Attachment patterns and autobiographical episodic memory functioning: A systemic review of adult studies to advance clinical psychological science

A. Lau-Zhu [a,b,*], F. Williams [a], C. Steel [a]

[a] Oxford Institute of Clinical Psychology Training and Research, Medical Sciences Division, University of Oxford, Oxford, United Kingdom
[b] Division of Psychiatry, Department of Brain Sciences, Imperial College London, London, United Kingdom

ARTICLE INFO

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 33 studies (in 28 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 a 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.

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, Weinfield, & Hamilton, 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, Kivity, Johnson, & Gooch, 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, Bullis, Comer, & Ametaj, 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. 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. 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.

---

* Corresponding author at: Division of Psychiatry, Department of Brain Sciences, Imperial College London, London W12 0NN, UK.
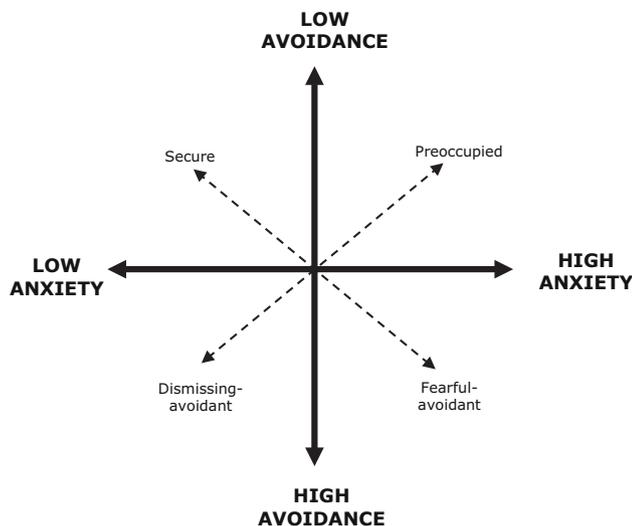E-mail address: alauzhu@ic.ac.uk (A. Lau-Zhu).

Fig. 1. Proposed Overlap between Dimensional and Categorical Models of Attachment Patterns.
Note. Adapted from Fraley, Hudson, Heffernan, and Segal (2015).

1. Conceptualising attachment patterns

Contemporary models in adults characterise attachment patterns using a dimensional approach (Fraley et al., 2015; Fraley, Waller, & Brennan, 2000). A dominant model by Brennan, Clark, and Shaver (1998) distinguishes two independent dimensions of attachment avoidance and attachment anxiety (Fig. 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 contexts and goals (Mikulincer & Shaver, 2007).

Such dimension models overlap with categorical models (Bartholomew & Horowitz, 1991; Hazan & Shaver, 1987), which stem from initial formulations on infant attachment (Ainsworth, Blehar, Waters, & Wall, 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 (Fig. 2), as these are assumed to reflect their IWMs (Main, Hesse, & Goldwyn, 2008).

2. Autobiographical memory and psychopathology

Autobiographical memories refer to personally-meaningful memories formed in an everyday context (Conway, 2005; 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 these autobiographical *episodic* memories (AEMs) as two of their key features – mental imagery (Rubin, Schrauf, & Greenberg, 2003) and involuntary/intrusive retrieval (Berntsen & Hall, 2004) – are key to emotional disorders (Brewin, Gregory, Lipton, & Burgess, 2010). Such an episodic memory system is also where affect-laden and sensory-based memories of specific attachment-relevant interactions are formed (Collins & Read, 1994), which are the foundation for the presumably semantic, script-like aspects of IWMs (H. Waters & Waters, 2006).

Autobiographical memories serve several broad functions, including problem-solving, self-soothing, creating intimacy, maintaining a coherent sense of self over time (Bluck, Alea, Habermas, & Rubin, 2005), and even predicting the future (Schacter, Benoit, & Szpunar, 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, Moreau, Tippett, & Addis, 2019; Williams et al., 2007), and intrusive

---

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…"

Fig. 2. Early Memories of Child-Parent Interactions Reported in the Adult Attachment Interview for Three Attachment Patterns.
Note. Extracted from Main et al. (2008).

Table 1
Key Design Characteristics of Included Studies.

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	Key finding (CI[a])
Beyderman and Young (2016)	89	46.60 (10.43)	40/60	Correlational	Outpatient psychiatric patients	USA	100% African Americans	ECR (general)	Anxiety & avoidance (D)	Autobiographical memory task	DID	Avoidance was not correlated with overgeneral memory (r = 0.10, [−0.11, 0.30])
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	Avoidance was correlated with higher post-savouring negative emotion (r = 0.53, [0.22, 0.74])
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	Secure (but not insecure) individuals generated more internal details in attachment-relevant memory and imagination ($\eta2$ = 0.10; [0.01, 0.24])
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	Insecure attachment predicted lower levels of sadness recovery (b = −0.14, [0.24,-0.04])
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	Low- (but not high-) anxious individuals perceived transgressions to be further way in time than kind acts (b = −0.22, [−0.93, −0.23])
Cortes & Wilson (2016; Study 1)	160	NR	112/48	Correlational	University students & MTW	Canada	NR	ECR-R (general)	Anxiety (D)	Transgression vs. kindness memory	NA	Low- (but not high-) anxious individuals perceived transgressions to be further way in time than kind acts (b = −0.15, [−0.88, −0.03])
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	Low- (but not high-) anxious individuals perceived transgressions to be further way in time than kind acts (b = −0.22)
Crawford et al. (2021)	284	NR	191/92	Correlational	University students	New Zealand	NR	ECR-R (romantic)	Anxiety & avoidance (D)	Autobiographical event recall	NA	Neither avoidance (b = 0.06) nor anxiety (b = 0.05) predicted fading bias
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	Avoidance was associated with higher intensity of non-dominant emotions (b = 0.11, [0.01, 0.21])
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	Avoidance predicted lower accuracy in those with high (but not low) levels of abuse severity (b = −0.21, [−0.27, −0.15])

Table 1 (*continued*)

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	Key finding (CI[a])
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	More family/relationship memories was correlated with preoccupied ($r = 0.15$, [0.02, 0.28]) and dismissing attachment ($r = -0.13$, [−0.26, 0.002])
Gentzler and Kerns (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	High anxiety ($b = -0.11$, [−0.23, −0.01]) and avoidance ($b = -0.14$, [−0.38, 0.10]) predicted underestimation of past positive affect
Goldner and 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	Participants with life-threatening memories (vs. those with interpersonal or achievement memories) showed higher profound-distrust attachment orientation ($\eta2 = 0.28$; [0.08, 0.40])
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	Avoidance correlated with reduced intensity of caregiver memories ($b = -0.35$)
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	Dismissing avoidance predicted slower recall of negative memories during free writing ($b = 0.11$, [0.01, 0.21]).
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	Insecurely-attached individuals showed greater arousal change from rest to retrieval ($\eta2 = 0.15$; [0.01, 0.24])
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	Insecurely-attached individuals showed slower retrieval ($\eta2 = 0.09$; [0.0002, 0.18])
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	High- (but not low-) anxious individuals made less positive relationship evaluations after third-(vs. first-) view recall of transgression memory ($b = -0.18$)
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	High- (but not low-) anxious individuals made less positive relationship evaluations after third-(vs. first-) view recall of transgression memory view ($b = -0.27$)
McCabe and 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	Avoidance was correlated with fewer unique details ($r = -0.13$, [−0.27, 0.01])
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	Anxious (vs avoidant or secure) individuals experienced less positive affect ($\eta2 = 0.06$; [0.00, 0.15])

4

Table 1 (*continued*)

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	Key finding (CI[a])
Mikulincer and 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	Avoidant individuals were slower at recalling sad/anxious memories ($\eta2 = 0.03$; [0.00, 0.07]); anxious individuals reported more intense sad/anxious memories ($\eta2 = 0.04$; [0.004, 0.09])
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	Neither anxiety ($r = -0.03$, [−0.24, 0.30]) nor avoidance ($r = -0.03$, [−0.24, 0.30]) were correlated with imagery vividness
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	Attachment did not predict changes in self-compassion (r = NR)
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	Anxiety was correlated with higher intensity ($r = 0.07$, [0.01, 0.13])
Öner and Gülgöz (2016)	113	20.88 (1.11)	67/46	Correlational	University students	Turkey	NR	ECR-R (romantic)	Anxiety & avoidance (D)	Memory Characteristics Questionnaire	NA	Anxiety was correlated with higher vividness ($r = 0.24$, [0.06, 0.41]) of negative memories; avoidance with lower intensity of positive memories ($r = -0.28$, [−0.44, −0.01])
Öner and Gülgöz (2022)	383	35.00 (11.59)	330/53	Correlational	Community sample	Turkey	NR	ECR-RS (parents)	Anxiety & avoidance (D)	Autobiographical Memory Questionnaire	NA	Anxiety was correlated with reliving ($r = 0.19$, [0.09, 0.28])
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	Neither anxiety ($r = 0.08$, [−0.14, 0.29]) nor avoidance ($r = -0.002$, [−0.22, 0.22]) were correlated with fragmentation
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	Anxiety was correlated with more intense negative memories ($r = 0.22$, [0.13, 0.31]) and less detailed positive memories ($r = -0.16$, [−0.25, −0.07]); avoidance was correlated with less intense ($r = -0.32$, [−0.40, −0.23]) and less detailed positive memories ($r = -0.34$, [−0.42, −0.26]), and less detailed negative memories ($r = -0.15$, [−0.24, −0.06])

Table 1 (*continued*)

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	Key finding (CI[a])
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	Anxiety was correlated with more intense ($r = 0.12$, [0.04, 0.20]) and less detailed ($r = -0.09$, [$-.0.17$, -0.01]) memories; avoidance was correlated with less detailed ($r = -0.19$, [-0.27, -0.11]) and less intense memories ($r = -0.25$, [-0.33, -0.17])
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	Security was associated with more relationship-maintaining memories ($b = 0.18$, [0.14, 0.21]).
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	Avoidance was associated with more details in negative memories ($b = 0.28$, [0.20, 0.35]).; anxiety with less details ($b = -0.26$, [-0.34, -0.18]).
Zengel et al. (2019)	MTW:85 US: 132	MTW: 40.00 (13.66); US: 19.27 (24.74)	MTW: 72% female; US: 50% female	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	The "fading bias" was present in securely- (but not insecurely-) attached individuals ($\eta2 = 0.05$; [0.01, 0.23])

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, Sheeran, & Young, 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-RS = The Experiences in Close Relationships Questionnaire – Relationship Structure (Fraley et al., 2011); 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 (Wang et al., 2016, 2018); PCL-S = PTSD Check List-Stressor Specific Version (Weathers, Litz, Herman, Huska, & Keane, 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; [a] CI is not reported/calculated when there was insufficient information.

and recurrent trauma memories in post-traumatic stress disorder or PTSD (Ehlers, Hackmann, & Michael, 2004). Autobiographical memory disruptions are also apparent early in development signalling latent vulnerability in those susceptible to later psychopathology (McCrory et al., 2017).

3. 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 and 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).

Individuals are thought to be motivated to process attachment-relevant information in autobiographical memory 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). Avoidant attachment has been linked to slower retrieval of childhood events (Dykas, Woodhouse, Jones, and Cassidy (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.

4. 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, Goodman, & Edelstein, 2011; Farrar, Fasig, & Welch-Ross, 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), characterised by the development of self-concept (Sebastian, Burnett, & Blakemore, 2008) and the laying down of long-lasting self-defining memories (Conway, 2005). Most health problems also emerge for the first time in that period (Patel, Flisher, Hetrick, & McGorry, 2007), representing a pivotal time for treatment innovation.

Our secondary questions were: 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?

5. Methods

5.1. Search strategy

A review protocol was registered in PROSPERO (registration number: CRD42020216345) and the study selection process followed PRISMA guidelines (Moher, Liberati, Tetzlaff, & Altman, 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.

5.2. 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 17/01/2023. Titles and abstracts were used for initial screening followed by full-text screening by the lead author, with a second rater screening a subset of them (10%). Inter-rater reliabilities for this subset achieved good to excellent agreement: initial screening: Cohen's kappa =0.82; full-text screening: Cohen's kappa =1.00 (Altman, 1991).

5.3. 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. 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.

A meta-analysis was not performed at this point in time for the following reasons: i) methodologies across studies (e.g., design of measures of attachment and AEM functioning) were highly heterogenous – including a vast diversity of AEM paradigms employed (with over 20 different memory tasks as confirmed later in *Results*) – making meaningful combinations of studies challenging (Borenstein, Hedges, Higgins, & Rothstein, 2009); ii) most designs were correlational (rather than longitudinal, as also confirmed later in *Results*), an important risk of bias which would overall render effect estimates less meaningful and possibly misleading for prediction or causal inference; and importantly, iii) our key motivation was to scope the literature to uncover novel ideas for theory and clinical developments, as well as encourage improved study designs which in turn could inform robust and meaningful meta-analytic approaches in future.

6. Results

To organise our findings, we will begin with an overview of key study characteristics (Table 1). We will then describe the broad patterns of associations found between attachment insecurity and AEM phenomenology; candidate factors influencing (i.e., moderators) and explaining
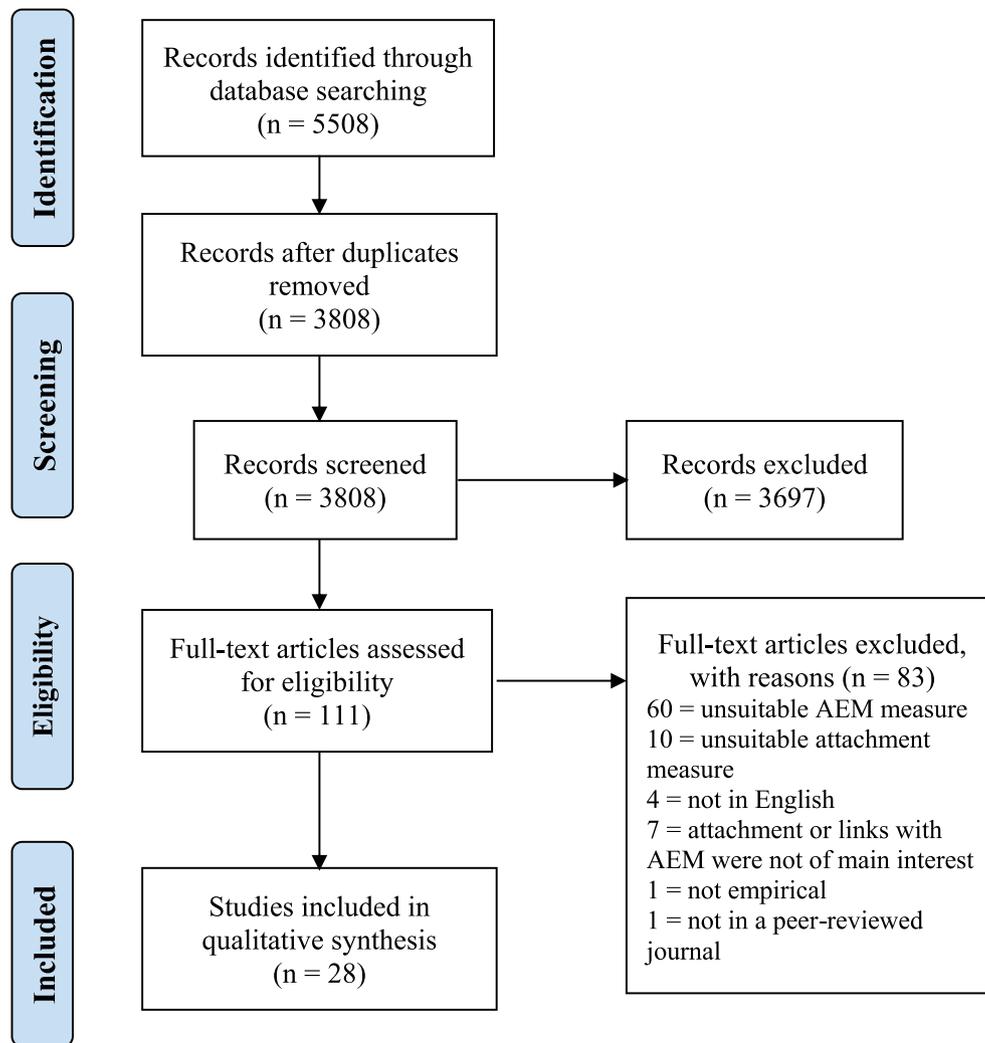
Fig. 3. PRISMA Flowchart for Study Selection.
Note. AEM = Autobiographical episodic memory.

such associations (i.e., mediators or mechanisms); potential relevance of these associations to mental health outcomes and to the effectiveness of AEM-based manipulations.

6.1. Study characteristics

In total, 33 studies from 28 articles met all inclusion/exclusion criteria (Fig. 3). Sample sizes ranged from 17 to 1061 participants, with the majority above 100 participants (20 [61%]). Most studies were correlational designs when examining the relationship between attachment and AEM (30 [91%]) rather than prospective designs. Most studies (20 [61%]) focused on young adults (aged 16–26), while only a minority (4 [12%]) focused on older adults (aged 60 and above). The majority recruited university students (20 [61%]) with only a subset focused on clinical samples (4 [12%]). Most studies were from the USA (13 [39%]) and other high-income Western countries (e.g., UK & Canada) with a few exceptions (e.g., China & 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 [12%]) focused exclusively on non-White participants (Chinese and African Americans). However, reports on ethnicity were often completely absent [15 [45%]].

6.2. Measures of attachment patterns

Most studies (20 [61%]) included the *Experience in Close Relationship* self-report questionnaire (ECR; Brennan et al., 1998) and its variants (Fraley et al., 2000; Fraley, Heffernan, Vicary, & Brumbaugh, 2011; Wei, Russell, Mallinckrodt, & Vogel, 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* (Wang, Wang, Feeney, & Li, 2016; Wang, Wang, Wang, & Feeney, 2018) – the latter developed specifically in a Chinese sample. A minority of studies (7 [21%]) 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, Kaplan, & Main, 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, Maunder, Hunter, Sthankiya, & Lancee, 2010).

Fig. 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 but experiences it as more emotionally intense; the avoidantly-attached adult in the middle recalls the same event and experiences it as less emotionally intense, less detailed, less coherent, and less quickly accessible.

6.3. 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, Nurs, Tyers, Rose, & MacLeod, 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, Madore, Wang, & Schacter, 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, Margrett, Fitzgerald, & Labouvie-Vief, 1999). Several studies focused on a period of emotional significance, including adolescence (Kohn, Rholes, & Schmeichel, 2012; McCabe & Peterson, 2012), marriage (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, Clark, & Ehlers, 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, Hammond, & Marsh, 2021; Zengel, Lee, Walker, & Skowronski, 2019). A few of these assessed phenomenology of the retrieved memories via The *Memory Characteristics Questionnaire* (Johnson, Foley, Suengas, & Raye, 1988).

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 by 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, Glode, & Opitz, 2015), positive attachment memories (Borelli et al., 2014; Mikulincer & Shaver, 2001), transgression memories (Cortes & Wilson, 2016; Marigold, Eibach, Libby, Ross, & Holmes, 2014), and compassion-focused imagery (Naismith, Mwale, & Feigenbaum, 2018).

6.4. 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 (Fig. 4).

6.4.1. 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.

Consistent with Mikulincer and Orbach's early findings, subsequent studies have found that attachment anxiety was associated with increased intensity of negative memories (Sutin & Gillath, 2009; Study 1) and trauma memories (Ogle, Rubin, & Siegler, 2015), as well as increased reports of sense of "reliving" for early memories (Öner & Gülgöz, 2022). Cortes and Wilson (2016; Studies 1-3) showed that individuals with high attachment anxiety perceived 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. Also consistent with Mikulincer and Orbach's work, attachment avoidance was associated with reduced intensity of caregiver memories (Haggerty, Siefert, & Weinberger, 2010) and non-valence specific memories (Sutin & Gillath, 2009; Study 2). However, a recent study by Dykas et al., (2014) using the Mikulincer and Orbach (1995)'s memory paradigm replicated the findings on memory intensity in anxiously-attached adults but not in avoidantly-attached adults. Note some key methodological differences in the study by Dykas and others include a younger sample and a different attachment measure.

Others have shown similar effects of attachment anxiety and avoidance on memory intensity. Gentzler and Kerns (2006) showed that both anxiously- and avoidantly-attached individuals underestimated the intensity of positive affect previously experienced for positive events. Both of these insecure 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, Leyh, & Spangler, 2016). Unlike securely-attached adults, the "fading affect bias" was absent in insecurely-attached adults (Zengel et al., 2019), which refers to a tendency for affective intensity to fade less over time for positive compared to negative memories of current relationships. This suggests that insecure attachment overall is related to a reduction in benefits from positive affect generated by relationship-based memories. However, Crawford and others (2021) failed to find an association between such bias and attachment patterns. Discrepancies between both studies may be due to the use of categorical (Zengel et al., 2019) versus dimensional analyses (Crawford et al., 2021) of attachment patterns.

Overall, memory intensity of specific memories has been the most researched index in this section. Of the eight studies described with such an outcome, four findings indicated that anxious attachment was

associated with increased intensity and four indicated that avoidant attachment was associated with decreased intensity instead, with mostly small-to-medium effects across studies (Table 1).

6.4.2. Memory details, specificity and vividness

Attachment avoidance may reduce the level of details retrieved in memory, as prominent theory has argued that such a pattern reflects habitual attempts to keep aversive memories at bay (Williams et al., 2007). Consistent with this account, Sutin and Gillath, (2009; Studies 1–2) found that attachment avoidance was associated with less detailed memories for positive (Study 1), negative (Study 1), and non-valence specific memories (Study 2; indexed by lower self-reported agreement with statements such as "I can picture this memory in great detail in my mind"). Similarly, avoidant attachment was associated with fewer unique details in a study using a more objective method of quantifying details (with research-led coding of memory elaboration; McCabe & Peterson, 2012). However, Wang et al. (2018) showed that avoidant attachment was associated instead with *more* memory details. It is possible that this avoidant strategy can backfire at times (Williams et al., 2007) resulting in *more* vivid memories akin to processes involved in the experience of intrusive memories in PTSD (Ehlers et al., 2004).

The above "avoidant strategy" account does not seem to explain the links between attachment anxiety and memory details. Sutin and Gillath (2009) found that attachment *anxiety* was also associated with less detailed positive (Study 1) and non-valence specific memories (Study 2). Similarly, Wang et al. (2018) found that anxious attachment was associated with fewer details of marriage-related memories. Such reduction in memory details may be better explained by excessive arousal associated with anxiety which impedes optimal cognitive performance (Yerkes & Dodson, 1908). Despite links with reduced details, anxiety has been found at times to be correlated with *higher* vividness of negative AEMs (Öner & Gülgöz, 2016), although not with vividness of positive memories (Öner & Gülgöz, 2016) or compassion-focused imagery (Naismith et al., 2018). High vividness may be of the small number of details retrieved. While details and vividness are both related to perceptual impressions of the memory content, they may represent distinct and dissociable aspects of memory that are related in a complex manner (Richter, Cooper, Bays, & Simons, 2016).

Patterns on past memories could extend to future imagined events. A study by Cao and others (2018) demonstrated that securely-attached adults generated more episodic details for both remembered and imagined attachment-relevant relative to attachment-irrelevant events. This attachment-relevance enhancement on recall was absent in both insecurely-attached individuals.

Finally, another memory feature related to detail is *specificity* – the extent to which a retrieved memory 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.

Overall, memory details has been the most researched index in this section. In the five studies described with such an outcome, four findings indicated that avoidant attachment was associated with decreased details and three indicated that anxious attachment was associated with decreased details too, with small-to-medium effects across studies (Table 1).

6.4.3. Memory coherence and fragmentation

Memory coherence refers to one's ability to re-construct past experiences through a connected and logical narrative (Vanderveren, Bijttebier, & Hermans, 2020). Attachment avoidance is thought to recruit a "defensive" strategy to deactivate the attachment system, contributing

to less coherent memory descriptions (Mikulincer, Shaver, Cassidy, & Berant, 2009). Accordingly, attachment avoidance was associated with less coherent AEMs of both positive and negative memories of marriage in older Chinese adults (Wang et al., 2018) and of both first memories and adolescence memories in US-based young adults (McCabe & Peterson, 2012). Quinn, Spiby, and Slade (2015) failed to find links between attachment patterns and more fragmented (i.e., less coherent) memories for childbirth trauma in mothers. Differences in methodologies for assessing memory coherence (objective coding) and fragmentation (self-report) may partly explain such discrepancies. In sum, two out of the three studies described has shown that attachment avoidance was associated with less memory coherence with small effects (Table 1).

6.4.4. Memory latency and accuracy

Attachment insecurity may also 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). Slower retrieval of negative memories has also been associated with greater levels of attachment avoidance measured dimensionally (Kohn et al., 2012). Conversely, faster retrieval of (anxious/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, which presumably reflects 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 is at play.

Memory accuracy is often challenging to study for autobiographical memories as researchers tend to have little control over encoding of the original event. However, a study by Edelstein and others (2005) took advantage of a community-based cohort study with access to confirmed records from 14 years earlier during childhood alongside a follow-up during adulthood. 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) in those with high levels of abuse severity.

Overall, retrieval latency has been the most researched index in this section. In the three studies described with such an outcome, all of them indicated that avoidant attachment was associated with slower retrieval, with small-to-medium effects across studies (Table 1).

6.4.5. Memory content

A minority of studies examined the types of events retrieved. For instance, associations were found 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).

6.5. Which factors are likely to influence the associations between attachment patterns and AEM functioning?

The distinct profiles of AEM phenomenology by attachment patterns (Fig. 4) seem to also depend on additional moderating factors, as explored in seven studies. One moderator considered relates to the characteristics of the event. 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 personally-relevant events.

Personal characteristics could also play an important role. A study in older Chinese adults (Wang et al., 2016) suggested 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 the latter decreases with age (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 (Wang et al., 2016). Such gender effects were derived from a study in Chinese participants thus may 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).

Overall, these findings tentatively suggest that processes related to demographics (e.g., age and gender), psychological traits (e.g., imagery abilities) and nature of the event (e.g., content and emotionality) could amplify and/or weaken attachment-related biases in memory processing.

6.6. What potential mechanisms underpin the associations between attachment patterns and AEM functioning?

Three studies interrogated potential processes mediating attachment and AEM. Using structural equation modelling to test hypothesised links between different memory stages, Öner and Gülgöz (2016) found that attachment avoidance may involve dampening down of the personal relevance of intimacy-related events in romantic relationships at the time of the initial experience (i.e., encoding), which can have knock-on effects on all subsequent memory stages, resulting in reduced rehearsal of such events (i.e., consolidation) and subsequently less intense and vivid memories (i.e., retrieval). Evidence on the role of memory rehearsal/consolidation comes from two additional studies. Attachment avoidance appears to be associated with reduced experiences of event elaboration from parents during childhood which could result in subsequent reduced recollection of early memories during adulthood (Öner & Gülgöz, 2022). Similarly, Edelstein and others (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 can contribute to reduced memory accuracy. These ideas are consistent with the hypothesis put forward by Mikulincer and 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 increase encoding) of negative memories, further enhancing retrieval of those memories. This finding is in line with the notion of schema-consistent processing 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) and retrieved negative memories consistent with such views.

6.7. Are attachment patterns linked to mental health outcomes through their effects on AEM functioning?

Only five 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. Beyderman and Young (2016) found an association between attachment avoidance and depressive symptoms; but overgeneral memory neither mediated such association nor was associated with attachment patterns.

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 the development of 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 directly 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, Wisco, & Lyubomirsky, 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), 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, but the evidence base is too small to draw any firm conclusions.

6.8. 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 securely- and 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 (negative) 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 was "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 one's own eyes) versus through a third-person perspective (i.e., seeing onself as outsider in the memory), with the latter thought to facilitate adaptive emotional distancing (Kross &
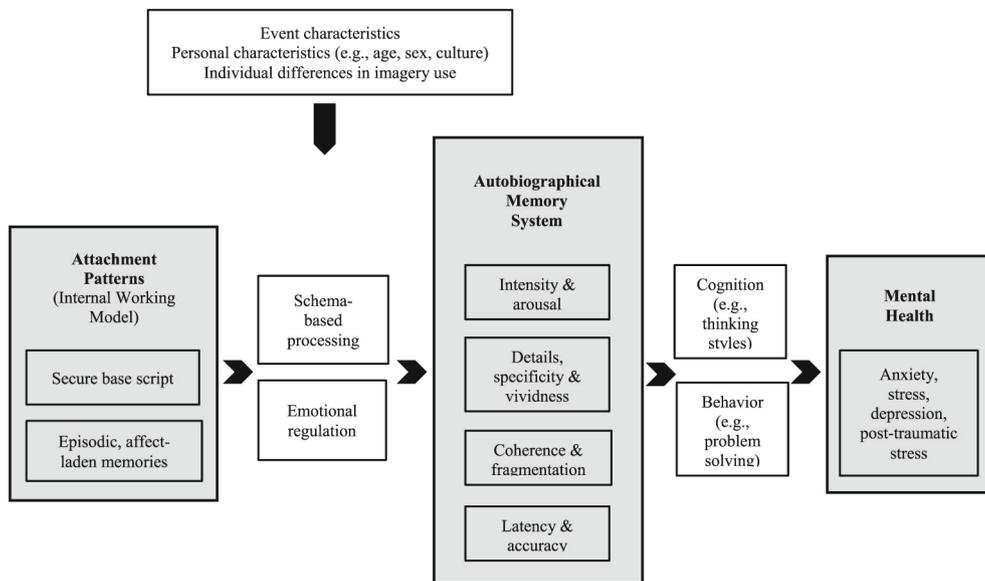
Fig. 5. A Schematic Model of Mechanistic Processes Connecting Attachment, Autobiographical Memory, and Mental Health.

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 maintenance of mental health and emotional psychopathology.

Ayduk, 2017). However, when visualising a relationship-based memory (of a transgression involving the partner) from a 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; Studies 1–2). 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 interventions using compassion-focused imagery (Naismith et al., 2018; Studies 1–2) or security priming where an attachment figure is visualised to offer comfort and increase "felt security" (Sutin & Gillath, 2009; Study 2).

In sum, an individual's pre-existing attachment pattern may be relevant to revealing the effects of some manipulations that capitalise on AEMs. The application of AEM-based techniques likely requires a thoughtful approach based on a sound understanding of the underlying mechanisms, ideally involving a nuanced match between attachment patterns and memory procedure to maximise the clinical effects while avoiding unintended harms.

7. 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, Werner-Seidler, Blackwell, & Dalgleish, 2017; Williams et al., 2007). Below we present an overview of key findings, and consider methodological, theoretical, and clinical issues to bridge the sciences of attachment, memory, and psychopathology for treatment innovation.

7.1. 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* intense, detailed, coherent and slower (Fig. 4). For anxiously-attached individuals, evidence indicates that recalling comparable memories can be *more* intense (Fig. 4) although possible also less detailed.

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 (mediated) by emotional regulation and self-relevant processing, as well as be influenced (moderated) by processes related to both event features (e.g., valence and interpersonal nature) and personal characteristics (e.g., age and trait imagery). Tentatively, attachment patterns and mental health outcomes/processes are linked through key AEM properties (e.g., intensity), with emerging evidence for depression and PTSD. Finally, the benefits of (at least some) AEM-based therapeutic techniques may depend on attachment patterns.

7.2. Methodological considerations

The vast number of studies using correlational designs (see Table A.1 in the Appendix for details on quality appraisal) highlights the need for further longitudinal and appropriately-powered studies (as most effects described were in the small-to-medium range) with repeated 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, Shmueli-Goetz, Viding, Fonagy, & Plomin, 2014), explore a global and diverse perspective (Bauer, 2019), and embrace robustness and transparency (Munafò et al., 2017).

Different measurements of attachment may reflect different aspects of attachment, which in turn may explain some of the inconsistent findings. 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 also remains to be explored whether attachment-related biases in memory are influenced by the attachment contexts and relationship foci.

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.

7.3. Theoretical implications

Notwithstanding the key limitations of the literature as described above, we have drawn up a schematic model bringing together attachment, memory and psychopathology (Fig. 5). Focusing on the first link from attachment to memory, the reviewed findings broadly accord with Dykas and Cassidy (2011)'s dual process model. In the majority of studies, it appeared that avoidantly-attached individuals display consistent signs of underactivating their attachment memories, as indexed across multiple memory outcomes. These include a reduction in memory intensity (Haggerty et al., 2010; Sutin & Gillath, 2009), details (e.g., McCabe & Peterson, 2012; Sutin & Gillath, 2009), coherence (e.g., McCabe & Peterson, 2012; Wang et al., 2018) and retrieval speed (e.g., Dykas et al., 2014; Kohn et al., 2012). This memory profile may be the consequence of downregulation to avoid emotional pain as initially proposed by Mikulincer and Orbach (1995), although this emotional "blocking" may also limit the benefits from such memories (e.g., from AEM-based interventions). One study used an experimental manipulation that purportedly disrupted self-regulatory processes (through a "controlled" writing task; Kohn et al., 2012) and found that this "normalised" retrieval speed to negative memories in avoidantly-attached individuals, supporting the role of emotional regulation in initially reducing memory accessibility. Nevertheless, despite long-standing proposals that emotion regulation plays a key role in mediating, no studies reviewed have included an independent measure assessing this construct.

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). Accordingly, anxiously-attached individuals showed more sensitivity to negative attachment memories (e.g., with negative self-views), as reflected in experiencing more intensity or sense of "reliving" while recalling such memories (Cortes & Wilson, 2016; Ogle et al., 2015; Öner & Gülgöz, 2022; Sutin & Gillath, 2009). Again, despite long-standing proposals that schema-relevant processing also plays a key mediating role between attachment and cognition (Dykas & Cassidy, 2011), none of the studies reviewed had directly studied it either through experimental manipulation or including independent measurement.

Turning to the second link linking memory and mental health, attachment-related memory biases likely 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, Watkins, Mansell, & Shafran, 2004), while other levels of analyses (e.g., biology and sociality) remain under-investigated. Only a few studies from the reviewed literature have focused on this second link as it pertains to attachment patterns (Ogle et al., 2015; Quinn et al., 2015; Sutin & Gillath, 2009) and therefore it remains inconclusive. Given the paucity of research in this area, there is also a lack of mechanistic investigations underlying the link from attachment-based memory biases to psychopathology. Future research could consider recent frameworks that have proposed key mechanisms impacted by attachment – negative expectancies, interpretation biases and defensive strategies (Kobak & Bosmans, 2019) – which are likely to dynamically influence intra- and interpersonal processes relevant to mental health outcomes.

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.

7.4. 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, Hembree, & Rothbaum, 2007), cognitive restructuring within reliving (Grey, Young, & Holmes, 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, Sze, & Raes, 2019), Episodic Specificity Induction (Jing, Madore, & Schacter, 2016), Memory Flexibility Training (Moradi et al., 2014) and Positive Memory Training (Steel et al., 2020). Another emerging approach is the use of (visuospatial) competing task techniques to reduce memory vividness (Engelhard, van Uijen, & van den Hout, 2010; Rackham & Lau-Zhu, 2021) and intrusive recall (Lau-Zhu, Henson, & Holmes, 2019, 2021). 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, Hackmann, & Clark, 2008) or bipolar disorder (Steel et al., 2020), 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 as currently explored for both adults (Holmes et al., 2016; Steel, Wright, et al., 2020) and youth (Lau-Zhu, Farrington, & Bissessar, 2022; 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, Kimiaee, Yazdi, & Safa, 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 (Holmes et al., 2018). 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 (Fig. 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

Table 2

Outstanding Questions for Clinical Psychological Science Bridging Attachment, Autobiographical Memories and Mental Health.

Question 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)?

stabilise in adulthood, recent neuroscientific accounts posit that memories may be rendered labile again under certain boundary conditions (Visser, Lau-Zhu, Henson, & Holmes, 2018). Accordingly, adults' attachment appear to change with psychological treatments even within CBT – where the theoretical focus is not explicitly on changing attachment (Taylor, Rietzschel, Danquah, & Berry, 2015). The success of changing attachment styles may depend on the varying degree to which the autobiographical memory system is (intentionally or incidentally) engaged across treatments. Attending to AEM-based images specifically underpinning one's attachment pattern (e.g., with a caregivers or partners) could help 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, Tyson, & Mason, 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.

8. 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 (Table 2). Mechanistically-informed interventions (Barlow et al., 2013; Holmes et al., 2018) harnessing psychological sciences hold promise for reducing mental health burden in the area of attachment insecurity across a range of clinical populations.

Contributors

All authors designed the study and wrote the protocol. ALZ conducted literature searches, data extraction, and wrote the first draft of the manuscript. All authors contributed and have approved the final manuscript.

Declaration of Competing Interest

We declare no conflicts of interests.

Data availability

No data was used for the research described in the article.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.cpr.2023.102254.

References

Ainsworth, M. S., Blehar, M. C., Waters, E., & Wall, S. (1978). *Patterns of attachment: A psychological study of the strange situation. Lawrence Erlbaum*.

Ainsworth, M. S., & Bowlby, J. (1991). An ethological approach to personality development. *American Psychologist, 46*(4), 333–341. https://doi.org/10.1037/0003-066x.46.4.333

Altman, D. G. (1991). *Practical Statistics for Medical Research. Chapman & Hall*.

Arnett, J. (2000). Emerging adulthood: A theory of development from the late teens through the twenties. *American Psychologist, 55*(5), 469–480.

Arntz, A. (2012). Imagery rescripting as a therapeutic technique: Review of clinical trials, basic studies, and research agenda. *Journal of Experimental Psychopathology, 3*(2), jep.024211. https://doi.org/10.5127/jep.024211

Arntz, A., & Weertman, A. (1999). Treatment of childhood memories: Theory and practice. *Behaviour Research and Therapy, 37*(8), 715–740. https://doi.org/10.1016/S0005-7967(98)00173-9

Barlow, D. H., Bullis, J. R., Comer, J. S., & Ametaj, A. A. (2013). *Evidence-based psychological treatments: An update and a way forward. 9* pp. 1–27). https://doi.org/10.1146/ANNUREV-CLINPSY-050212-185629

Barry, T. J., Sze, W. Y., & Raes, F. (2019). A meta-analysis and systematic review of memory specificity training (MeST) in the treatment of emotional disorders. *Behaviour Research and Therapy, 116*, 36–51. https://doi.org/10.1016/J.BRAT.2019.02.001

Bartholomew, K., & Horowitz, L. M. (1991). Attachment styles among young adults: A test of a four-category model. *Journal of Personality and Social Psychology, 61*(2), 226–244. https://doi.org/10.1037/0022-3514.61.2.226

Bauer, P. J. (2019). Expanding the reach of psychological science. *Psychological Science, 31*(1), 3–5. https://doi.org/10.1177/0956797619898664

Benjamin, C. L., Puleo, C. M., Settipani, C. A., Brodman, D. M., Edmunds, J. M., Cummings, C. M., & Kendall, P. C. (2011). History of cognitive-behavioral therapy (CBT) in youth. *Child and Adolescent Psychiatric Clinics of North America, 20*(2), 179. https://doi.org/10.1016/J.CHC.2011.01.011

Berntsen, D. (2009). *Involuntary autobiographical memories: An introduction to the unbidden past. Cambridge University Press*.

Berntsen, D., & Hall, N. M. (2004). The episodic nature of involuntary autobiographical memories. *Memory & Cognition, 32*(5), 789–803. https://doi.org/10.3758/BF03195869

Beyderman, I., & Young, M. A. (2016). Rumination and overgeneral autobiographical memory as mediators of the relationship between attachment and depression. *Personality and Individual Differences, 98*, 37–41. https://doi.org/10.1016/J.PAID.2016.03.077

Bluck, S., Alea, N., Habermas, T., & Rubin, D. C. (2005). A tale of three functions: The self-reported uses of autobiographical memory. *Social Cognition, 23*(1), 91–117. https://doi.org/10.1521/SOCO.23.1.91.59198

Borelli, J. L., Sbarra, D. A., Snavely, J. E., McMakin, D. L., Coffey, J., Ruiz, S. K., … Chung, S. Y. (2014). With or without you: Preliminary evidence that attachment avoidance predicts nondeployed spouses' reactions to relationship challenges during deployment. *Professional Psychology: Research and Practice, 45*(6), 478–487. https://doi.org/10.1037/a0037780

Borenstein, M., Hedges, L. V., Higgins, J. P. T., & Rothstein, H. R. (2009). When does it make sense to perform a meta-analysis?. In *Introduction to Meta-analysis* (pp. 357–364). John Wiley & Sons, Ltd.. https://doi.org/10.1002/9780470743386.CH40

Boroujerdi, F. G., Kimiaee, S. A., Yazdi, S. A. A., & Safa, M. (2019). Attachment style and history of childhood abuse in suicide attempters. *Psychiatry Research, 271*, 1–7. https://doi.org/10.1016/J.PSYCHRES.2018.11.006

Bowlby, J. (1969). *Attachment. Attachment and loss* (Vol. 1). Loss. Basic Books. https://doi.org/978/0712674713.

Brennan, K. A., Clark, C. L., & Shaver, P. R. (1998). Self-report measurement of adult attachment: An integrative overview. In J. A. Simpson, & W. S. Rholes (Eds.), *Attachment theory and close relationships* (pp. 46–76). Guilford Press.

Brewin, C. R., Gregory, J. D., Lipton, M., & Burgess, N. (2010). Intrusive images in psychological disorders: Characteristics, neural mechanisms, and treatment implications. *Psychological Review, 117*(1), 210–232. https://doi.org/10.1037/a0018113

Bryant, R. A., & Chan, I. (2017). Activating attachment representations during memory retrieval modulates intrusive traumatic memories. *Consciousness and Cognition, 55*, 197–204. https://doi.org/10.1016/j.concog.2017.08.010

Cao, X., Madore, K., Wang, D., & Schacter, D. (2018). Remembering the past and imagining the future: Attachment effects on production of episodic details in close relationships. *Memory, 26*(8), 1140–1150. https://doi.org/10.1080/09658211.2018.1434800

Cavanagh, S. R., Glode, R. J., & Opitz, P. C. (2015). Lost or fond? Effects of nostalgia on sad mood recovery vary by attachment insecurity. *Frontiers in Psychology, 773*. https://doi.org/10.3389/FPSYG.2015.00773

Chae, Y., Goodman, G. S., & Edelstein, R. S. (2011). Autobiographical memory development from an attachment perspective: The special role of negative events. *Advances in Child Development and Behavior, 40*, 1–49. https://doi.org/10.1016/B978-0-12-386491-8.00001-3

Çili, S., & Stopa, L. (2015). Intrusive mental imagery in psychological disorders: Is the self the key to understanding maintenance? *Frontiers in Psychiatry, 6*, 103. https://doi.org/10.3389/fpsyt.2015.00103

Collins, N. L., & Read, S. J. (1994). Cognitive representations of attachment: The structure and function of working models. In K. Bartholomew, & D. Perlman (Eds.), *Attachment processes in adulthood* (pp. 53–90). Jessica Kingsley Publishers.

Conway, M. A. (2001). Sensory-perceptual episodic memory and its context: Autobiographical memory. *Philosophical Transactions of the Royal Society of London. Series B, Biological Sciences, 356*(1413), 1375–1384. https://doi.org/10.1098/rstb.2001.0940

Conway, M. A. (2005). Memory and the self. *Journal of Memory and Language, 53*(4), 594–628.

Conway, M. A., & Pleydell-Pearce, C. W. (2000). The construction of autobiographical memories in the self-memory system. *Psychological Review, 107*(2), 261–288. https://doi.org/10.1037/0033-295X.107.2.261

Cortes, K., & Wilson, A. (2016). When slights beget slights: Attachment anxiety, subjective time, and intrusion of the relational past in the present. *Personality and Social Psychology Bulletin, 42*(12), 1693–1708. https://doi.org/10.1177/0146167216670606

Crawford, M. T., Hammond, M. D., & Marsh, C. (2021). Holding on & letting go: Romantic attachment and fading affect bias. *The Journal of Social Psychology.*. https://doi.org/10.1080/00224545.2021.2017254

Crittenden, P. M. (2006). A dynamic-maturational model of attachment. *Australian and New Zealand Journal of Family Therapy, 27*(2), 105–115. https://doi.org/10.1002/J.1467-8438.2006.TB00704.X

Cusimano, A. M., & Riggs, S. A. (2013). Perceptions of interparental conflict, romantic attachment, and psychological distress in college students. *Couple and Family Psychology: Research and Practice, 2*(1), 45–59. https://doi.org/10.1037/A0031657

Dalgleish, T., & Brewin, C. R. (2007). Autobiographical memory and emotional disorder: A special issue of memory. *Memory, 15*(3), 225–226. https://doi.org/10.1080/09658210701256399

Dykas, M. J., & Cassidy, J. (2011). Attachment and the processing of social information across the life span: Theory and evidence. *Psychological Bulletin, 137*(1), 19–46. https://doi.org/10.1037/a0021367

Dykas, M. J., Woodhouse, S., Jones, J., & Cassidy, J. (2014). Attachment-related biases in adolescents' memory. *Child Development, 85*(6), 2185–2201. https://doi.org/10.1111/CDEV.12268

Edelstein, R., Ghetti, S., Quas, J., Goodman, G., Alexander, K., Redlich, A., & Cordón, I. (2005). Individual differences in emotional memory: Adult attachment and long-term memory for child sexual abuse. *Personality and Social Psychology Bulletin, 31*(11), 1537–1548. https://doi.org/10.1177/0146167205277095

Ehlers, A., Hackmann, A., & Michael, T. (2004). Intrusive re-experiencing in post-traumatic stress disorder: Phenomenology, theory, and therapy. *Memory, 12*(4), 403–415. https://doi.org/10.1080/09658210444000025

Elnick, A. B., Margrett, J. A., Fitzgerald, J. M., & Labouvie-Vief, G. (1999). Benchmark memories in adulthood: Central domains and predictors of their frequency. *Journal of Adult Development, 6*(1), 45–59. https://doi.org/10.1023/A:1021624324994

Engelhard, I. M., van Uijen, S. L., & van den Hout, M. A. (2010). The impact of taxing working memory on negative and positive memories. *European Journal of Psychotraumatology, 1*, 1–8. https://doi.org/10.3402/ejpt.v1i0.5623

Farrar, M. J., Fasig, L. G., & Welch-Ross, M. K. (1997). Attachment and emotion in autobiographical memory development. *Journal of Experimental Child Psychology, 67*(3), 389–408. https://doi.org/10.1006/jecp.1997.2414

Fearon, P., Shmueli-Goetz, Y., Viding, E., Fonagy, P., & Plomin, R. (2014). Genetic and environmental influences on adolescent attachment. *Journal of Child Psychology and Psychiatry, 55*(9), 1033–1041. https://doi.org/10.1111/JCPP.12171

Foa, E., Hembree, E., & Rothbaum, B. (2007). *Prolonged exposure therapy for PTSD: Emotional processing of traumatic experiences therapist guide (treatments that work)*. Oxford University Press.

Fraley, R. (2019). Attachment in adulthood: Recent developments, emerging debates, and future directions. *Annual Review of Psychology, 70*, 401–422. https://doi.org/10.1146/ANNUREV-PSYCH-010418-102813

Fraley, R., Heffernan, M. E., Vicary, A. M., & Brumbaugh, C. C. (2011). The experiences in close relationships-relationship structures questionnaire: A method for assessing attachment orientations across relationships. *Psychological Assessment, 23*(3), 615–625. https://doi.org/10.1037/A0022898

Fraley, R., Hudson, N. W., Heffernan, M. E., & Segal, N. (2015). Are adult attachment styles categorical or dimensional? A taxometric analysis of general and relationship-specific attachment orientations. *Journal of Personality and Social Psychology, 109*(2), 354–368. https://doi.org/10.1037/PSPP0000027

Fraley, R., Waller, N. G., & Brennan, K. A. (2000). An item response theory analysis of self-report measures of adult attachment. *Journal of Personality and Social Psychology, 78*(2), 350–365. https://doi.org/10.1037/0022-3514.78.2.350

Gallitto, E., & Leth-Steensen, C. (2015). Autistic traits and adult attachment styles. *Personality and Individual Differences, 79*, 63–67. https://doi.org/10.1016/J.PAID.2015.01.032

Gamble, B., Moreau, D., Tippett, L. J., & Addis, D. R. (2019). Specificity of future thinking in depression: A meta-analysis. *Perspectives on Psychological Science, 14*(5), 816–834. https://doi.org/10.1177/1745691619851784

Gentzler, A. L., & Kerns, K. A. (2006). Adult attachment and memory of emotional reactions to negative and positive events. *Cognition and Emotion, 20*(1), 20–42. https://doi.org/10.1080/02699930500200407

George, C., Kaplan, N., & Main, M. (1996). *Adult Attachment Interview.* Unpublished Manuscript.

Gilbert, P. (2014). The origins and nature of compassion focused therapy. *British Journal of Clinical Psychology, 53*(1), 6–41. https://doi.org/10.1111/BJC.12043

Gillath, O., & Karantzas, G. (2019). Attachment security priming: A systematic review. *Current Opinion in Psychology, 25*, 86–95. https://doi.org/10.1016/j.copsyc.2018.03.001

Goldner, L., & Scharf, M. (2017). Individuals' self-defining memories as reflecting their strength and weaknesses. *Journal of Psychologists and Counsellors in Schools, 27*(2), 153–167. https://doi.org/10.1017/JGC.2016.32

Grey, N., Young, K., & Holmes, E. A. (2002). Cognitive restructuring within reliving: A treatment for peritraumatic emotional "hotspots" in posttraumatic stress disorder. *Behavioural and Cognitive Psychotherapy, 30*(1), 37–56. https://doi.org/10.1017/S1352465802001054

Griffin, D., & Bartholomew, K. (1994). Models of the self and other: Fundamental dimensions underlying measures of adult attachment. *Journal of Personality and Social Psychology, 67*(3), 430–445.

Haggerty, G. D., Siefert, C. J., & Weinberger, J. (2010). Examining the relationship between current attachment status and freely recalled autobiographical memories of childhood. *Psychoanalytic Psychology, 27*(1), 27–41. https://doi.org/10.1037/a0018638

Halligan, S. L., Clark, D. M., & Ehlers, A. (2002). Cognitive processing, memory, and the development of PTSD symptoms: Two experimental analogue studies. *Journal of Behavior Therapy and Experimental Psychiatry, 33*(2), 73–89. https://doi.org/10.1016/S0005-7916(02)00014-9

Harvey, A. G., Watkins, E., Mansell, W., & Shafran, R. (2004). *Cognitive Behavioural processes across psychological disorders: A transdiagnostic approach to research and treatment* (1st ed.). Oxford University Press.

Hazan, C., & Shaver, P. (1987). Romantic love conceptualized as an attachment process. *Journal of Personality and Social Psychology, 52*(3), 511–524.

Hirsch, C. R., & Holmes, E. A. (2007). Mental imagery in anxiety disorders. *Psychiatry, 6*(4), 161–165. https://doi.org/10.1016/j.mppsy.2007.01.005

Hitchcock, C., Werner-Seidler, A., Blackwell, S. E., & Dalgleish, T. (2017). Autobiographical episodic memory-based training for the treatment of mood, anxiety and stress-related disorders: A systematic review and meta-analysis. *Clinical Psychology Review, 52*, 92–107. https://doi.org/10.1016/J.CPR.2016.12.003

Holmes, E. A., Bonsall, M. B., Hales, S. A., Mitchell, H., Renner, F., Blackwell, S. E., ... di Simplicio, M. (2016). Applications of time-series analysis to mood fluctuations in bipolar disorder to promote treatment innovation: A case series. *Translational Psychiatry, 6*(1), Article e720. https://doi.org/10.1038/tp.2015.207

Holmes, E. A., Ghaderi, A., Harmer, C. J., Ramchandani, P. G., Cuijpers, P., Morrison, A. P., ... Craske, M. G. (2018). The Lancet Psychiatry commission on psychological treatments research in tomorrow's science. *The Lancet Psychiatry, 5*(3), 237–286. https://doi.org/10.1016/S2215-0366(17)30513-8

Hudson, N. W., & Fraley, R. (2018). Does attachment anxiety promote the encoding of false memories? An investigation of the processes linking adult attachment to memory errors. *Journal of Personality and Social Psychology, 115*(4), 688–715. https://doi.org/10.1037/pspp0000215

Insel, T. R. T., Cuthbert, B., Garvey, M., Heinssen, R., Pine, D. S., Quinn, K., ... Wang, P. (2010). Research domain criteria (RDoC): Toward a new classification framework for research on mental disorders. *American Journal of Psychiatry, 167*(7), 748–751. https://doi.org/10.1176/appi.ajp.2010.09091379

James, I. A., & Barton, S. (2004). Changing core beliefs with the continuum technique. *Behavioural and Cognitive Psychotherapy, 32*(4), 431–442. https://doi.org/10.1017/S1352465804001614

Jing, H. G., Madore, K. P., & Schacter, D. L. (2016). Worrying about the future: An episodic specificity induction impacts problem solving, reappraisal, and well-being. *Journal of Experimental Psychology: General, 145*(4), 402–418. https://doi.org/10.1037/xge0000142

Johnson, M. K., Foley, M. A., Suengas, A. G., & Raye, C. L. (1988). Phenomenal characteristics of memories for perceived and imagined autobiographical events. *Journal of Experimental Psychology: General, 117*(4), 371–376.

Kellogg, S. H., & Young, J. E. (2006). Schema therapy for borderline personality disorder. *Journal of Clinical Psychology, 62*(4), 445–458. https://doi.org/10.1002/JCLP.20240

Kobak, R., & Bosmans, G. (2019). Attachment and psychopathology: A dynamic model of the insecure cycle. *Current Opinion in Psychology, 25*, 76. https://doi.org/10.1016/J.COPSYC.2018.02.018

Kohn, J. L., Rholes, W. S., & Schmeichel, B. J. (2012). Self-regulatory depletion and attachment avoidance: Increasing the accessibility of negative attachment-related memories. *Journal of Experimental Social Psychology, 48*(1), 375–378. https://doi.org/10.1016/J.JESP.2011.06.020

Kross, E., & Ayduk, O. (2017). Self-distancing: Theory, research, and current directions. *Advances in Experimental Social Psychology, 55*, 81–136. https://doi.org/10.1016/BS.AESP.2016.10.002

Kungl, M. T., Leyh, R., & Spangler, G. (2016). Attachment representations and brain asymmetry during the processing of autobiographical emotional memories in late adolescence. *Frontiers in Human Neuroscience, 10*. https://doi.org/10.3389/FNHUM.2016.00644

Landa, S., & Duschinsky, R. (2013). Crittenden's dynamic–maturational model of attachment and adaptation. *Review of General Psychology, 17*(3), 326–338. https://doi.org/10.1037/a0032102

Lau, J. Y. F., & Waters, A. M. (2017). Annual research review: An expanded account of information-processing mechanisms in risk for child and adolescent anxiety and depression. *Journal of Child Psychology and Psychiatry, and Allied Disciplines, 58*(4), 387–407. https://doi.org/10.1111/JCPP.12653

Lau-Zhu, A., Farrington, A., & Bissessar, C. (2022). Boosting exposure and response prevention with imagery-based techniques: A case study tackling sexual obsessions in an adolescent. *The Cognitive Behaviour Therapist, 15*. https://doi.org/10.1017/S1754470X22000058

Lau-Zhu, A., Henson, R. N., & Holmes, E. A. (2019). Intrusive memories and voluntary memory of a trauma film: Effects of a cognitive interference task after encoding. *Journal of Experimental Psychology: General, 148*(2), 2154–2180.

Lau-Zhu, A., Henson, R. N., & Holmes, E. A. (2021). Selectively interfering with intrusive but not voluntary memories of a trauma film: Accounting for the role of associative memory. *Clinical Psychological Science, 9*(6), 1128–1143. https://doi.org/10.1177/2167702621998315

Levy, K. N., Kivity, Y., Johnson, B. N., & Gooch, C. V. (2018). Adult attachment as a predictor and moderator of psychotherapy outcome: A meta-analysis. *Journal of Clinical Psychology, 74*(11), 1996–2013. https://doi.org/10.1002/JCLP.22685

Libby, L. K., & Eibach, R. P. (2011). Visual perspective in mental imagery: A representational tool that functions in judgment, emotion, and self-insight. In J. M. Olson, & M. P. Zanna (Eds.), *Vol. 44. Advances in experimental social psychology* (pp. 185–245). Academic Press. https://doi.org/10.1016/B978-0-12-385522-0.00004-4.

Luo, Y., Liu, C., Zheng, L., & Chen, X. (2020). Attachment and autobiographical memory retrieval: Event-related potential evidence from strategic information processing. *Consciousness and Cognition, 83*, Article 102980. https://doi.org/10.1016/J.CONCOG.2020.102980

Maccallum, F., & Bryant, R. A. (2013). A cognitive attachment model of prolonged grief: Integrating attachments, memory and identity. *Clinical Psychology Review, 33*(6), 713–727. https://doi.org/10.1016/J.CPR.2013.05.001

Main, M., Hesse, E., & Goldwyn, R. (2008). Studying differences in language usage in recounting attachment history: An introduction to the AAI. In H. Steele, & M. Steele (Eds.), *Clinical applications of the adult attachment interview* (pp. 31–68). Guildford Press.

Marigold, D. C., Eibach, R. P., Libby, L. K., Ross, M., & Holmes, J. G. (2014). Framing memories of relationship transgressions: How visual imagery perspective activates relational knowledge. *Journal of Social and Personal Relationships, 32*(4), 491–508. https://doi.org/10.1177/0265407514536304

McCabe, A., & Peterson, C. (2012). Predictors of adult narrative elaboration: Emotion, attachment, and gender. *Imagination, Cognition and Personality, 31*(4), 327–344. https://doi.org/10.2190/IC.31.4.F

McCrory, E. J., Puetz, V. B., Maguire, E. A., Mechelli, A., Palmer, A., Gerin, M. I., … Viding, E. (2017). Autobiographical memory: A candidate latent vulnerability mechanism for psychiatric disorder following childhood maltreatment. *British Journal of Psychiatry, 211*(4), 216–222. https://doi.org/10.1192/bjp.bp.117.201798

Mikulincer, M., & Orbach, I. (1995). Attachment styles and repressive defensiveness: The accessibility and architecture of affective memories. *Journal of Personality and Social Psychology, 68*(5), 917–925. https://doi.org/10.1037//0022-3514.68.5.917

Mikulincer, M., & Shaver, P. (2001). Attachment theory and intergroup bias: Evidence that priming the secure base schema attenuates negative reactions to out-groups. *Journal of Personality and Social Psychology, 81*(1), 97–115. https://doi.org/10.1037/0022-3514.81.1.97

Mikulincer, M., & Shaver, P. R. (2007). Boosting attachment security to promote mental health, prosocial values, and inter-group tolerance. *Psychological Inquiry, 18*(3), 139–156. https://doi.org/10.1080/10478400701512646

Mikulincer, M., Shaver, P. R., Cassidy, J., & Berant, E. (2009). Attachment-related defensive processes. In J. H. Obegi, & E. Berant (Eds.), *Attachment theory and research in clinical work with adults* (pp. 293–327). The Guilford Press. https://psycnet.apa.org/record/2009-02347-012.

Mikulincer, M., & Sheffi, E. (2000). Adult attachment style and cognitive reactions to positive affect: A test of mental categorization and creative problem solving. *Motivation and Emotion, 24*(3), 149–174. https://doi.org/10.1023/A:1005606611412

Moher, D., Liberati, A., Tetzlaff, J., & Altman, D. G. (2009). Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. *BMJ (Online), 339* (7716), 332–336. https://doi.org/10.1136/bmj.b2535

Moradi, A. R., Moshirpanahi, S., Parhon, H., Mirzaei, J., Dalgleish, T., & Jobson, L. (2014). A pilot randomized controlled trial investigating the efficacy of MEmory Specificity Training in improving symptoms of posttraumatic stress disorder. *Behaviour Research and Therapy, 56*(1), 68–74. https://doi.org/10.1016/J.BRAT.2014.03.002

Mullen, G. (2019). Mapping evidence from systematic reviews regarding adult attachment and mental health difficulties: A scoping review. *Irish Journal of Psychological Medicine, 36*(3), 207–229. https://doi.org/10.1017/IPM.2017.27

Munafò, M. R., Nosek, B. A., Bishop, D. V. M., Button, K. S., Chambers, C. D., Percie Du Sert, N., … Ioannidis, J. P. A. (2017). A manifesto for reproducible science. *Nature Human Behaviour, 1*(1), 1–9. https://doi.org/10.1038/s41562-016-0021

Naismith, I., Mwale, A., & Feigenbaum, J. (2018). Inhibitors and facilitators of compassion-focused imagery in personality disorder. *Clinical Psychology & Psychotherapy, 25*(2), 283–291. https://doi.org/10.1002/CPP.2161

Nolen-Hoeksema, S., Wisco, B. E., & Lyubomirsky, S. (2008). Rethinking rumination. *Perspectives on Psychological Science, 3*(5), 400–424. https://doi.org/10.1111/j.1745-6924.2008.00088.x

Ogle, C. M., Rubin, D. C., & Siegler, I. C. (2015). The relation between insecure attachment and posttraumatic stress: Early life versus adulthood traumas. *Psychological Trauma Theory Research Practice and Policy, 7*(4), 324–332. https://doi.org/10.1037/tra0000015

Öner, S., & Gülgöz, S. (2016). Latent constructs model explaining the attachment-linked variation in autobiographical remembering. *Memory, 24*(3), 364–382. https://doi.org/10.1080/09658211.2015.1009469

Öner, S., & Gülgöz, S. (2022). Adults' recollection of the earliest memories: Early parental elaboration mediated the link between attachment and remembering. *Current Psychology, 1–12*. https://doi.org/10.1007/S12144-022-03811-7/TABLES/3

Patel, V., Flisher, A. J., Hetrick, S., & McGorry, P. (2007). Mental health of young people: A global public-health challenge. *Lancet, 369*(9569), 1302–1313.

Pile, V., Smith, P., Leamy, M., Oliver, A., Blackwell, S. E., Meiser-Stedman, R., … Lau, J. Y. F. (2020). Harnessing mental imagery and enhancing memory specificity: Developing a brief early intervention for depressive symptoms in adolescence. *Cognitive Therapy and Research, 1–17*. https://doi.org/10.1007/s10608-020-10130-3

Platts, H., Tyson, M., & Mason, O. (2002). Adult attachment style and core beliefs: Are they linked? *Clinical Psychology & Psychotherapy, 9*(5), 332–348. https://doi.org/10.1002/CPP.345

Quinn, K., Spiby, H., & Slade, P. (2015). A longitudinal study exploring the role of adult attachment in relation to perceptions of pain in labour, childbirth memory and acute traumatic stress responses. *Journal of Reproductive and Infant Psychology, 33*(3), 256–267. https://doi.org/10.1080/02646838.2015.1030733

Rackham, L. A., & Lau-Zhu, A. (2021). Taxing working memory to modulate mental imagery of the 9/11 terrorist attacks following media exposure during childhood: A pilot study in young adult UK residents. *Anxiety, Stress, and Coping*. https://doi.org/10.1080/10615806.2020.1870107

Ravitz, P., Maunder, R., Hunter, J., Sthankiya, B., & Lancee, W. (2010). Adult attachment measures: A 25-year review. *Journal of Psychosomatic Research, 69*(4), 419–432. https://doi.org/10.1016/j.jpsychores.2009.08.006

Richter, F. R., Cooper, R. A., Bays, P. M., & Simons, J. S. (2016). Distinct neural mechanisms underlie the success, precision, and vividness of episodic memory. *ELife, 5*. https://doi.org/10.7554/ELIFE.18260

Rubin, D. C. (2005). A basic-systems approach to autobiographical memory. *Current Directions in Psychological Science, 14*(2), 79–83. https://doi.org/10.1111/j.0963-7214.2005.00339.x

Rubin, D. C., Schrauf, R. W., & Greenberg, D. L. (2003). Belief and recollection of autobiographical memories. *Memory & Cognition, 31*(6), 887–901. https://doi.org/10.3758/BF03196443

Rutter, M. (2014). Commentary: Attachment is a biological concept - A reflection on Fearon et al. (2014). *Journal of Child Psychology and Psychiatry, and Allied Disciplines, 55*(9), 1042–1043. https://doi.org/10.1111/JCPP.12301

Schacter, D. L., Benoit, R. G., & Szpunar, K. K. (2017). Episodic future thinking: Mechanisms and functions. *Current Opinion in Behavioral Sciences, 17*, 41–50. https://doi.org/10.1016/j.cobeha.2017.06.002

Sebastian, C., Burnett, S., & Blakemore, S. J. (2008). Development of the self-concept during adolescence. *Trends in Cognitive Sciences, 12*(11), 441–446. https://doi.org/10.1016/J.TICS.2008.07.008

Singer, J. A., & Moffitt, K. H. (1992). An experimental investigation of specificity and generality in memory narratives. *Imagination, Cognition and Personality, 11*(3), 233–257. https://doi.org/10.2190/72A3-8UPY-GDB9-GX9K

Steel, C., Korrelboom, K., Fazil Baksh, M., Kingdon, D., Simon, J., Wykes, T., Phiri, P., & van der Gaag, M. (2020). Positive memory training for the treatment of depression in schizophrenia: A randomised controlled trial. *Behaviour Research and Therapy, 135*, Article 103734. https://doi.org/10.1016/J.BRAT.2020.103734

Steel, C., Wright, K., Goodwin, G., Morant, N., Taylor, R., Brown, M., … Holmes, E. (2020). The IBER study: Study protocol for a feasibility randomised controlled trial of imagery based emotion regulation for the treatment of anxiety in bipolar disorder. *Pilot and Feasibility Studies, 6*(1), 1–9. https://doi.org/10.1186/S40814-020-00628-8/FIGURES/1

Stopa, L. (2009). *Imagery and the threatened self: Perspectives on mental imagery and the self in cognitive therapy* (1st ed.). Routledge.

Sutin, A. R., & Gillath, O. (2009). Autobiographical memory phenomenology and content mediate attachment style and psychological distress. *Journal of Counselling Psychology, 56*(3), 351–364.

Taylor, P., Rietzschel, J., Danquah, A., & Berry, K. (2015). Changes in attachment representations during psychological therapy. *Psychotherapy Research, 25*(2), 222–238. https://doi.org/10.1080/10503307.2014.886791

Thompson, R. A. (2008). Attachment-related mental representations: Introduction to the special issue. *Attachment & Human Development, 10*(4), 347–358. https://doi.org/10.1080/14616730802461334

Valentino, K. (2011). A developmental psychopathology model of overgeneral autobiographical memory. *Developmental Review, 31*(1), 32–54. https://doi.org/10.1016/j.dr.2011.05.001

Vanderveren, E., Bijttebier, P., & Hermans, D. (2020). Autobiographical memory coherence in emotional disorders: The role of rumination, cognitive avoidance, executive functioning, and meaning making. *PLoS One, 15*(4), Article e0231862. https://doi.org/10.1371/JOURNAL.PONE.0231862

Visser, R. M., Lau-Zhu, A., Henson, R. N., & Holmes, E. A. (2018). Multiple memory systems, multiple time points: How science can inform treatment to control the expression of unwanted emotional memories. *Philosophical Transactions of the Royal Society, B: Biological Sciences, 373*(1742), 20170209. https://doi.org/10.1098/rstb.2017.0209

Wang, Y., Wang, D., Feeney, B. C., & Li, F. (2016). What will I tell you about my marriage? The relationship between attachment and autobiographical memory of married life. *Journal of Social and Personal Relationships, 34*(7), 963–983. https://doi.org/10.1177/0265407516664417

Wang, Y., Wang, Q., Wang, D., & Feeney, B. C. (2018). How do I narrate my marriage: The relationship between attachment orientation and quality of autobiographical memory. *Frontiers in Psychology, 2107*. https://doi.org/10.3389/FPSYG.2018.02107

Waters, E., Weinfield, N. S., & Hamilton, C. E. (2000). The stability of attachment security from infancy to adolescence and early adulthood: General discussion. *Child Development, 71*(3), 703–706. https://doi.org/10.1111/1467-8624.00179

Waters, H., & Waters, E. (2006). The attachment working models concept: Among other things, we build script-like representations of secure base experiences. *Attachment & Human Development, 8*(3), 185–197. https://doi.org/10.1080/14616730600856016

Watson, D., Weber, K., Assenheimer, J. S., Clark, L. A., Strauss, M. E., & McCormick, R. A. (1995). Testing a tripartite model: I. evaluating the convergent and discriminant validity of anxiety and depression symptom scales. *Journal of Abnormal Psychology, 104*(1), 3–14. https://doi.org/10.1037/0021-843X.104.1.3

Weathers, F., Litz, B., Herman, D., Huska, J., & Keane, T. (1993). The PTSD checklist: Reliability, validity, and diagnostic utility. In *Meeting of the International Society for Traumatic Stress Studies*.

Wei, M., Russell, D., Mallinckrodt, B., & Vogel, D. (2007). The experiences in close relationship scale (ECR)-short form: Reliability, validity, and factor structure. *Journal of Personality Assessment, 88*(2), 187–204. https://doi.org/10.1080/00223890701268041

Weiss, D. S., & Marmer, C. R. (1997). The impact of event scale – Revised. In J. P. Wilson, & T. M. Keane (Eds.), *Assessing psychological trauma and PTSD* (pp. 299–411). Guilford Press.

Wild, J., Hackmann, A., & Clark, D. M. (2008). Rescripting early memories linked to negative images in social phobia: A pilot study. *Behavior Therapy, 39*(1), 47–56. https://doi.org/10.1016/j.beth.2007.04.003

Williams, J. M. G., Barnhofer, T., Crane, C., Hermans, D., Raes, F., Watkins, E., & Dalgleish, T. (2007). Autobiographical memory specificity and emotional disorder. *Psychological Bulletin, 133*(1), 122–148. https://doi.org/10.1037/0033-2909.133.1.122

Williams, J. M. G., Nurs, N., Tyers, C., Rose, G., & MacLeod, A. K. (1996). The specificity of autobiographical memory and imageability of the future. *Memory & Cognition, 24*(1), 116–125.

Yerkes, R. M., & Dodson, J. D. (1908). The relation of strength of stimulus to rapidity of habit-formation. *Journal of Comparative Neurology and Psychology, 18*(5), 459–482. https://doi.org/10.1002/CNE.920180503

Zengel, B., Lee, E. M., Walker, W. R., & Skowronski, J. J. (2019). Romantic relationships and fading of affect for memories of the shared past. *Applied Cognitive Psychology, 33*(5), 861–872. https://doi.org/10.1002/acp.3527

Zilberstein, K. (2014). The use and limitations of attachment theory in child psychotherapy. *Psychotherapy, 51*(1), 93–103. https://doi.org/10.1037/a0030930

Zimmerman, M., Sheeran, T., & Young, D. (2004). The diagnostic inventory for depression: A self-report scale to diagnose DSM-IV major depressive disorder. *Journal of Clinical Psychology, 60*(1), 87–110. https://doi.org/10.1002/JCLP.10207