AUTOBIOGRAPHICAL MEMORY DIFFERENCES AMONG INDIVIDUALS WITH SUBCLINICAL DEPRESSION AND PTSD

MICHELE ANNE

Thesis submitted to the University of Nottingham

for the Degree of Doctor of Philosophy

July 2020

Abstract

Autobiographical memories are complex multidimensional memories an individual has about their past, which are used for bonding, problem solving, creating self-concepts, and emotion regulation. Previous research has found differences in autobiographical memory recall among individuals with clinical levels of depression and post-traumatic stress disorder (PTSD) in comparison to psychological healthy individuals. However, the extent of these differences among individuals with subclinical levels of depression and PTSD, and the mechanisms that may underlie or influence these differences have not been established clearly. These gaps in the knowledge limit our understanding into the type of memory-related difficulties experienced, and whether subclinical samples will likely benefit from similar memory-related interventions as clinical samples.

The current thesis aimed to investigate whether there are differences in various facets of autobiographical memory recall in individuals with subclinical levels of depression and PTSD as compared to psychologically healthy individuals. Investigating different facets of autobiographical memory enables a holistic overview of memory recall to be established for the subclinical populations. In addition, the current thesis also aimed to investigate whether potential mechanisms and factors associated with those differences could explain, strengthen, or weaken the differences and associations observed.

Each chapter in this thesis investigated a different area of autobiographical memory recall. Chapter 2 focused on the retrieval of semantic and episodic components of memory recall. Study 1 in this chapter investigated differences in the characteristics of Cultural Life Scripts (CLS) and Individual Life Stories (ILS) recalled among individuals with subclinical depression and PTSD symptoms, and the role of societal identification. Participants generated events expected to be experienced by a prototypical infant from their culture, as well as

events they had (or expect to) experienced themselves, and rated these events on importance, emotional valence, pressure, and perceived ability. They then completed questionnaires measuring levels of depression, trauma, collectivism, and individualism. Results from Study 1 showed that when compared to psychologically healthy individuals, individuals with subclinical depression generated CLS that were less typical, whereas individuals with subclinical PTSD did not have differences in the CLS. Individuals with subclinical depression did not retrieve different ILS, whereas individuals with subclinical PTSD retrieved ILS that were more negative and have higher pressure to achieve. In addition, collectivism moderated the relations of depression with CLS typicality, and depression and trauma with ILS pressure.

Study 2 in this chapter studied whether the differences in CLS typicality observed among people with subclinical depression in Study 1 was linked to differences in knowledge of CLS events or differences in selection of typical CLS events. To examine differences in the knowledge, participants decided whether the events from a list were CLS events or not. To examine difference in the selection, participants also generated events expected to be experienced by a prototypical infant from their culture. They then answered questionnaires measuring depression and trauma symptoms. Results from Study 2 showed that there were differences in the knowledge of CLS events for individuals with subclinical levels of depression, which may explain the differences in typicality of the CLS observed in the previous study.

Chapter 3 examined the type of autobiographical memories retrieved. Differences in recalled memory specificity among individuals with subclinical depression and PTSD symptoms, and whether the CaR-FA-X model (i.e., capture and rumination, functional avoidance, and executive functioning) would underlie those differences were studied. Study 3

in this chapter used minimal instructions to elicit autobiographical memories, whereas Study 4 used specific instructions. Participants retrieved memories in response to emotional cue words and categorized them based on specificity. They then completed executive functioning tasks measuring verbal working memory and inhibition and answered questionnaires measuring depression, trauma, rumination, and avoidant coping levels. For both studies, there were no differences in memory specificity for people with subclinical depression and PTSD as compared to psychological healthy people, regardless of the valence and intensity of the cues. Trauma severity predicted the development of semantic associations in Study 3, and overgeneral memory in Study 4. Components of the CaR-FA-X model did not function as mediators for both studies and as moderators for Study 4, but rumination and inhibition strengthened the relations of depression and trauma with semantic associations in Study 3.

Chapter 4 looked at subjective feelings towards autobiographical memories. Differences in psychological distance among individuals with subclinical depression and PTSD symptoms, and whether memory phenomenology and emotion regulation strategies would underlie those differences were examined in Study 5 in this chapter. Participants described their most positive and negative memories that occurred within the last three years and that occurred more than three years ago and rated these four memories on recollective experience, vantage perspective, emotional intensity, and centrality. They then answered questionnaires measuring levels of depression, trauma, cognitive reappraisal, and expressive suppression. The results showed that there were no differences in psychological distance for those with subclinical depression and PTSD as compared to those who are psychological healthy, regardless of the age or valence of the memory, but depression severity predicted feeling closer to recent negative memories. Recollective experience was shown to explain the associations of depression and trauma with psychological distance of recent negative

memories, whereas the other memory phenomenology and emotion regulation strategies did not function as mediators. Emotional intensity moderated the relations of depression with psychological distance of remote positive events, and field perspective moderated the relations of depression and trauma with psychological distance of remote negative events, whereas other memory phenomenology and emotion regulation strategies did not function as moderators.

The findings from the current thesis showed that individuals with subclinical depression symptoms display small differences in the semantic aspects of their memories but not the episodic aspects of their memories, the types of memories they recalled, and how they felt towards the memories. Individuals with subclinical PTSD symptoms, on the other hand, show small differences in the episodic aspects of their memories but not the semantic aspects of their memories, the types of memories they recalled, and how they felt towards the memories. The differences in memory observed from the current thesis were small, and could be attributed to small differences in cognitive areas associated with memory recall. The findings from this thesis improve our understanding into memory recall in subclinical populations, and indicate that memory should be studied in a holistic manner. Possible clinical applications that can be hypothesised from the current theoratical findings are also discussed.

Keywords: Autobiographical memory, depression, PTSD, subclinical

Acknowledgements

First, I would like to express my deepest gratitude to my primary supervisor, Professor Steve Janssen, for providing me with an immense amount of guidance, for sharing pearls of wisdoms from his own experiences, and for showing me a magnitude of compassion and support for the past 3 years. I cannot begin to convey how thankful I am for his unending empathy, patience, and kindness, for always making time for me no matter how busy he was, for reading and providing feedback on infinite amounts of writings, and for providing me with so many opportunities to expand and enrich my research experience. I have no doubt that I have learnt so much from him, and his infectitious passion for research has definitely amplified my own passion for research, all of which I will forever be grateful for.

I would also like to thank my second supervisor, Dr Marieke de Vries, for sharing her knowledge, for providing me with extra avenues for tools and skills for my research, and for putting in the time and effort to read and provide detailed feedback on my writings. I am very grateful to Dr Jessica Price and Professor Michelle Moulds, for taking the time to be my examiners and being willing to read, provide constructive feedback, and have engaging discusssions on my not-so-short dissertation.

Next, I want to give my upmost appreciation to my mother, for supporting and encouraging me to follow my passion in research and humouring this arduous career change. I am so thankful for all the times she went out of her way to reduce my stress and force me to have fun, for making me laugh even in the most troubled of times, for pretending that she understood what I was saying when I talked passionately about research, and for giving me the strength to go all out on this journey. I would also like to thank my family and friends, who despite not fully understanding the attraction of the research world, have supported and cheered me on in every single research endevour I have undertaken.

I would like to give an extra special shout out to my PhD mates, past and present, within and outside UNM. These like-minded people not only assisted me with difficulties I had with my research, but also provided me an environment to vent, appreciated my sarcastic and cynical tendencies, and engaged in many thought-provoking conversations about research and life in general. They made the journey over the past 3 years more bearable, for which I am extremely grateful for.

I want to also thank the wonderful participants who have painstakingly and repeatedly participated in the studies that I conducted. None of this would have been possible without their willingness to set aside time to humour my infinite curiosity into the many topics discussed in this dissertation. Last, I want say thank you to all the people who come across this dissertation and decide to read it. I hope you find the information and findings here as interesting as I did, and may it be useful and helpful to you in some way.

Table of Contents

Abbreviations

AMQ	Autobiographical Memory Questionnaire
AMT	Autobiographical Memory Test
CaR-FA-X	Capture and Rumination – Functional Avoidance – Executive Functioning Model
CES	Centrality of Event Scale
CES-D	Center for Epidemiologic Studies – Depression scale
CLS	Cultural Life Scripts
DASS-21	Depression Anxiety Stress Scales – 21 Items
DSM	Diagnostic and Statistical Manual of Mental Disorders
DSM-5	Diagnostic and Statistical Manual of Mental Disorders – 5th Edition
ERQ	Emotion-Regulation Questionnaire
ILS	Individual Life Stories
MDD	Major Depressive Disorder
OGM	Over-General Memory
PCL-5	PTSD Checklist for DSM-5
PTSD	Post-Traumatic Stress Disorder
RRS-SF	Rumination Response Scale – Short Form
RT	Response Time
SMS	Self-Memory System
SSRT	Stop-Signal Reaction Time

Glossary

Attentional bias – increased or decreased attention allocated towards certain stimuli over other stimuli in the same environment

Autobiographical memory – complex multidimensional memories an individual has about their past, consisting of various components of sensory, emotional, temporal, spatial, narrative information, and personal meaning, and are used for bonding, emotion regulation, problem solving, and creating self-concepts

Avoidant coping – coping strategies that involve cognitive, emotional, and behavioural aversions towards distressing memories, thoughts, and emotions

Basic executive functioning – executive functioning involved in processing less complex information and achieving simple goals

Brooding – the tendency to compare their situation and symptoms to others and standards set by themselves, and negatively criticize themselves for the difference in situations and inability to achieve those set standards, and is perceived to be maladaptive

CAR-FA-X model – model that proposes three mechanisms that explain the relationship between overgeneral autobiographical memory and psychopathology: capture and rumination (CaR), functional avoidance (FA), and executive functioning (X)

Categorical memory – the recall of events that occurred repeatedly, or summaries of a number of similar events, or events that did not have a distinct time or place

Centrality of event – the relevance and importance an event has towards a person's current self-concept and life narrative, and how much the event is used as a point of reference for meaning making and future expectations

Cognitive reappraisal – changing the meanings and perceptions associated with an event, which is turn changes the emotions attached to the event

Collectivism – viewing oneself as part of the group or society, and are bound by the norms and expectations of that said society

Cultural Life Script – series of events that are expected by a culture to occur in a typical individual's life at specified age ranges, and are used to structure the recall of autobiographical memory and the planning of future goals

Depression – a fluctuation in normal mood ranging from unhappiness and discontent to an extreme feeling of sadness, pessimism, and despondency

Executive functioning – a set of cognitive processes that are responsible for the planning, initiation, sequencing, and monitoring of complex goal-directed behaviour in the face of distracting information

Expressive suppression – inhibiting or repressing any behaviours or actions that involve expressing emotions

Extended memory – the recall of one event that lasted longer than a day

Field perspective – viewing the memory from a first-person point of view or as the person primarily experiencing the memory during memory recall

Functional avoidance – passive aversion towards negative memories, by halting the memory search process to remain at a general description level void of negative affect

Individual life story – experienced autobiographical memories that form personal narratives

Individualism – focusing on the wants, needs, and expectations of the self, prior to those of the society

Inhibition – the ability to screen and supress task irrelevant information and responses

Observer perspective – viewing the memory from a third-person point of view or from the standpoint of an audience during memory recall

Omission – when there was no event recalled or no response was given

Overgeneral Autobiographical Memory – retrieved memories that lack specific events or details of time, place, and people involved, and have higher categoric components instead, and typically constitute of categorical memories and extended memories

Perceived ability – a person's perception and confidence of having the ability to engage in the actions and behaviours needed to achieve certain goals and outcomes

Pressure – excessive demands and expectations that are real or imagined, by a group or individual, for a person to think or behave in a specific way

Psychological distance – how far away and long ago the event feels from the current time, and how far away the self that experienced the event feels from the current self, independent of the objective time and distance

Psychologically healthy – having below average to average range of symptoms of a psychological disorder

Recollective experience – the ability to mentally travel back to the event and relive or re-experience the past event in the present

Reflection – the ability to reduce depressive symptoms and feelings by turning inward to conduct cognitive problem solving, and is perceived to be adaptive

Rumination – persistent and continuous thoughts regarding the individuals' difficulties and symptoms, as well as factors that lead to and result from their current state

Self-Memory System – model that proposes that the retrieval of autobiographical memories depends on the working self and the long-term self

Semantic association – the recall of any verbal or schematic associations, descriptions of cue word, or names of persons, animals or objects, or future thoughts

Specific memory – the recall of one event that had happened at a particular time and place, and lasted less than a day

Subclinical – having above average symptoms of a psychological disorder, but the symptoms are insufficient to meet the diagnosis of the disorder in question

Trauma – a negative experience that results in high helplessness, fear, confusion, and dissociation, and further changes one's perception that the world is safe, fair, and predictable

Typicality – how much the life script or life story generated matches the average Cultural Life Script

Vantage perspective – viewpoint that a person sees when they recall a memory

Verbal working memory – maintaining and manipulating verbal-based information during a certain span of time

Vertical collectivism – acceptance of hierarchies and inequalities within a society and the willingness to sacrifice personal goals to meet the group goals even if it is against one's personal values, as a sense of duty to the society

Chapter 1: Introduction

Autobiographical Memory

Autobiographical Memories

Autobiographical memories are complex multidimensional recollections an individual has about their past (Rubin, 2005). These memories contain personal meaning and consist of different levels of narrative, emotional, spatial, temporal, and sensory information, such as auditory, visual, olfactory, and tactile characteristics (Rubin, 2005). Autobiographical memories involve not only the recollection of experienced events but also the processing and integration of viewpoints, insights, and appraisals across time and self to form a personal narrative or history (Fivush, 2011). These different dimensions or facets come together to form a coherent autobiographical memory. An example of a multidimensional autobiographical memory that belongs to the current researcher is as follows:

"Two months ago (temporal), I went to the beach near my university (spatial) with seven of my classmates. Although we had been friends for years, this was the first time we took a trip together (narrative). It was the middle of the last semester of our degree (temporal), and we were all drowning under the workload and feeling stressed (emotional), which is why a trip to the beach seemed like a good break (narrative). Fortunately, it was a sunny day with clear skies (visual), the wind bringing about a slight chill to counter the heat of the sun (tactile). Since it was still early in the morning when we went (temporal), the beach was reasonably quiet and peaceful (auditory). Breathing in the salty air of the ocean (olfactory) the moment I stepped on the beach instantaneously brought about a calming effect on me (emotional)."

Autobiographical memories are categorized as episodic memories (Rubin, 2005), which are defined as personal experiences of singular events that are stored in relation to

other memories and systems, but they can be discriminated as being a unique event during recall (Tulving, 1972). However, Fivush (2011) argued that autobiographical memories are not equivalent to but an advanced version of episodic memories, because they go beyond recalling personal experiences to incorporate higher levels of mental time travel, awareness of the self that had experienced the memory, and linkage of events temporally to create and consolidate an individual's life story or narrative.

Although autobiographical memories are considered as episodic memories, they include both episodic and semantic components (Conway, 1987; Levine, Svoboda, Hay, Winocur, & Moscovitch, 2002). Whereas episodic components constitute of temporal, sensory, emotional, interpersonal, and intrapersonal information of the autobiographical memory, semantic components or autobiographical facts constitute of scripts, categorical, and factual knowledge that contain self-references (Conway, 1987, 2001; Tulving, 1972). For example, an autobiographical memory of "I celebrated my birthday this year by eating my favourite cake with my family at home" may be accompanied by autobiographical facts such as "my birthday is on the 15th of January" and "my favourite cake is the red velvet cake from the bakery down the street" and "my family consists of my father, mother, and brother". In another example, a memory of "I watched a movie at the cinema yesterday" will likely be composed of a script of "buying movie tickets", "buying popcorn and drinks", "finding seats", and "watching the movie", all of which are typical behaviours that are associated with going to the cinema. These semantic components are included into the main autobiographical memory despite not being explicitly described.

Self-Memory System Model

One model used to explain the process of retrieval of autobiographical memories is the Self-Memory System (SMS; Conway & Pleydell-Pearce, 2000; Conway, Singer, & Tagini, 2004). The SMS proposes that retrieval of autobiographical memories involves the interaction of the working self and the long-term self. The working self refers to the goals that need to be achieved at the current moment. The long-term self, meanwhile, consists of the conceptual self and the autobiographical knowledge base. The conceptual self refers to the schemas and beliefs about relations and views of the self, others, and the world.

Autobiographical knowledge base contains the memories that individuals possess, stored in a hierarchy of varying levels of memory details or specificity (Conway & Pleydell-Pearce, 2000). The hierarchy consists of four levels, with the upper level containing general information and the bottom level containing specific information. The memory search process follows a top-down approach, which allows the retrieved memory to become progressively specific with more levels that it searches. The hierarchy from top to bottom are conceptual themes, lifetime periods, general events, and event-specific knowledge (Conway & Loveday, 2015; Conway & Pleydell-Pearce, 2000). Structurally, the hierarchy has several conceptual themes; with each conceptual theme consisting of several lifetime periods; each lifetime period consisting of several general events; and each general event consisting of several event-specific knowledge (Conway & Pleydell-Pearce, 2000; Conway et al., 2004).

At the conceptual themes level, memories are organized according to overarching thematic knowledge that are used to create more coherent life stories, such as “education theme”, “relationship theme”, and “work theme”. Within the conceptual themes is the lifetime period level, whereby memories from each theme are further organized according to temporal knowledge and periods of time that have starting and ending points. For example, memories within the “education theme” could be categorized as “that time I was enrolled in

summer school" or "when I was studying at university". Each lifetime period further contains a general event level, which consists of memories and events that can either be singular, repeated, or extended, but lacks the details necessary to make the event unique or identifiable. Continuing from the previous example, general memories within "when I was studying at university" could include "graduating" (i.e., singular event), or "attending lectures" (i.e., repeated event), or "going on a class trip" (i.e., extended event). Finally, within each general event is the event-specific knowledge level, which contains specific details and elements that makes each memory and event unique and identifiable. Examples of possible details that could be stored at this level include the place, time, people involved, sensory information, phenomenological details, emotions, and cognitions. Although the concepts are not viewed as parallel, lifetime periods and general events are suggested to be similar to semantic or autobiographical facts, whereas event specific knowledge has been suggested to be similar to episodic components (Conway & Pleydell-Pearce, 2000).

When the current goal of retrieval (i.e., working self) interacts with the beliefs about oneself and the world (i.e., conceptual self) and the autobiographical knowledge base, the memory search process within the base is activated. If the memory search process completes successfully and reaches the bottom level, a unique autobiographical memory with specific elements and details will be retrieved.

Eliciting Autobiographical Memories

Retrieval of autobiographical memories can be elicited using several different methods, depending on the type of memory that needs to be retrieved. Although these methods are typically used in laboratory settings, they can also be observed in the context of social situations, daily living events, and self-reflections (Wenzel & Rubin, 2005). There are

numerous methods that can be used depending on the facet or dimension of autobiographical memory that needs to be elicited (e.g., structured interviews, diaries, and self-body camera), but the three more typical methods used in the literature are requests for most important events, Galton-Crovitz word cueing, and questionnaires (Wenzel & Rubin, 2005). These three methods are discussed in more detail because they elicit the facet of memories that are studied in the subsequent chapters of this thesis.

The first method, asking about most important events, are used to elicit a person's life narrative or life story. Individuals are asked to retrieve the most important or significant or central events that they have experienced in their lifetime, from birth to present (e.g., Rubin & Schulkind, 1997a; Rubin, Berntsen, & Hutson, 2009; Thomsen & Berntsen, 2008). Variations of this method have been used to elicit the retrieval of the most emotional memories (e.g., Janssen, Hearne, & Takarangi, 2015; Niziurski, Johannessen, & Berntsen, 2018), the most traumatic memories (e.g., Chu, Buchman-Schmitt, & Joiner, 2015; Rubin, 2011), and the most vivid memories (e.g., Hoekstra, Harris, & Helmick, 1999; Kaya, 2018).

The second method is Galton-Crovitz word cueing, which is used to elicit memories that are associated with the cues. Individuals are presented with cue words, one at a time, and asked to describe one memory for each cue word (e.g., Rubin & Schulkind, 1997a, 1997b). Often, individuals are instructed to recall events that occurred at a specific time and place and lasted less than a day (e.g., Williams & Broadbent, 1986), but the instructions can also be modified to allow free association towards any event (e.g., Debeer, Hermans, & Raes, 2009). A wide array of cues can be used, such as cues that are neutral (e.g., Zheng & Gray, 2018; Neshat-Doost, Dalgleish, & Golden, 2008), emotional (e.g., Champagne et al., 2016; Schönfeld, Ehlers, Böllinghaus, & Rief, 2007), self-relevant (e.g., Sumner, Griffith, & Mineka, 2010), or disorder-specific (e.g., Huber et al., 2015). In variations of this method,

cues can be also be presented in the form of visual or pictorial stimuli (e.g., Schönfeld & Ehlers, 2006; Ridout, Dritschel, Matthews, & O'Carroll, 2016), olfactory stimuli (e.g., El Haj, Gandolphe, Gallouj, Kapogiannis, & Antoine, 2018; Greenberg et al., 2011), or auditory stimuli (e.g., Herz, 2004; Willander, Sikström, & Karlsson, 2015).

The third method, questionnaires, can either be used as complementary to the other methods or be administered independently. The former involves questions in reference to particular memories that have been retrieved (e.g., Rubin, Schrauf, & Greenberg, 2003), whereas the latter involves questions towards overall memory retrieval (e.g., Berntsen, Hoyle, & Rubin, 2019). Questions can be structured or semi-structured, and the type of questions that can be included into the questionnaires vary depending on the type of information needed. This information can include phenomenological characteristics of the memory, extra details of the memory, and insights and knowledge related to the memory (Wenzel & Rubin, 2005).

Purpose of Retrieving Autobiographical Memory

Autobiographical memories in naturalistic settings can similarly be elicited using those methods previously discussed, but more often the memories in this setting are retrieved to tap into the four functions that these memories have (Bluck, Alea, Habermas, & Rubin, 2005). First, autobiographical memories are used to direct both present and future behaviours and thought processes. Past experiences of dealing with similar people, events, or problems are used as references to solve current problems as well as predict future events, and how to react to them. Second, autobiographical memories are linked to the process of defining and conceptualizing the self in a bidirectional relation. Autobiographical memories are used as references to create, evolve, and reinforce one's self-concept and narrative. At the same time,

the current self-concept determines which autobiographical memories are more coherent and easily accessible for recall. Third, autobiographical memories help to bond with others in society. Sharing personal experiences and reminiscing about shared experiences creates, enhances, and maintains both emotional and social relations.

Last, autobiographical memories relate to emotion regulation and well-being, in a bidirectional relation (Fivush, 2011; Holland & Kensinger, 2010; Pasupathi, 2003). Good abilities to integrate personal memories and create coherent life narratives that provide meaning to difficult and unpleasant experiences leads to better mental health, and vice versa (Pascuzzi & Smorti, 2017; Pasupathi, 2003; Waters & Fivush, 2013). However, the exact mechanisms underlying these relations are not fully understood yet.

Mental Health and Psychopathology

Psychopathology

Mental health is a psychological state consisting of good emotional and behavioural adjustments, adequate coping skills towards daily stresses, and minimal psychological distress symptoms (American Psychological Association, 2013; World Health Organization, 2018). Poor mental health and high psychological distress could lead to the development of psychopathology. Psychopathology is characterized as abnormalities and disturbances in cognition, emotion, behaviours, and functionality (American Psychological Association, 2013). When these abnormalities exceed the ‘average’ or ‘acceptable’ range, also known as clinical cut-offs, and are further accompanied by significant psychological distress and impairments in daily functionality, a diagnosis of a specific psychopathology may be given. Approximately 450 million people worldwide suffer from some form of psychopathology,

with the onset of pervasive disorders (not including developmental and childhood disorders) starting as early as 14 years old (World Health Organization, 2001, 2019).

Psychopathology has traditionally been viewed in terms of disorders with strict clinical cut-offs and classifications, as set by the Diagnostic and Statistical Manual of Mental Disorders (DSM) (American Psychiatric Association, 2013). However, over time, the DSM classifications of disorders have come into heavy criticism due to its practitioner-consensus origins, poor grounds in empirical evidence, and a lack of recognition of variations in symptomology and functioning across individuals (Krueger & Markon, 2006; Lobo & Agius, 2012; Rössler, 2013; Timimi, 2014). Hence, in addition to the clinical cut-offs, mental health is now also viewed as a continuous model, whereby psychological disorders or problems lie on a spectrum, with people experiencing different mental states and different degrees of symptoms on the same spectrum.

This view indicates that besides clinical samples, a normal sample would also fall somewhere on the spectrum and may exhibit certain number of symptoms despite not being at clinical levels, suggesting that investigation of psychopathological variables in normal samples are equally as warranted as clinical samples. Individuals from the normal sample on the spectrum can exhibit symptoms within the average or ‘normal’ range (i.e., no symptoms or minimal symptoms), or within the subclinical range (i.e., above the average or ‘normal’ range of symptoms). Subclinical refers to individuals who do not have sufficient symptoms to meet the clinical cut-offs or clasifications needed to be diagnosed with a disorder but have high enough symptoms to be at risk for developing the disorder in question (Ji, 2012). Normal samples, inclusive of samples obtained from university students, have been shown to have similar types and number of symptoms and similar relations as clinical samples for psychopathological variables such as trauma (Boals, Contractor, & Blumenthal, 2020). This

similarity indicates that subclinical range of symptoms are comparable to clinical range of symptoms, and hence, studying psychopathological variables in normal or subclinical samples could produce similar results and trends as studying them in clinical samples.

Despite majority of the literature using clinical samples when testing clinical variables and impairments, there may also be some value in investigating similar variables in subclinical samples. By doing so, impairments in functionality, cognition, and behaviours that are experienced before symptoms reach severe or clinical levels can be identified. This knowledge can be used to screen for potential disorders and to develop early treatment plans to manage the impairments (Ji, 2012; McCubbin et al., 2016). Symptoms and impairments experienced at subclinical levels can then be prevented from escalating, and this in turn can improve overall mental health and quality of life (Cuijpers et al., 2014; Cuijpers & Smit, 2008; Ji, 2012; McCubbin et al., 2016).

Depression

The Diagnostic and Statistical Manual of Mental Disorders-5th edition (DSM-5) (American Psychiatric Association, 2013) has a total of 21 umbrella-disorders or larger categories of disorders, each consisting of several specific psychopathologies. One example of a common umbrella-disorder is depressive disorders, which refer to an overarching category containing psychopathologies that revolve around moods of sadness, irritableness, and emptiness, along with changes in cognition and physiology, all of which affect functionality negatively. Depression, the primary factor of depressive disorders, is defined as "a fluctuation in normal mood ranging from unhappiness and discontent to an extreme feeling of sadness, pessimism, and despondency" (American Psychological Association, 2013, p. 165).

It is a condition which affects approximately 264 million or 4.4% of the population globally (James et al., 2018; World Health Organization, 2017). From this global depression prevalence, the highest amount was traced back to the South-East Asia region (27%) and the Western Pacific region (21%) (World Health Organization, 2017). Although globally depression is most prevalent among older adults aged 60 to 64 years old, in populations from the United States, highest prevalence was recorded among adolescents aged 15 to 17 years old and young adults aged 18 to 25 years old (Substance Abuse and Mental Health Services Administration, 2019; World Health Organization, 2017). Furthermore, age of onset of depression is highest in young adults (American Psychiatric Association, 2013).

Symptoms of depressive disorders typically include depressed mood, loss of interest in pleasurable activities, changes in psychomotor behaviours (i.e., agitation or retardation), changes in sleep (i.e., insomnia or hypersomnia), changes in weight or appetite (i.e., increase or decrease), difficulty concentrating or making decisions, easily tired, feelings of worthlessness or unreasonable guilt, and suicidal ideation or attempts (American Psychiatric Association, 2013). Besides these symptoms, the other two criteria of depressive disorders are high psychological distress and impairments in functioning (i.e., daily, social, and occupational).

High levels of these symptoms (i.e., 6 symptoms lasting 2 weeks) may classify an individual for a diagnosis of Major Depressive Disorder (MDD), whereas prolonged experience of these symptoms (i.e., 3 symptoms lasting 2 years) results in a diagnosis of Persistent Depressive Disorder (PDD) or dysthymia (American Psychiatric Association, 2013). Above average levels of these symptoms that do not meet the clinical cut-off are viewed as subclinical depression, which are precursors for developing MDD and other mental health issues (Cuijpers et al., 2014; Cuijpers & Smit, 2008; Ji, 2012).

Trauma

Another common umbrella-disorder is trauma and stressor disorders, which refer to an overarching category containing psychopathologies that involve exposure to traumatic events, resulting in psychological distress and changes in cognition and physiology, all of which causes impairments in daily functioning. Trauma, the primary factor of trauma and stressor disorders, is defined as a negative experience that results in high levels of helplessness, fear, confusion, and dissociation, and that changes one's perception that the world is safe, fair, and predictable (American Psychological Association, 2013).

Approximately 70.4% of people globally experience at least one traumatic event in their lifetime (Kessler et al., 2017), but not everyone who experiences a traumatic event develops long-term trauma symptoms. It is estimated that 4% of people globally develop clinical-level trauma symptoms and trauma-related disorders upon exposure to a traumatic event. Globally, there is greater risk of trauma-related disorders developing in adolescents and older adults aged 65 years old and above. However, exposure to the traumatic events that have the highest risk of developing into trauma-related disorders (e.g., intimate partners or sexual violence) occurs most often in young adults aged 17 to 31 years old (Kessler et al., 2017).

Symptoms of trauma-related disorders begin upon exposure to traumatic events. Exposure can take different forms: direct experience, witnessing the event, associations with people who experienced the event, and receiving aversive details of the event repeatedly (American Psychiatric Association, 2013). Trauma symptoms encompass four general areas; re-experiencing of traumatic event, avoidance of trauma related stimuli, having negative thoughts and emotions, and experiencing increased arousal. The first area, re-experiencing

traumatic events, encompasses any involuntary or intrusive memories, dreams, and flashbacks about the traumatic event that causes psychological distress. Avoidance of traumatic stimuli involves avoidance and aversion towards any thoughts, emotions, memories, and cues related to the traumatic event. The area of negative thoughts and emotions includes negative and distorted beliefs, negative and detached feelings, and loss of interest in pleasurable activities. The last area, experiencing increased arousal, is categorized by changes or difficulties in sleeping, attention, control of anger, and decision-making. Two other criteria of trauma-related disorders in addition to exposure and symptoms are high psychological distress and impairments in daily, social, and occupational functioning (American Psychiatric Association, 2013).

According to the American Psychiatric Association (2013), high levels of these symptoms (i.e., 9 symptoms lasting less than 1 month) may be indicative of Acute Stress Disorder. If these symptoms persist (i.e., 6 symptoms lasting 1 month), they may be indicative of Post-Traumatic Stress Disorder (PTSD). Above average levels of these symptoms that do not meet the clinical cut-off are classified as subclinical PTSD or subclinical trauma, which are precursors for developing PTSD (McCubbin et al., 2016).

Comparing Disorders of Depression and Trauma

Depressive disorders and trauma-related disorders are separate umbrella disorders that consists of different types of specific disorders, diagnostic criteria, and aetiology (American Psychiatric Association, 2013). Despite those differences, depressive disorders and trauma-related disorders do share similarities and overlap in certain areas.

Although the symptoms that characterize depressive disorders are focused on mood and the symptoms that characterize trauma disorders are focused on reactions following

trauma, there is an overlap of several symptoms between the two. For example, MDD and PTSD share four symptoms, which are loss of interest in pleasurable activities, feelings of unreasonable guilt, difficulties in sleeping, and difficulties in concentration (American Psychiatric Association, 2013; Flory & Yehuda, 2015). Both also have a similar symptom involving the emotional state, whereby MDD is characterized as experiencing depressed mood, whereas PTSD is characterized as experiencing more general negative mood.

Besides overlap in symptomology, both psychopathologies have impairments in cognitive functioning. Although not included in the DSM-5 diagnostic criteria for disorders related to depression and trauma, both types of psychopathology have been associated with impairments and differences in the domains of executive functioning, processing speed, visuospatial processing, learning abilities, language, attention, and verbal and non-verbal memory recall (Schultz, Sepehry, & Greer, 2018). In addition to these domains, depression and trauma have also been associated with differences in autobiographical memory recall.

Autobiographical Memory, Depression, and Trauma

Differences in Autobiographical Memory

As previously described, autobiographical memories are muldimensional and consist of different facets with varying levels integrated together to form overall coherent recollections (Rubin, 2005). Any difficulties or differences in these facets of autobiographical memories could potentially affect the functions that these memories have, which could in turn affect daily functioning and quality of life.

Individuals with psychological disorders, such as depression and PTSD, have been shown to have differences in some of the facets of autobiographical memory. Although there are many different dimensions and facets of autobiographical memories, only four will be

explored in this thesis. These facets are episodic aspects, semantic aspects, types, and subjective feelings of autobiographical memories.

Differences in Episodic Memories and Semantic Knowledge

Individuals with depression and trauma symptoms have differences in the recall of episodic aspects of memories, such as Individual Life Stories (ILS). ILS are significant autobiographical memories that form the individual's personal narrative (Berntsen & Rubin, 2002). They are events that people narrate to others when asked to describe themselves and their lives. According to the SMS model, ILS are represented at the conceptual self and the higher levels of the autobiographical knowledge base that contains semantic or autobiographical facts about the self (Conway & Jobson, 2012). ILS are primarily utilized for the function of creating and maintaining one's identity, which are the autobiographical facts about oneself, as well as creating emotional bonds (Conway & Jobson, 2012; Habermas, 2012).

ILS usually contain events that are positive and typical, which refers to events that are expected to be experienced by most people in the society (e.g., Berntsen, Rubin, & Siegler, 2011). When imagining future experiences as part of one's ILS, a similar pattern is observed (e.g., Bohn & Berntsen, 2013). However, people with clinical depression and people with more depression and trauma symptoms recall less typical and more negative memories in the ILS (e.g., Dalgleish, Hill, Golden, Morant, & Dunn, 2011; Habermas, Ott, Schubert, Schneider, & Pate, 2008; Rubin et al., 2009).

Those with depression and trauma symptoms may also have differences in semantic aspects of memories, such as Cultural Life Scripts (CLS). CLS are culturally shared semantic knowledge about events that most people experience and society deems as important,

transitional, and occur at predictable ages (Berntsen & Rubin, 2002). They are used as a framework to recall ILS events as well as plan for future events to achieve (Berntsen & Jacobsen, 2008; Rubin & Berntsen, 2003). The CLS is proposed to be able to trigger the autobiographical knowledge base to start the memory search process and create specific memories (Conway & Jobson, 2012). It is able to serve as a trigger or cue due to it being represented as part of the conceptual self and the working self in the SMS model. The CLS is part of the former due to its role as the ILS framework and it being a type of schema of the world, and is part of the latter as the present goal of organizing memories according to societal expectations (Conway & Jobson, 2012).

Generally, people generate CLS events that are positive and typical of the culture they belong to (Berntsen & Rubin, 2004). Higher depression and trauma scores are, however, associated with generating CLS events that are less typical, but this association was concluded to still fall within the normal range (Rubin et al., 2009).

Differences in Types of Autobiographical Memory

Besides differences in episodic and semantic aspects of autobiographical memory, there are differences in the types of autobiographical memories retrieved by people with depression and trauma symptoms. Typically, people recall specific memories, which are unique memories that have occurred at a specific time and place, and contain specific phenomenological and sensory details (Williams et al., 2007). The inability or difficulty in recalling these specific memories results in the recall of overgeneral memories (OGM). OGM refers to autobiographical memories that are summaries or categoric in nature, lack specific phenomenological characteristics, and contain events that occurred longer than a day (Ono, Devilly, & Shum, 2016; Sumner, 2012; Sumner et al., 2010; Williams & Broadbent, 1986).

The recall of specific memories is the product of the completion of the memory search process within the autobiographical knowledge base, which requires the interaction of both the long-term self and working self (Conway & Pleydell-Pearce, 2000; Conway et al., 2004; Williams et al., 2007). Thus, OGM becomes the substitute product of specific memories due to the incompletion of this memory search process. Specific memories tap into all the functions associated with autobiographical memories (i.e., problem solving, identity formation, socialization, and emotion regulation), and, hence, difficulties in recalling specific memories could result in inabilities to perform those functions (Fivush, 2011; Sutherland & Bryant, 2008).

Those with clinical depression and PTSD and those with more depression and trauma symptoms have difficulties retrieving these specific memories and instead retrieve more OGM (e.g., Fisk, Ellis, & Reynolds, 2019; Kleim & Ehlers, 2008; Schönfeld & Ehlers, 2006; Watson, Berntsen, Kuyken, & Watkins, 2013; Williams et al., 2007). In terms of underlying mechanisms, components, such as rumination, functional avoidance, and executive functioning, have been shown to underlie the associations of depression and trauma with OGM and less specific memories independently (e.g., Dalgleish et al., 2007; Liu et al., 2016; Kleim & Ehlers, 2008; Watson et al., 2013).

Differences in Feelings Towards Autobiographical Memories

In addition to differences in episodic, semantic, and types of memories recalled, there also might be differences in how people with depression and trauma symptoms feel about the memories that they retrieve. Psychological distance is how near and recent autobiographical memories feel, independent of actual temporal distance, as well as how similar the past self in the events is to the current self (Ross & Wilson, 2002; Van Boven & Caruso, 2015). It is

quite likely that psychological distance relates to the conceptual self in the SMS model, with the distance of events depending on whether it fits aspects of the conceptual self.

Individuals typically perceive themselves to be closer to memories that are recent and positive, and feel further away from memories that are older and negative. In contrast, those with higher levels of depression perceived themselves to be further away from positive memories, whereas those with higher levels of trauma perceived themselves to be nearer to negative memories (e.g., Janssen et al., 2015).

The Current Thesis

Rationale of Current Thesis

Autobiographical memory differences have been seen in clinical depression and PTSD populations. However, there is a lesser number of studies that have examined subclinical depression and PTSD samples, which means there are large gaps in our understanding of memory recall in these subclinical samples, and how much their memory impairments overlap with clinical samples. Filling these gaps will inform us whether the same type of memory-related difficulties is experienced by both samples, and whether the subclinical samples will likely benefit from the same type of memory-related interventions as the clinical samples.

There is a substantial amount of literature in memory impairments and differences for depression and PTSD populations specifically, as compared to other types of psychopathologies. This large amount of studies suggests that people with depression and PTSD symptoms are more likely to experience memory impairments, along with the difficulties in daily functioning that typically accompanies those impairments. Therefore, there is a high likelihood that the subclinical populations of depression and PTSD will also

experience memory impairments, which increases the importance of studying memory recall in these populations before expanding to the populations of other psychopathologies.

Futhermore, the different facets of autobiographical memory are typically studied individually. However, when considering the multidimensionality of autobiographcial memories, only studying one area or facet is not able to provide information beyond that one area, which makes it more difficult to obtain a macro-level understanding of memory recall. Therefore, investigating several different facets of autobiographical memory will enable a more holistic overview of memory recall and its differences to be established for subclinical depression and PTSD populations.

Research Gaps

Although the literature review has indicated that these differences in autobiographical memory exist in relations to depression and trauma, our current understanding of these areas –why and when these differences exist and the mechanisms involved in these differences– are still minimal. First, the differences in autobiographical memory from the literature were observed mostly for individuals with clinical depression and PTSD. Whether there are differences in autobiographical memory for individuals with subclinical symptoms of depression and PTSD, and how strong these differences will be present, has not been established in detail. Furthermore, it is not yet known how much these differences extend to the systems associated with autobiographical memory.

Second, on the mental health spectrum, the subclinical range exist in between the clinical range and the psychologically healthy range. Whether the autobiographical memory recall of those with subclinical symptoms will be more similar to those with clinical symptoms or those who are psychologically healthy is, however, not yet known. If there are

any variations in autobiographical memory seen among people experiencing subclinical symptoms of depression or PTSD, whether those variations are same or different from the variations seen in clinical samples is still unclear. Third, although depression and PTSD are two distinct psychopathologies, both share similar impairments in cognitive functioning. Whether the variations observed in autobiographical memory recall for individuals with subclinical symptoms of depression will be similar to individuals with subclinical symptoms of PTSD has not been explored in detail.

Fourth, the underlying mechanisms of why these differences in memory recall may exist among individuals with subclinical symptoms of depression and PTSD have not been fully understood yet. Whether similar mechanisms will be observed across the different memory components is also yet to be established. Last, factors that may strengthen or weaken these differences in autobiographical memory recall for people with subclinical depression and subclinical PTSD symptoms are still being investigated, with the weight of their roles yet to be established.

Aim of Current Thesis

In line with these research gaps, the general objective of this thesis is therefore to gain a better understanding into the differences of autobiographical memory recall among individuals with subclinical symptoms of depression and PTSD, the overlap and variations in these differences, the underlying mechanisms of these differences, and the factors that may affect these differences. The specific aim of this thesis is to investigate whether differences in various facets of autobiographical memory may exist in individuals with subclinical depression and PTSD symptoms when compared to psychologically healthy individuals. This thesis aims to examine differences in the (1) episodic and semantic components of

autobiographical memory, (2) types of memory recalled, in terms of specificity, and (3) feelings towards memories, in the context of psychological distance, between individuals with subclinical depression and PTSD symptoms and psychologically healthy individuals. In addition to identifying these differences, the overlap and variation of these memory differences with those observed in clinical samples from the literature will be discussed. Overlaps and variations of these memory differences between subclinical depression and PTSD groups in the current thesis will also be discussed.

Another specific aim of this thesis is to investigate the underlying mechanisms of the differences in autobiographical memory recall among individuals with subclinical symptoms of depression and PTSD. Areas of cognitive functioning will be tested as potential underlying mechanisms of differences in types of memory recalled, and facets of memory phenomenology and emotion regulation will be tested as underlying mechanisms for differences in feelings towards the memory. The last specific aim of this thesis is to identify factors that may strengthen or weaken the differences in autobiographical memory recall among those with subclinical depression and PTSD symptoms. Whether factors such as societal identification (episodic and semantic components), cognitive functioning (types of memory), and memory phenomenology (feelings towards memory) have the ability to strengthen or weaken the differences, respectively, will be explored.

Participants

In the current thesis, participants are recruited from the normal population and conceptualized as subclinical and psychologically healthy groups to examine whether there were clear memory differences upon crossing the subclinical symptom threshold. The subclinical depression group encompasses individuals with above average to high range of

depression symptoms, whereas the corresponding psychologically healthy group encompasses individuals with none to minimal range of depression symptoms. Similarly, the subclinical PTSD group consists of individuals with above average to high range of trauma symptoms, whereas the corresponding psychologically healthy group encompasses individuals with none to minimal range of trauma symptoms.

Cut-off scores from the respective measures were used as opposed to a median split to allocate the participants into subclinical and psychologically healthy groups. To determine subclinical groups (above average symptoms), a fixed cut-off of average and above average depression and trauma symptoms which reflect the norms of the disorder within the general population are needed. This information can be obtained from the cut-offs of the questionnaires, which is the reason this method was selected for subclincal group allocation. Using a median split, on the other hand, would result in the groups being distributed according to the norms of only the current samples, forming high and low groups (sample based) instead of subclinical and psychologically healthy groups (population based).

The choice to use the term subclinical and psychologically healthy groups instead of high and low groups was made because the conceptualization of the latter has too wide of a scope as compared to the former. A “high” group can encompass those who have symptoms (i.e., higher than no symptoms), those who have high symptoms within the sample (i.e., relative to the norms of the current sample), those who have above average symptoms (i.e., relative to the norms of the population), and those with clinical symptoms (i.e., compared to those without clinical symptoms). In comparison, the term “subclinical” refers to those with above average symptoms from normal populations who are at risk for developing psychological disorders (Ji, 2012), which better represents the aims of this thesis.

However, looking at the data in terms of groups only provides information of whether the pattern of relations of one group with certain range of scores (e.g., scores between 1 and 10) are different or same to another group that has a different range of scores (e.g., scores between 11 and 20). It does not provide information about whether individuals within the same group (e.g., a score of 2 versus a score of 7) would have similar pattern in relations, or whether scores with a smaller difference across groups (e.g., a score of 10 versus a score of 11) would have the same pattern in relations as those with a bigger difference across groups (e.g., a score of 1 versus a score of 20). Due to these reasons, the current study also conceptualizes depression and trauma as existing on a continuum, in addition to the categorical conceptualization of subclinical and psychologically healthy groups. Viewing the data both ways enables a more nuanced view of the differences and similarities in the relations to be captured. To accommodate these two approaches, group comparisons, such as independent-samples t-tests and Analyses of Variance (ANOVAs), as well as regression analyses will therefore be conducted.

The current thesis focuses on memory recall in samples of young adults (i.e., 17 to 30 years old), because this age group recorded high prevalences of depression and PTSD, and have high exposure to traumatic events that result in PTSD (Kessler et al., 2017; Substance Abuse and Mental Health Services Administration, 2019; World Health Organization, 2017). Hence, young adults with depression and trauma symptoms are likely to experience the possible autobiographical memory differences and difficulties associated with depression and trauma that we will test in this thesis.

The studies in Chapter 2 require the culture of the participants to be controlled to match a culture or country with an already established CLS. The Malaysian CLS is one of the CLS that has been established from the literature (Janssen & Haque, 2018), and hence, fully

Malaysian samples will be recruited for both studies in that chapter. Malaysia has a depression prevalence ranging between 8% and 10%, and falls into the Western Pacific region, which reported the second highest depression prevalence among the global regions (Ng, 2014; World Health Organization, 2017). Depression appears to be a prevalent psychopathology among the Malaysian population and, hence, is also suitable to be used in studies examining depression. Other studies in this thesis will not control for culture, but will mostly consist of Malaysian participants.

Variables and Components Tested

Each chapter in this thesis examines different areas and components of autobiographical memory, to be able to create a profile of autobiographical memory recall of people with subclinical symptoms of depression and PTSD across episodic components, semantic components, specificity, and subjective closeness. The first and second studies (i.e., Chapter 2) in this thesis investigate differences in CLS and ILS in individuals with subclinical symptoms of depression and PTSD. The studies not only look at general characteristics (i.e., importance and emotional valence) and typicality, but also includes pressure and perceived ability associated with these memory components. The role of societal identification, consisting of collectivism and individualism components, in strengthening or weakening differences in CLS and ILS will be tested.

The third and fourth studies (i.e., Chapter 3) investigate the phenomenon of OGM and memory specificity in individuals with subclinical symptoms of depression and PTSD. The roles of emotion valence (i.e., positive and negative) and intensity (i.e., high and low) of cues and instructions of memory recall (i.e., minimal and specific) on memory specificity of people with subclinical symptoms are also examined. The CaR-FA-X model, consisting of

the components of rumination, functional avoidance, and executive functioning, will be tested as to whether its components could explain, strengthen, or weaken differences in memory specificity.

The fifth study (i.e., Chapter 4) investigates differences in psychological distance of significant memories in individuals with subclinical symptoms of depression and PTSD. The roles of emotion valence (i.e., positive and negative) and age of memory (i.e., recent and remote) on psychological distance of those with subclinical symptoms will be tested. Emotion regulation strategies such as cognitive reappraisal and expressive suppression, and memory phenomenology, such as recollective experience, vantage perspective, emotional intensity, and centrality, are also examined as to whether they could explain, strengthen, or weaken differences in psychological distance.

Materials and Analyses Used

Materials. The studies included in Chapters 2, 3, and 4 will be conducted using the desktop computers in the research laboratory of the university, except for Study 2 in Chapter 2, which is a fully online study that participants can complete remotely. All the other studies are conducted in a safe and private space within the research laboratory because the tasks require participants to retrieve and provide personal and sensitive memories, whereas Study 2 does not require such information, and hence, can be completed outside laboratory settings.

All memory tasks and questionnaires in the studies in Chapters 2, 3, and 4 will be administered using the Qualtrics survey software. In Chapter 3, the experimental tasks (i.e., executive functioning tasks) will be run using Psychopy software (version 2) in Study 3 and Presentation experimental software in Study 4. The memory tasks, experimental tasks, and questionnaires used in the current thesis are selected because the literature on the respective

areas that are being measured also used similar tasks, in addition to having good reliability scores.

Analyses. IBM SPSS Statistics (version 25) will be used for all statistical analyses in this thesis. To accommodate both categorical and continuous approaches, a wide range of analyses will be employed. Group differences will be analysed using independent-samples t-tests, whereas interactions between variables will be analysed using either between- or within-subjects analyses of variance (ANOVAs). Predictive effects on changes in dependent variables will be tested using linear regressions and associations between variables will be tested using Pearson's correlation coefficients.

Mediation analyses will be conducted in Chapters 3 and 4 to test whether a variable (i.e., the mediator) is able to explain the relation between the independent variable and dependent variable (Hayes, 2013; Jose, 2013). Two hierarchical linear regressions (i.e., Regression 1: only IV; Regression 2: mediator in first step, and IV in second step) and a Sobel test (i.e., to determine whether the variance of Regression 1 is significantly different from the change of variance in Regression 2, which would indicate a mediation effect) are used to analyse the mediations. Moderation analyses will be conducted in Chapters 2, 3, and 4 to test whether a variable (i.e., the moderator) interacts with the independent variable to strengthen or weaken an existing significant relation, or lead a previously not significant relation to become significant (Hayes, 2013; Jose, 2013). The PROCESS macro, an extension software in IBM SPSS Statistics, will be used to analyse the moderations.

Because multiple analyses of similar nature are conducted in each study, the results will be corrected using Bonferroni to avoid family-wise errors (Field, 2009). Bonferroni corrections will be applied for all analyses involving group differences, predictive effects, and associations. The current thesis reports the results prior to and after Bonferroni

corrections in the Results sections, but discusses the results as per after Bonferroni corrections in the Discussion sections. The reason both type of results are reported is because the alpha value of the Bonferroni is not a standardized value, and instead varies according to the number of similar analyses conducted in the study. The results prior to Bonferroni correction can provide insight for future researchers about whether relations exist when taking into account the test individually, which can help them to decide future research directions. Meanwhile, results after Bonferroni correction provided insight into overall findings in the context of the current respective studies. Corrections are also done for independent-samples t-tests. One of the assumptions of t-test is that the variances of the groups need to be equal (Field, 2009). When this assumption is not met, Welch's test for unequal variance is used instead of independent-samples t-tests.

Implications

The results obtained from studying different areas of autobiographical memory recall in this thesis can be used to gain a holistic understanding of autobiographical memory recall among individuals with subclinical symptoms of depression and PTSD, which is needed to build a more complete and coherent theoretical framework of memory recall for these populations. The findings also will provide insight into overlaps of memory impairments with clinical populations, which could inform whether similar daily functioning difficulties arising from memory impairments are experienced, and whether the current memory-related interventions and trainings used for clinical populations would also be suited for subclinical populations.

The theoratical findings could also have implications for the diagnosis and treatment of these disorders. The findings can contribute to the framework of symptoms and deficits

experienced in depressive and trauma-based disorders, and they can be used to improve diagnostics of MDD and PTSD. For example, prevalent and pervasive autobiographical memory differences and impairments could be evaluated as additional symptoms of MDD and PTSD, or they can be used to screen for the potential development of MDD and PTSD in the future. Screening for possible depression and PTSD at subclinical levels could identify people at risk and enable them to seek psychological help early, and hence, reduce the risk of these symptoms exacerbating to clinical levels (e.g., Leaman, Kearns, & Rothbaum, 2013; Muñoz, Beardslee, & Leykin, 2012).

The findings from the current thesis can also provide insight into the strength of memory difficulties and impairments specifically experienced by people who have subclinical levels of depression and PTSD. These results can help identify the possible autobiographical memory functions that may also be affected from the memory difficulties, to obtain a clearer view of the effects of the memory difficulties on overall daily functioning, worsening of symptoms, and well-being. By doing so, the importance and relevance of creating and implementing memory focused interventions for subclinical populations can be established. Furthermore, by examining how similar or different autobiographical memory recall and difficulties are between clinical (from the literature) and subclinical samples, the findings from the current thesis could further shed light into the appropriateness of using similar memory focused interventions for both clinical and subclinical populations.

Besides these implications, clinical interventions for individuals with subclinical depression and PTSD can be modified to accommodate difficulties in autobiographical memory retrieval that may be observed in the findings of the current thesis. Psychotherapy modalities and techniques that rely on autobiographical memory recall could be substituted with other modalities and techniques that rely less on memory recall for those with

subclinical symptoms. For example, psychotherapy modalities such as narrative therapy and psychodynamic therapy use the recall of autobiographical memories, in terms of narratives, memory details, and associated feelings, to explore and understand the issues and life of the individual, as well as manage their issues and improve overall well-being (Corey, 2013). However, if there are deficits in autobiographical memory recall for subclinical populations, other psychotherapies that do not primarily rely on the recall of memories could be used instead, such as cognitive behavioural therapy, existential therapy, and solution-focused therapy. In another example, cognitive behavioural therapy uses the recall of autobiographical memory as a technique to oppose inaccurate beliefs and thoughts, and in turn, generate new adaptive beliefs and thoughts (Beck, 1995). In the event of difficulties in recalling the required memories, this technique could be modified to use imaginative and hypothetical situations or vicarious experiences instead. Therefore, by having a better understanding of their memory recall, appropriate modalities and techniques can be selected or modified for the psychotherapy of individuals with subclinical symptoms.

Chapter 2: Depression, Trauma, Cultural Life Scripts, and Individual Life Stories

Two prominent facets of autobiographical memories are their episodic and semantic aspects. An example of an episodic aspect of autobiographical memory is the Individual Life Story, whereas an example of a semantic aspect is the Cultural Life Script. Individual Life Stories (ILS) are experienced personal narratives, whereas Cultural Life Scripts (CLS) are series of events that are expected by a culture to occur in a typical individual's life and are used to structure the recall of autobiographical memories in the ILS and in the formation of future goals. The events in the CLS are often expected to occur in the second and third decades of life, are positive in nature, and stable within cultures. Although CLS are –unlike autobiographical memories– semantic knowledge, differences in CLS characteristics for individuals with subclinical levels of depression and PTSD have not been fully understood yet. Differences in ILS are related to depression and trauma in older samples but not younger samples, due to a lack of experiencing many ILS events for the latter. Whether allowing younger samples to include future ILS events in addition to experienced ILS events would produce those differences and relations to depression and trauma, as seen in older samples, has not been studied. The differences in societal pressures and perceived ability in regard to achieving events in the CLS and the ILS among those with subclinical depression and PTSD symptoms have also not been explored. Societal identification has been theorized to affect memory recall, but its influence on CLS and ILS has yet to be tested. The present study aims to address these gaps of knowledge, which limit our understanding of the implications that CLS may have on mental health, and, hence, the application of this concept into clinical settings.

Background

Reminiscence Bump

Although memories are expected to be stored throughout one's lifespan, the retrieval of autobiographical memories is not equally distributed throughout the lifespan. When individuals were asked to recall significant events from their lives, it was observed that a larger part of the memories were retrieved from the second and third decades of life (Rubin & Schulkind, 1997a, 1997b). This distribution of important events forms a bump in the temporal distribution of the recall of autobiographical memories, known as the reminiscence bump (Berntsen & Rubin, 2002; Rubin, Wetzler, & Nebes, 1986). The reminiscence bump for important memories has been shown to exist for positive and transitional memories but not negative memories (Berntsen & Rubin, 2002; Dickson, Pillemer, & Bruehl, 2011; Glück & Bluck, 2007).

Several hypotheses have been proposed to explain the reminiscence bump in the distribution of important events (Berntsen & Rubin, 2002). The first hypothesis is the cognitive account, which states that novel events form the reminiscence bump. Novel events have a higher likelihood of being processed and remembered due to their distinctiveness, and its usage as reference points for future encounters increases the recall of those memories. The second hypothesis is the identity-formation account, which proposes the reminiscence bump consists of identity-related memories. Autobiographical memories are used as references and evidence when forming one's identity or self-concepts, which means that these memories will be recalled more often when defining and describing the self (Conway & Pleydell-Pearce, 2000). Both novel memories and memories related to identity are formed during the second and third decades of life, indicating that memories from this time frame will be recalled more

often, in line with the reminiscence bump. The last hypothesis is the cultural life script account (Berntsen & Rubin, 2002).

Cultural Life Scripts

Cultural life scripts (CLS) consist of events in an individual's lifespan which are determined and sanctioned by culture to be important, transitional, and expected to occur within a specified age range (Berntsen & Rubin, 2002). These life scripts are culturally shared semantic knowledge of agreed upon events expected to be experienced by most people within their society at a specific time in their lives (Berntsen & Rubin, 2002). For example, on average across several different cultures (i.e., the United States, Denmark, Australia, and Malaysia), graduation from university is a life script event that is expected to be achieved between the ages of 22 and 23 years; beginning one's first fulltime job is believed to happen between the ages of 21 and 25 years; and marriage is expected to occur approximately between the ages of 26 and 28 years (Berntsen & Rubin, 2004; Janssen & Haque, 2018; Rubin et al., 2009). Events that do not have a specific age range for occurrence, such as death of a loved one or getting a promotion, are less likely to be included as a CLS event.

Berntsen and Rubin (2004) compiled a total of ten properties and characteristics of a CLS, of which the first six characteristics were derived from Schank and Abelson (1977). These CLS characteristics are,: (1) semantic knowledge specific to a certain culture or society; (2) has a temporal distribution; (3) has a specific order of occurrence; (4) described based on specific slots and requirements; (5) these slots and requirements are based on culturally expected events and timing; (6) can process life stories; (7) transmitted from generation to generation within the society; (8) represents an idealized life; (9) favours positive events; and (10) favours events that typically occur in late adolescence and early

adulthood. These characteristics of the CLS enable it to function as a framework for the recall and narration of one's life narratives (Berntsen & Rubin, 2004). Moreover, manipulating information of CLS events has been shown to result in changes in future life goals (Berntsen & Jacobsen, 2008; Shanahan & Busseri, 2016).

When asked to retrieve important events, the CLS, which contains more events from adolescence and early adulthood is used as a framework for recall, and thus creating the reminiscence bump for the second and third decades of life (Koppel & Berntsen, 2015, 2016; Rubin & Schulkind, 1997a). Berntsen and Rubin (2002) asked participants to recall their most important, happy, sad, and traumatic memories, and found that the reminiscence bump was seen only for happiest and most important memories. This finding provides further support for the CLS as an explanation for the reminiscence bump. As CLS consist of predominantly positive and important events from the second and third decades of life, significant positive memories that occurred during this age range are likely to be rehearsed more often, which leads to easier and higher recall of these memories. Negative memories are less likely to be rehearsed due to less social acceptance and normality. Even when life narratives were viewed as chapters rather than individual events, a reminiscence bump consisting of CLS events was observed (Thomsen & Berntsen, 2008).

Previous studies have investigated the content and the characteristics of CLS across many cultures such as Australia, China, Denmark, Germany, Greenland, Japan, Malaysia, Mexico, the Netherlands, Qatar, Trinidad & Tobago, Turkey, and the United States (Alea, Ali, & Marcano, 2014, Berntsen & Rubin, 2004; Bohn, 2010; Coleman, 2014; Erdoğan, Baran, Avlar, Taş, & Tekcan, 2008; Grysman & Dimakis, 2018; Habermas, 2007, Study 2; Hatiboğlu & Habermas, 2016; Janssen, 2015; Janssen & Haque, 2018; Janssen & Rubin, 2011; Janssen, Uemiya, & Naka, 2014; Kawasaki & Uehara, 2020; Ottsen & Berntsen, 2014;

Rubin et al., 2009; Tekcan, Kaya-Kızılöz, & Odaman, 2012; Zaragoza Scherman, Salgado, Shao, & Berntsen, 2017).

These studies have found that there are some culture-specific differences in the types of events listed, such as Seijinshiki ceremony and Shichi-go-san festival in the Japanese CLS, facing discrimination in the African-American CLS, Hajj pilgrimage in the Qatar CLS, military service in the Turkish CLS, and confirmation in the Danish and German CLS. Despite the culture-specific differences, these studies showed that there are large overlaps of the events and characteristics of the CLS, including listing more positive events and more events from the second and third decades of life. This bump was not observed for negative events, which were distributed more equally throughout the lifespan and did not have a fixed temporal point (Rubin & Berntsen, 2003). Besides a lower rate of rehearsal and higher social censure, negative events tend to be more unpredictable and not linked to a specific age range, which leads individuals to select positive predictable events when asked about their CLS (Berntsen & Rubin, 2002; Dickson et al., 2011).

Tekcan et al. (2012) discovered that the CLS of older adults were different from the young and middle-aged adults, whereby the older adults in their Turkish sample reported more typical and positive events. However, Janssen and Rubin (2011) and Janssen et al. (2014) did not find substantial differences in the CLS between young, middle-aged, and older adults in Dutch and Japanese samples. Bohn (2010) found that older adults reported less typical and idealistic events in the CLS than the younger adults in their Danish sample, but these differences were concluded as normal due to the higher experienced events and lower idealism of the older adults. Similarly, CLS was also found to not vary substantially despite differences in gender and education levels (Janssen & Rubin, 2011; Janssen et al., 2014). These findings provide evidence that CLS are reasonably stable across age, gender, and

education levels when individuals are from the same cultural background, corroborating that CLS are culturally semantic in nature.

Individual Life Stories

The CLS are not to be confused with individual life stories (ILS), which are episodic memories of personally experienced events and personal narratives (Berntsen & Rubin, 2002). The ILS contain events that are important and central, and are what we narrate to others when asked to describe ourselves and our lives. The ILS is typically retrieved and narrated in the form of individual significant events. Alternatively, the ILS can also be narrated as chapters, which are periods of time that contain a cluster of ILS individual events that may be organized by age, temporal time, or themes (Thomsen & Berntsen, 2008). It has a reminiscence bump for the positive events that peaks at late adolescence and early adulthood, and a recency effect for the negative events (Berntsen et al., 2011; Glück & Bluck, 2007; Thomsen & Berntsen, 2008). Positive events become part of the ILS due to them matching societal expectations and being part of the CLS, whereas negative events become part of the ILS due to the emotional distress they produce (Berntsen et al., 2011).

The function of CLS as a framework for ILS recall indicates that a large number of the memories in the ILS should overlap with the events of the CLS. However, it is still possible for unexpected transitional events to be included in a personal narrative but not in the CLS (Berntsen & Rubin, 2002). The CLS do not determine which memories are encoded; rather they are used as a framework for recall during the self-narration of autobiographical memories (Rubin & Berntsen, 2003). Regardless whether their ILS matches the CLS, it is expected that individuals do possess the knowledge of societal expectations of events and age norms and whether they meet or stray from these norms (Berntsen & Rubin, 2004).

Scripts, Stories, Depression, and Trauma

Associations between depression and trauma with CLS and ILS characteristics have been examined in the literature. Rubin et al. (2009) theorised that the ILS may vary from the CLS with different levels of psychological functioning, due to differences in centrality and identification with experienced events in the ILS. To test this theory, they asked Danish and American undergraduates to list and rate seven significant events in a prototypical infants' life and seven significant events they had experienced in their own lives, and measured their depression and trauma levels. From the CLS and ILS obtained from the participants, they calculated typicality scores, which referred to how much the generated CLS and ILS matched the average CLS of their respective cultures.

For both samples, higher depression and trauma scores were associated with ILS that were less positive. Higher depression and trauma related to lower typicality of ILS in the Danish sample, but not the American sample. The American sample (18–28 years old) was younger than the Danish sample (21–49 years old), and, therefore the absence of the effect in the American sample was attributed to them not having experienced a sufficient number of CLS events yet, which meant the participants were unable to include those events into their ILS, despite being aware that the event was a typical CLS event. They also found that higher depression related to low CLS typicality in the Danish sample, and higher trauma related to more negative CLS in the American sample and low CLS typicality for both samples. However, because there were less associations between measures of depression and trauma with CLS characteristics as compared to ILS characteristics, Rubin et al. (2009) concluded that the CLS is still stable and varies less amongst individuals regardless of the levels of psychological functioning.

Rubin, Boals, and Berntsen (2008) studied the differences in characteristics and typicality of CLS and ILS between high and low trauma groups in a sample of undergraduate students. Similar methods were used as Rubin et al. (2009) to elicit the CLS and ILS, but the Autobiographical Memory Questionnaire – a self-report questionnaire that is used to measure facets of memory phenomenology – was used to rate the ILS instead of the characteristics questions that typically accompany these tasks. Individuals with higher and lower trauma both generated CLS events that had similar importance, valence, and typicality. There were also no differences in importance and valence of ILS events between those with high and low trauma.

Using similar methodology as Rubin et al. (2009), Jørgensen et al (2012) investigated the characteristics and typicality of CLS and ILS and depression levels in populations with Borderline Personality Disorder, Obsessive Compulsive Disorder, and controls. Borderline Personality Disorder is characterized as having significant impulsivity and unpredictable mood, self-perceptions, and relationships with others, whereas Obsessive Compulsive Disorder involve intrusive and repetitive thoughts or urges (i.e., obsessions) and repetitive and rigid behaviours in response to the obsessions (i.e., compulsions) (American Psychiatric Association, 2013). Across all groups, higher depression predicted more negative events retrieved in the ILS, but it did not predict the typicality of the CLS and ILS. However, the presence of Borderline Personality Disorder and Obsessive Compulsive Disorder in the samples used raises the possibility that any associations (or lack of associations) observed may reflect Borderline Personality Disorder symptoms and Obsessive Compulsive Disorder symptoms instead of depressive symptoms.

Bohn (2010) studied the associations of ILS characteristics and typicality with depression in young and older adults from the normal population. Having more negative ILS

events related to higher depression for the younger group but not the older group. The lack of association between depression and negative ILS in the older group was explained to be due to the ILS becoming less idealistic and positive with age, independent of depression levels. There were no associations between typicality of ILS with depression for both age groups.

When Habermas et al. (2008) and Jobson et al. (2018) looked into the ILS events and chapters retrieved by middle-aged and older clinically depressed and control groups in German, British, and Malaysian samples, they found that the depressed groups recalled less typical and more negative ILS events or chapters than the control groups. Fromholt et al. (2003) tested ILS recall between groups with clinical depression, dementia, centenarians, and 80-year-old controls. The clinical depression group recalled more negative ILS events as compared to the other groups. Dalgleish et al. (2011) similarly asked clinically depressed, remitted, and controlled groups to produce ILS in the form of chapters or themes, and found that the depressed group retrieved more negative ILS chapters, themes, and events. Associations between depression and the recall of higher negative events in the ILS were suggested to occur due to people with higher depression experiencing more negative events in their life (Bohn, 2010; da Silva et al., 2016) and having a higher negative attentional bias (Dalgleish et al., 2011), which makes these negative events more accessible during retrieval of ILS.

The literature suggests that the characteristics of the CLS appear to be stable across different levels of depression and trauma, which is in line with the CLS being semantic knowledge that does not vary greatly within the respective cultures. For the ILS, individuals with depression symptoms appear to retrieve more negative events and chapters in their ILS. However, there were mixed findings for the associations of depression with typicality of the ILS, and the associations of trauma with typicality and emotional valence of the ILS.

Pressure to achieve the CLS and ILS

The narration of the ILS has been shown to be shaped by the CLS (Rubin & Berntsen, 2003), and CLS are semantic knowledge suggested to be learnt from society (Berntsen & Rubin, 2002). Bandura's Social Learning Theory, also known as social cognitive theory, theorizes that people not only learn from their own direct experiences but are also able to learn from observing the experiences of others (i.e., vicarious experiences) and the occurrences in the surrounding environment (Bandura, 1977). Besides observations, people are also theorized to learn from the verbal suggestions, comments, and feedback provided from other people in the same environment.

Janssen and Haque (2018) found that, following Bandura's (1977) Social Learning Theory, CLS could be transmitted via vicarious experiences and via comments and feedback from family and friends. Comments and feedback from society are likely to help clarify expectations about which events are important or typical and when they are supposed to experience these events, but also increase the pressure to achieve these events at those ages. Pressure refers to excessive demands and expectations, that can either be real or imagined, by an external group or individual, for a person to think or behave in a certain manner (American Psychological Association, 2013). Societal norms and expectations have been associated with societal pressure to perform and meet those expectations (Ajzen, 1991). Hence, although everyone is expected to possess information regarding the CLS, the pressures to fulfil these societal expectations may vary.

Rubin et al. (2009) suggested that being unaware or disconnected from these societal expectations about which events people are expected to achieve and its associated ages may be linked to higher levels of emotional distress. In line with that suggestion, people with

depression have been shown to be more disconnected from society and demonstrate higher apathy towards expectations and pressure from society (Cruwys, Alexander Haslam, Dingle, Haslam, & Jetten, 2014; Taylor & Vaughan, 1967). Therefore, it is possible that those with higher depression and trauma symptoms also experience a disconnect or unawareness towards the societal expectations of the CLS, which may manifest in differences of typicality and pressure for both the CLS and ILS.

Hence, pressure to meet these societal expectations and achieve the events in the CLS and ILS may be important characteristics to take into account, but previous studies have not explored this facet yet. Especially, the pressure to achieve life events expected by society may be the highest among young adults, because many CLS events are supposed to occur in early adulthood (Berntsen & Rubin, 2004).

Societal identification

How much the comments and feedback regarding typical CLS events become ingrained and how much a person experiences pressure towards those expectations could also depend on identification with society or collectivism. Collectivism refers to viewing oneself as part of the group or society and bound by the norms and expectations of the society with which one identifies (Triandis, 1995). Individualism, on the other hand, refers to focusing on the wants, needs, and expectations of the self, prior to those of the society.

Both collectivism and individualism can be further divided into vertical dimensions, which are the perceptions of hierarchies and everyone being different from each other; and horizontal dimensions, which are perceptions of equality and everyone being same as each other. People who have high horizontal collectivism believe they and others within the group have the same personal goals as the group they belong to, whereas those with high vertical

collectivism perceive that they have different personal goals which they need to conform and sacrifice for the group goals. Meanwhile, people with high horizontal individualism want to achieve their own goals but are content with performing and achieving equally as others, whereas those with high vertical individualism similarly want to achieve their own goals but seek to outperform and be better than others (Triandis, 1995).

Although collectivism and individualism were previously theorized as opposite ends of the same spectrum, these components have been shown not to be mutually exclusive (Paquet & Kline, 2009; Triandis, 1995; Triandis & Gelfland, 1998). This co-existence of the components means individuals can prioritize expectations and goals of the society without neglecting the goals of the individual. Higher collectivism is, however, related to higher adherence towards the norms and expectations of the society (Fukushima, Sharp, & Kobayashi, 2009). This finding indicates that those with higher collectivism may also be more aware of societal norms and expectations, such as typical CLS events, and this higher identification with society may further induce more pressure to meet the expectations by the society as it is viewed as important.

Perceived ability of achieving the CLS and ILS

Despite being expected by society to achieve events in the CLS at the specified ages, an individual may perceive that they are not able to meet those expectations. Perceived ability is similar to self-efficacy, which refers to an individual's perception and confidence of having the ability to engage in actions and behaviours needed to achieve certain goals and outcomes (Ajzen, 1991; Bandura, 1977). Although perception of one's abilities differs accordingly with each situation or event, people with depression and trauma have been shown to exhibit lower

self-efficacy in general (Diehl & Prout, 2002; Kanfer & Zeiss, 1983; Saigh, Mroueh, Zimmerman, & Fairbank, 1995).

To investigate the CLS of middle and late adulthood, Grysman and Dimakis (2018) asked middle-aged and older adults to list seven significant events in a prototypical middle and late adults' life, and compared them to components of well-being. Although typicality of CLS was not related to any of the well-being measures, generating more positive events in the CLS and having higher perceived ability to achieve the events in the CLS predicted higher facets of well-being.

Study 1

The Current Study

The purpose of the current study was to investigate how individuals with subclinical depression and PTSD symptoms may process CLS and ILS differently as compared to psychologically healthy individuals. The current study also aimed to explore whether the additional characteristics of pressure and ability related to achieving the CLS and ILS would be different among individuals with subclinical depression and PTSD symptoms. Last, the study aimed to investigate the role of societal identification on the relations of depression and trauma with the CLS and ILS.

The outcomes from this study could provide insight into the processing of culturally obtained semantic information among individuals with mental health concerns. CLS serve as the underlying mechanism for the recall of autobiographical memories and the formation of future goals (Berntsen & Jacobsen, 2008; Rubin & Berntsen, 2003), and the results of this study can be used to provide better understanding of the differences in the recall of autobiographical memories and future-directed behaviour between individuals with a risk of

developing mental health issues and individuals without mental health issues. Furthermore, the results of this study will be able to ascertain the significance of societal pressure and perceived ability of memory components in regards to mental health issues, which could be applied into creating more focused treatment for mental health issues.

Although Rubin et al. (2009) and Habermas et al. (2008) found associations between typicality of ILS with depression and trauma in older samples, this result was not replicated in the younger sample. The lack of observed effect in the younger sample of Rubin et al. (2009)'s study was suggested to be due to participants being unable to include typical events that they had not experienced in their ILS, despite being aware that the event is typical. Modifying the ILS task to include future events may provide insight into future-directed goals and reduce possible pre-existing discrepancies between CLS and ILS in a young adult sample that have not experienced many of the events, although this modification has not been tested yet.

Individuals with clinical or higher depression and trauma symptoms have been shown to display a negative attentional bias and greater ease at recalling negative autobiographical memories, causing more negative events to be included into the ILS (Bohn, 2010; Dalgleish et al., 2011; Fromholt et al., 2003; Habermas et al., 2008; Jobson et al., 2018; Jørgensen et al., 2012; Rubin et al., 2009). However, CLS are –unlike autobiographical memories– semantic knowledge, and are stable across age, gender, and education (Janssen & Rubin, 2011; Janssen et al., 2014). Characteristics of the CLS have been shown not to differ for individuals with higher and lower trauma groups from the normal population (Rubin et al., 2008), but whether there are differences in characteristics of the CLS for individuals with subclinical levels of depression has not been investigated.

Rubin et al. (2009) found associations between depression and trauma symptoms and typicality of the ILS, and further hypothesized that low typicality of the ILS indicates that individuals are also less aware of the typical events in the CLS. Contradictory to that hypothesis, Rubin et al. (2008) did not find any differences in CLS typicality for high and low trauma groups from the normal population. However, differences in typicality of CLS for individuals with subclinical depression symptoms has not been explored in detail. Expanding upon the studies that found higher depression symptoms related to less typical ILS (Habermas et al., 2008; Rubin et al., 2009), it would be valuable to investigate whether individuals with subclinical depression symptoms would also display an atypical CLS, as the recall of ILS are influenced by CLS.

Janssen and Haque (2018) found that expectations regarding the CLS are transmitted and clarified via family and friends, which in turn could increase the pressure to achieve the CLS as well as the ILS. Individuals with clinical depression have been shown to become disconnected and develop apathy towards societal expectations and pressures (Cruwys Alexander Haslam, Dingle, Haslam, et al., 2014; Taylor & Vaughan, 1967), but whether those with subclinical depression and PTSD symptoms would also display apathy towards societal pressures to achieve events in CLS and ILS has not been studied yet. Societal identification is associated with adherence to society's expectations (Fukushima et al., 2009), which relates to areas, such as knowledge and pressures of societal expectations. However, the role of societal identification towards the awareness of typical CLS and ILS events and pressure of achieving CLS and ILS events experienced by those with higher depression and trauma symptoms have not been explored. Lower perceived ability of achieving CLS events has been shown to relate to poorer well-being (Grysman & Dimakis, 2018). Although people with depression and trauma have lower self-efficacy (Diehl & Prout, 2002; Kanfer & Zeiss,

1983; Saigh et al., 1995), it is not known whether there would also be differences in perceived ability to achieve the CLS and ILS.

Based on the review of previous literature, the research questions that we aim to answer in our study include:

1) Are there differences in the characteristics (i.e., importance, emotional valence) of the CLS generated between individuals with subclinical levels of depression and PTSD and psychologically healthy individuals?
2) Are there differences in the typicality of the CLS between individuals with subclinical levels of depression and PTSD and those who are psychologically healthy?
3) Are there differences in the typicality of the ILS (consisting of past and future events) between individuals with subclinical levels of depression and PTSD and those who are psychologically healthy?
4) Are there differences in the pressure and perceived ability towards the CLS and ILS between individuals with subclinical levels of depression and PTSD and those who are psychologically healthy?
5) Will collectivism moderate the relations between depression and trauma with CLS and ILS typicality and pressure?

Based on these research questions and the previous findings, we hypothesized for our current study that:

1) Because CLS is semantic knowledge, the characteristics of the CLS (i.e., importance, emotional valence) generated by individuals with subclinical levels of depression and PTSD will be similar to those generated by psychologically healthy individuals.

2) As a result, individuals with subclinical levels of depression and PTSD will have similar typicality of the CLS as those who are psychologically healthy.
3) Individuals with subclinical levels of depression and PTSD will report a less typical ILS (consisting of past and future events) than those who are psychologically healthy.
4) Individuals with subclinical levels of depression and PTSD will associate less pressure and perceived ability towards achieving CLS and ILS events than those who are psychologically healthy.
5) Collectivism will moderate the relations between depression and trauma with CLS and ILS typicality and pressure.

To test these hypotheses, Malaysian participants were asked to describe and rate seven significant events experienced by a prototypical infant from their culture, and seven significant events they had experienced or would experience in their own lifetime. Participants then answered the Depression Anxiety and Stress Scales, the PTSD Checklist for DSM-5, and the Individualism and Collectivism Scale.

Method

Participants

CLS have been found to relate to the reminiscence bump, which indicates that individuals experience a large amount of important, positive, and transitional events during the second and third decades in life (Rubin & Schulkind, 1997a, 1997b; Berntsen & Rubin, 2004). To obtain a mixture of experienced past life events and imagined future life events, a sample within the age range of 18 to 29 years appeared the most appropriate. It was also expected that the societal pressure to fulfil these events would be highest among this age

group. To study differences in types and characteristics of CLS events generated, the culture of the sample needs to be controlled for ease of comparison between the sample and the standard measures, and the culture chosen needs to have existing CLS measures to be compared against. Because of these reasons, only participants with a Malaysian background were included in the current study.

Power analysis with a medium effect size of .50, an alpha of .05, and a beta of .20 (to give a power of .80) indicated that 102 participants would be needed to reach statistical significance in an independent-samples t-test. For all studies, only the power analyses of the t-test are reported because the number of participants needed to achieve statistical significance for the other analyses (i.e., correlation and regression) are lower, and hence are already encompassed within the sample size of the t-test.

One-hundred fifty-two students from the University of Nottingham Malaysia were recruited for this study. Twenty-seven participants were excluded from the analyses due to errors in answering the CLS task (three listed recurrent religious events; five listed recurrent daily activities; three listed personal experiences; two listed all events from the same developmental stage; one listed emotions; thirteen made errors in categorization and ratings of events). An example of errors in categorization would be if the participant retrieved an event about starting university but categorized it as ‘marriage’, whereas an example of errors in rating would be if the participant retrieved an event categorized as ‘birth’ but allocated the age at which the event occurs as 10 years old. Another five participants were excluded from the analyses due to listing personality traits and self-concepts in the Individual Life Story task. The remaining 120 participants had a mean age of 20.49 (*SD* = 2.10, range = 18-29), and the sample consisted of 35 males and 85 females. As explained in the previous chapter, the data is conceptualized as both categorical groups and as existing on a continuum.

Materials

Cultural Life Script task. To record the CLS, the methodology from Berntsen and Rubin (2004) was used. In the Cultural Life Script (CLS) task, participants were asked to describe seven important events that would most likely occur in a prototypical infant's life from their culture from birth to death. Subsequently, they were given the events back one-by-one. Participants categorized the events they had listed into 50 pre-existing options derived from Rubin et al. (2009), Janssen and Rubin (2011), and Janssen and Haque (2018). If the event retrieved by the participants did not fit into any of the pre-existing categories, they were asked to categorize the event as 'other'. They then rated the prevalence of the event measured by number of people that will experience the event (0-100 people) and the expected age at occurrence (0-120 years old), and whether they had personally experienced the event ('yes' or 'no'). Seven-point Likert scales were used to rate the events on importance (1 = 'unimportant' to 7 = 'of greatest importance') and emotional valence (-3 = 'very negative' to 3 = 'very positive'). To measure societal pressure and perceived ability to achieve the events, ratings on societal expectations (1 = 'no pressure' to 7 = 'extreme pressure') and perceived ability to achieve the event (1 = 'very unlikely' to 7 = 'extremely likely') were added to the list of ratings.

Individual Life Story task. To gather information of the ILS, the methodology from Rubin et al. (2009) was used. To reduce possible pre-existing discrepancies between the CLS and ILS, the instructions of the Individual Life Story (ILS) task was modified to accommodate the imagined component of the ILS, as the sample consisted of young adults who may not have experienced many of the events in the CLS. Participants were therefore asked to describe seven significant events that they had experienced or expected that they

would experience in their lifetime. Similar to the CLS Task, participants subsequently categorized the events and rated them on prevalence, (expected) age at occurrence, experience of event, importance, emotional valence, societal pressure, and perceived ability. Whereas the item on societal pressure in the CLS task asks about general societal pressure, the societal pressure item in the ILS task specifies pressure related to society, family, and friends.

Depression Anxiety and Stress Scales (DASS-21). The DASS-21 (Lovibond & Lovibond, 1993) is a 21-item instrument developed to assess the presence of symptoms of depression, anxiety, and stress/tension in the previous week (refer to Appendix A). It consists of a four-point Likert scale (0-3). Because the DASS-21 is the short form of the 42-item DASS, scores need to be doubled. Total scores for each domain range between 0 and 42, with higher scores reflecting a higher magnitude of symptoms. Total depression score was obtained by adding the items in the depression domain, with cut-off scores of 10 indicating a higher-than-average (i.e., mild to extremely severe) range of symptoms. This scale has Cronbach's alphas of .94 for the depression domain (Antony, Bieling, Cox, Enns, & Swinson, 1998).

The PTSD Checklist for DSM-5 (PCL-5). The PCL-5 (Weathers et al., 2013) is a 20-item instrument developed to screen individuals with PTSD symptoms (refer to Appendix B). It consists of a five-point Likert scale (0-4), and PTSD symptom severity scores are obtained by summing all the items. Total score ranges from 0 to 80, and a higher total score reflects stronger PTSD symptom severity. A cut-off score of 33 indicates clinical levels of PTSD symptoms. This scale has a Cronbach's alpha of .94 and a one-week test-retest reliability of .82 (Blevins, Weathers, Davis, Witte, & Domino, 2015). All studies in this thesis used the PCL-5 scale to measure trauma.

Individualism and Collectivism Scale. The Individualism and Collectivism Scale (Triandis & Gelfland, 1998) is a 16-item instrument developed to measure individualism and collectivism on vertical and horizontal dimensions (refer to Appendix C). It consists of a nine-point Likert scale (1-9), with total scores for each domain ranging between 4 and 36. Total collectivism is calculated by adding the score of vertical collectivism and horizontal collectivism. The collectivism scale has Cronbach's alphas ranging between .62 and .78 (Paquet & Kline, 2009).

Procedure

This study was approved by the Science and Engineering Research Ethics Committee of the University of Nottingham Malaysia (MA260717). The study was conducted on a desktop computer in a controlled space in the university. Participants were first given an information sheet to read, and a consent form and demographic sheet to answer. After they had given their informed consent, participants answered the CLS task, ILS task, DASS-21, PCL-5, and the Individualism and Collectivism Scale. The order of the CLS task and the ILS task was counterbalanced. The session took approximately 30-45 minutes to complete. At the end of the session, the participants were thanked for their contribution, for which they received a small financial reward (RM10).

Scoring

From the literature, there are two methods to score the typicality measures obtained from the CLS and ILS. In the first typicality scoring method, used by Rubin et al. (2009) and Jørgensen et al. (2012), the typicality scores are obtained from a previous study that measured the CLS of the respective culture. The second typicality scoring method, used by Bohn

(2010) and Grysman and Dimakis (2018), obtains the typicality scores from the current sample of the study. The present study employed the first typicality scoring method, whereby the typicality scores were obtained from a previous study that measured the Malaysian CLS (i.e., Janssen & Haque, 2018). This choice was made to obtain independent Malaysian CLS typicality scores that were unaffected by the levels of depression and trauma of the current study.

Hence, to obtain typicality scores for the events, the events generated in both the CLS and ILS tasks were compared to existing data of the Malaysian CLS (n=121) collected by Janssen and Haque (2018). The typicality score for the events generated in this study was taken from the percentage of times the event was mentioned in the Malaysian CLS as a significant event that is experienced by most people in Malaysian society (e.g., marriage was mentioned 89.3% of the times in the Malaysian CLS, and so the typicality score of marriage in the current study is 89.3). Berntsen and Rubin (2004) proposed a cut-off score of 4% for the typicality scores, whereby only events that were mentioned 4% or higher were considered as a typical CLS event and events that were mentioned less often were considered an atypical or idiosyncratic event. Following this cut-off score, events mentioned 4% or more times in the Malaysian CLS were given the corresponding typicality scores in the current study, but events that were mentioned less than 4% times in the Malaysian CLS were given a typicality score of zero. Total typicality of CLS was then calculated by summing the typicality scores for the seven events generated in the CLS task, whereas adding the typicality scores for the seven events in the ILS tasks produced total typicality of ILS.

To calculate the mean societal pressure to achieve CLS events, the pressure ratings for the seven events generated in the CLS task were averaged, whereas to calculate the mean perceived ability of achieving the CLS events, the perceived ability of achieving event ratings

for the seven events generated in the CLS task were averaged. Similarly, averaging the importance ratings for the seven CLS events listed produced the mean CLS importance, and averaging the emotional valence ratings for the seven CLS events generated produced the mean CLS emotional valence. Following the same scoring method as the CLS, the pressure, perceived ability, importance, and emotional valence ratings for the events in the ILS tasks were similarly averaged to obtain the mean pressure to achieve ILS, mean perceived ability of achieving ILS, mean importance of ILS, and mean emotional valence of ILS.

Results

Cultural Life Script *[Descriptives]*

Participants listed seven significant events that would most likely be experienced by a prototypical infant in their culture. In reference to the scales' midpoints as being average, the listed events were important (M = 5.77, SD = 1.23), prevalent (M = 79.19, SD = 19.60), and had above medium pressure levels (M = 4.46, SD = 1.97). The majority of the events were rated positive (68.6%), and fewer events were rated negative (11.5%) or neutral (19.9%). Whereas 52.4% of events had been experienced, 47.6% of events had not been experienced yet. The events were mostly expected to occur in adolescence and early adulthood, with 26.4% of the events expected to occur before the age of 11, 57.5% between the ages of 11 and 30 years, and 16.1% after the age of 30.

Table 2.1 shows the event categories selected by the participants and the ratings associated with those categories. Whereas 2.4% of the CLS events was categorised as 'others', the participants assigned the remaining events to 43 categories. Thirty-four of these categories were Malaysian CLS events (representing 88.7% of the events), whereas the remaining 9 categories were atypical according to the norms of Janssen and Haque (2018). Of

the 43 event categories in the present study, 31 categories surpassed the 4% cut-off set by Berntsen and Rubin (2004). Twenty-eight of these categories were Malaysian CLS events from Janssen and Haque (2018). However, there were also three 'new' categories ("own birth", "adulthood", and "twenty-first birthday") that surpassed the 4% cut-off.

Although the typicality scores and rankings may not have been exactly the same between the Malaysian CLS categories (Janssen & Haque, 2018) and the current study's CLS categories, both shared the same 8 categories in the ten most typical categories listed ("marriage", "having children", "university graduation", "first full-time job", "begin university", "begin primary school", "begin childcare", and "own death"). The percentage of mentions of the categories in the current study was strongly and positively associated with the percentage of mentions of the same categories in the Malaysian CLS ($r(46) = .80$, $p < .001$), suggesting that the typicality scores of the Malaysian CLS and the current study do overlap largely for their corresponding categories.

Individual Life Story *[Descriptives]*

Participants also listed seven significant events they had experienced or perceived they would experience in their life. In reference to the scales' midpoints as being average, the events were on average important ($M = 5.91$, $SD = 1.25$), prevalent ($M = 63.39$, $SD = 26.94$), and had medium pressure levels ($M = 3.84$, $SD = 2.10$). The majority of the events were rated positive (62.1%), and fewer events were rated negative (21.7%) or neutral (16.2%). Whereas 66.4% of events had been experienced, 33.6% of events had not been experienced yet. Similar to the CLS, the majority of events occur during adolescence and early adulthood, with 15.0% of the events having occurred (or being expected to occur) before the age of 11, 77.4% between the ages of 11 and 30 years, and 7.6% after the age of 30.

Table 2.2 provides information about the categories and ratings of the ILS events. Whereas 7.9% of the ILS events were categorised as 'others', the remaining events were divided into 45 categories. Thirty-three of these categories were Malaysian CLS events (representing 78.9% of the events), and 12 categories were atypical (Janssen & Haque, 2018). A total of 31 categories surpassed the 4% cut-off, whereby 24 events were part of the Malaysian CLS (Janssen & Haque, 2018), and there were seven 'new' categories ("adulthood", "problems at home", "own birth", "first part-time job", "death grandparent", "divorce parents", and "moving to another house").

Life Scripts and Life Stories *[Descriptives]*

Categories. The CLS and ILS of the current study were very similar. Of the 45 categories in the ILS, 41 categories appeared in the CLS. Four ILS categories were not mentioned as CLS categories ("birth of younger sibling", "death of friend or sibling", "divorce parents", and **"**eighteenth birthday"), whereas two CLS categories were not mentioned as ILS categories ("having grandchildren" and "learning to walk or first steps"). However, this large overlap did not mean that event categories were mentioned with the same frequencies, but there were similar trends in the mentions, $r(45) = .55$, $p < .001$. Although 31 categories in both the CLS and ILS of the present study surpassed the 4% threshold, only 23 categories were present in both subsets.

Order effects. The order of the CLS and ILS tasks were counterbalanced, with half the participants answering CLS task first followed by the ILS task and the other half answering the ILS task first followed by the CLS task. To test for order effects, independent-samples t-tests were conducted. Participants who answered the CLS task first listed ILS events that were more important (CLS-ILS: $M = 6.05$, $SD = 0.68$; ILS-CLS: $M = 5.75$, $SD =$

0.67; $t(118) = 2.38$, $p = .019$, $d = 0.44$), more typical (CLS-ILS: $M = 155.83$, $SD = 64.83$; ILS-CLS: $M = 118.05$, $SD = 67.48$; $t(118) = 3.13$, $p = .002$, $d = 0.57$), and not yet experienced (CLS-ILS: $M = 2.67$, $SD = 1.54$; ILS-CLS: $M = 2.00$, $SD = 1.65$; $t(118) = 2.30$, $p = .024$, $d = 0.42$). However, after applying a Bonferroni correction ($p \leq .005$), there was only an order effect for typicality of the ILS, suggesting that the CLS is used as a framework for the recall of ILS events.

Predictive effects of CLS on ILS. Pearson correlation coefficients were calculated to investigate the relations between and within the components of the CLS and ILS (see Table 2.3). Because CLS has been theorised as the framework underlying the recall of autobiographical memories, linear regressions were calculated to investigate the predictive effects of CLS components towards its corresponding ILS components. The importance of the CLS significantly explained 23.8% of the variance in the importance of the ILS, $F(1, 118) = 36.77$, $p < .001$. Similarly, the corresponding variables of the CLS significantly explained 13.7% of the variance in emotional valence, $F(1, 118) = 18.70$, $p < .001$; 10.3% of the variance in pressure, $F(1, 118) = 13.49$, $p < .001$; 4.6% of the variance in perceived ability, $F(1, 118) = 5.70$, $p = .019$; and 14.0% of the variance in typicality, $F(1, 118) = 19.21$, $p < .001$, of the ILS. However, application of a Bonferroni correction ($p \leq .01$) showed that perceived ability towards CLS did not predict perceived ability towards ILS. These findings further provide evidence that CLS is the underlying framework for the recall of ILS.

Life Scripts, Depression, and Trauma *[Hypotheses 1, 2, and 4]*

Scoring of subclinical and psychologically healthy groups. To examine the data from a categorical approach, participants were allocated into subclinical and psychologically healthy groups according to the cut-off scores of the measures. Participants who scored a

total of 10 and above in the depression sub-scale of the DASS-21 (Lovibond & Lovibond, 1993) were categorized as subclinical depression (n = 54; males = 12, females = 42), whereas those who scored a total of 9 and below were categorized as non-depressed (n = 66; males = 23, females = 43). The depression scores did not vary significantly from the cut-off score (M = 10.62, SD = 10.16, $t(119) = 0.67$, $p = .507$), indicating the scores clustered around the cut-off.

For the PCL-5 (Weathers et al., 2013), individuals that scored a total of 33 and above were categorized as subclinical PTSD (n = 42; males = 10, females = 32), whereas those who scored a total of 32 and below were categorized as non-PTSD (n = 78; males = 25, females = 53). The trauma scores varied significantly from the cut-off score (M = 26.73, SD = 18.58, $t(119) = -3.70$, $p < .001$), indicating that the scores were distributed away from the cut-off.

Subclinical and psychologically healthy group differences. To examine differences in CLS components between subclinical depression and non-depressed groups, and between subclinical PTSD and non-PTSD groups, independent-samples t-tests were conducted (see Table 2.4, Figure 2.1, Figure 2.2, Figure 2.3, Figure 2.4). The subclinical depression and non-depressed groups gave similar ratings of importance, $t(118) = 0.85$, $p = .398$; emotional valence, $t(97.45) = 0.33$, $p = .744$; societal pressure, $t(118) = 0.99$, $p = .323$; and perceived ability, $t(118) = 0.47$, $p = .637$. However, the subclinical depression group reported less typical CLS events, $t(118) = 2.80$, $p = .006$, $d = 0.51$. This difference remained significant after applying a Bonferroni correction ($p \leq .01$). The order of tasks did not affect the relation between depression and CLS typicality, $F(1, 116) = 0.69$, $p = .408$.

Similarly to the depression groups, there was no difference in ratings of importance $t(118) = -0.79$, $p = .430$; emotional valence, $t(67.20) = -0.44$, $p = .659$; societal pressure, $t(118) = -0.92$, $p = .360$; and perceived ability, $t(118) = -1.51$, $p = .133$, between the

subclinical PTSD and non-PTSD groups. Although the subclinical PTSD group reported CLS events that were less typical, $t(118) = 2.12$, $p = .036$, $d = 0.42$, this difference was no longer significant after correcting with Bonferroni ($p \leq .01$).

Predictive effects of depression and trauma on CLS and ILS. To examine the data using a continuous approach, exploratory linear regression analyses were conducted, to investigate the possible predictive effects of depression and trauma severity on CLS characteristics. Although depression severity significantly explained 5% of the variance in CLS typicality ($F(1, 118) = 6.16$, $p = .015$, *beta* = -.22), it was no longer a predictor of CLS typicality after Bonferroni corrections ($p \leq .01$). Depression severity also did not significantly predict CLS importance, emotional valence, pressure, or perceived ability (*p*s > .05). Regression analyses also showed that trauma severity did not significantly predict any of the CLS characteristics (*p*s > .05).

Life Stories, Depression, and Trauma *[Hypotheses 3 and 4]*

Subclinical and psychologically healthy group differences. Independent-samples t-tests were used to examine differences in ILS between subclinical depression and non-depressed groups, and between subclinical PTSD and non-PTSD groups (see Table 2.4, Figure 2.2, Figure 2.4, Figure 2.5, Figure 2.6). This categorical approach showed that both subclinical depression and non-depressed groups had similar ratings for importance $t(118) = 0.40$, $p = .692$; societal pressure, $t(118) = -1.57$, $p = .118$; perceived ability, $t(118) = 0.06$, $p = .951$; and typicality, $t(118) = 1.70$, $p = .092$, of the ILS events. Although the subclinical depression group reported less positive events as part of their ILS, $t(118) = 2.39$, $p = .018$, $d = 0.43$, this difference did not remain significant after applying a Bonferroni correction ($p \leq .01$).

Similar to the depression groups, there was no difference between importance, $t(118) = -0.78$, $p = .436$; perceived ability to achieve the events, $t(118) = 0.35$, $p = .727$; and typicality, $t(118) = 1.51$, $p = .134$, of ILS events for subclinical PTSD and non-PTSD groups. However, the subclinical PTSD group reported less positive events, $t(118) = 2.67$, $p = .009$, $d = 0.49$, and higher societal pressure to experience events perceived as significant to their ILS, $t(118) = -3.15$, $p = .002$, $d = 0.60$. These differences remained significant after applying a Bonferroni correction ($p \leq .01$). The order of tasks did not affect the relations of trauma with emotional valence, $F(1, 116) = 0.26$, $p = .615$, and pressure, $F(1, 116) = 1.30$, $p = .257$.

Because there was a difference in ILS valence but not ILS typicality between the subclinical PTSD and non-PTSD groups, additional analyses were conducted to test whether there were differences in the emotional valence ratings between the PTSD groups for each ILS event that was typical (i.e., events that had more than 4% rating in the Malaysian CLS) and had a minimum of 10 participants per group. Ten ILS events met these criteria, and, although the mean ratings of the subclinical PTSD group were more negative than the mean ratings of the non-PTSD group for 8 out of the 10 events (see Table 2.5), there were no significant differences (ps > .05).

Predictive effects of depression and trauma on CLS and ILS. To investigate whether depression and trauma severity could be predictors of ILS characteristics, exploratory linear regression analyses were conducted using a continuous approach. Although depression severity explained 5.4% of variance in ILS emotional valence ($F(1, 118) = 6.71$, $p = .011$, *beta* = -.23), it was no longer a predictor of ILS valence after correcting with Bonferroni ($p \leq .01$). On the other hand, trauma severity explained 5.9% of the variance in ILS emotional valence ($F(1, 118) = 7.42$, $p = .007$), with higher trauma scores predicting the listing of less positive events in the ILS (*beta* = -.24, $p = .007$). Trauma severity also

explained 6.7% of variance in ILS pressure ($F(1, 118) = 8.48$, $p = .004$), with higher trauma scores predicting higher pressure to achieve ILS events (*beta* = .26, $p = .004$). These associations were still significant after correcting for family-wise errors ($p \leq .01$). Other ILS characteristics were not predicted by depression or trauma severity ($ps > .05$).

Moderators of Depression, Trauma, Life Scripts, and Life Stories *[Hypothesis 5]*

To investigate the effects societal identification on the relations of depression and trauma with CLS typicality and pressure, moderation analyses were conducted. Total collectivism was found to only moderate the relation between depression and CLS typicality ($\Delta R^2 = .04$, $B = .18$, $SE = .08$, $p = .022$). Higher depression predicted lower CLS typicality more strongly as collectivism levels decreased. However, this moderating effect was only present at low collectivism levels. Upon further exploration, it was found that having less vertical collectivism specifically strengthened the predictive effects of depression on the typicality of CLS ($\Delta R^2 = .04$, $B = .20$, $SE = .10$, $p = .035$), but only at low levels of vertical collectivism. Horizontal collectivism did not significantly moderate this association ($\Delta R^2 = .01$, $B = .12$, $SE = .12$, $p = .322$). Total collectivism did not moderate the relations between depression and CLS pressure ($\Delta R^2 = .02$, $B = .00$, $SE = .00$, $p = .108$), trauma and CLS typicality ($\Delta R^2 = .02$, $B = .06$, $SE = .04$, $p = .111$), and trauma and CLS pressure ($\Delta R^2 = .01$, $B = .00$, $SE = .00$, $p = .262$).

Moderation analyses were also conducted to test the effects societal identification on the relations between depression and trauma with ILS typicality and pressure. Total collectivism moderated the relation between depression and ILS pressure ($\Delta R^2 = .07$, $B = .00$, $SE = .00$, $p = .004$), from a non-significant relation to a significant relation. Higher depression predicted higher ILS pressure more strongly as collectivism levels increased.

Similarly, total collectivism also moderated the relation between trauma and ILS pressure (ΔR^2 = .03, *B* = .00, *SE* = .00, *p* = .049), whereby higher trauma predicted higher ILS pressure more strongly as collectivism levels increased. These moderating effects were observed at moderate and high levels of collectivism. Additional analyses indicated that having more vertical collectivism specifically strengthened the predictive effects of depression on the pressure towards ILS (ΔR^2 = .06, *B* = .01, *SE* = .00, *p* = .009), and trauma on the pressure towards ILS (ΔR^2 = .03, *B* = .00, *SE* = .00, *p* = .046), at both moderate and high levels of vertical collectivism. Horizontal collectivism was not a significant moderator of the depression and ILS pressure (ΔR^2 = .00, *B* = .00, *SE* = .00, *p* = .710) and trauma and ILS pressure (ΔR^2 = .00, *B* = .00, *SE* = .00, *p* = .782) relations. Total collectivism did not moderate the relations between depression and ILS typicality (ΔR^2 = .00, *B* = -.03, *SE* = .09, *p* = .775), and trauma and ILS typicality (ΔR^2 = .00, *B* = -.01, *SE* = .05, *p* = .778).

Discussion

The current study examined differences in the recall of CLS and ILS for participants with subclinical depression and PTSD and participants who are psychologically healthy. It also aimed to examine whether the societal pressure and perceived ability related to achieving the CLS and ILS events would be different for those with subclinical levels of depression and PTSD. Last, it aimed to study the role of societal identification on the relations of depression and trauma with CLS and ILS. To investigate these questions, participants completed the CLS and ILS tasks, along with measures of trauma, depression, and societal identification.

Overall findings indicate that:

1) There were no differences in importance and emotional valence of the CLS between individuals with subclinical depression and PTSD and psychologically healthy individuals (Hypothesis 1 was accepted).
2) Individuals with subclinical levels of depression generated CLS events that were less typical as compared to those who are psychologically healthy (part of Hypothesis 2 was not accepted), but there were no differences in typicality of the CLS between individuals with subclinical PTSD and those who are psychologically healthy (part of Hypothesis 2 was accepted).
3) There was no difference in typicality of ILS events between individuals with subclinical depression and PTSD and those who are psychologically healthy (Hypothesis 3 was not accepted).
4) There were no differences in CLS pressure, CLS perceived ability, and ILS perceived ability between individuals with subclinical depression and PTSD and those who are psychologically healthy. There was also no difference in ILS pressure between individuals with subclinical depression and those who are psychologically healthy (Hypothesis 4 was not accepted).
5) Individuals with subclinical levels of PTSD retrieved ILS events that were more negative and associated higher pressure towards ILS events than psychologically healthy individuals (Hypothesis 4 was not accepted). Similarly, higher trauma severity predicted more negative ILS and higher ILS pressure.
6) Collectivism moderated the relation between depression with CLS typicality, depression with ILS pressure, and trauma with ILS pressure (part of Hypothesis 5 was accepted). Lower collectivism strengthened relations of higher depression and lower typicality of CLS, whereas higher collectivism strengthened relations of higher

depression and trauma with higher pressure of ILS. Collectivism did not moderate the relations between depression and trauma with CLS pressure and ILS typicality, and trauma with CLS typicality (part of Hypothesis 5 was not accepted).

Characteristics of Life Scripts and Life Stories

The CLS in the current study had large overlaps with the existing Malaysian CLS (Janssen & Haque, 2018), in terms of the types of events mentioned often (i.e., typical events) and the frequency of mentions for the respective CLS events (i.e., typicality scores). Despite largely overlapping, there were still small differences in the events and frequency between the two CLS. These small differences may be because, although the CLS is a type of semantic knowledge that does not change much, there is still room for some variation due to noise. The characteristics of the CLS were also shown to be related to the parallel characteristics of the ILS, suggesting that CLS may indeed be used as a framework for the narration of ILS (Berntsen & Jacobsen, 2008; Rubin & Berntsen, 2003).

Life Scripts, Depression, and Trauma

Most characteristics of the CLS were alike (i.e., importance, emotional valence, pressure, and perceived ability) for subclinical depression and non-depressed groups, and for subclinical PTSD and non-PTSD groups. The lack of differences in these CLS characteristics between the groups matched previous findings (Rubin et al., 2008). CLS are semantic knowledge about events which are culturally shared, and are stable across age, gender, and education (Berntsen & Rubin, 2004; Janssen & Rubin, 2011; Janssen et al., 2014). Semantic memory consists of factual knowledge and schemas of the world, which is why it is not expected to vary widely between individuals (Binder & Desai, 2011; Tulving, 1972). This

explanation indicates that individuals should possess the same range of information about which are the typical events in a CLS and would account for the lack of variation in the characteristics of CLS.

In line with the expectation that everyone has similar information about the CLS, the current study did not find differences in the typicality of the CLS for the subclinical PTSD and non-PTSD groups, similar to the findings of Rubin et al. (2008) but different from the findings of Rubin et al. (2009). However, the current study found that the subclinical depression group listed CLS events that were less typical than the non-depressed group. Rubin et al. (2009) similarly found a relation between high depression and low CLS typicality for their older sample. This finding was, however, not discussed in detail and the CLS was concluded as still stable due to the smaller associations as compared to the ILS. Although when using a categorical approach there were differences in the typicality of the CLS between subclinical depression and non-depressed groups, when using a continuous approach depression severity was not a predictor of typicality of the CLS, similar to the results of Jørgensen et al. (2012). This finding suggests that there may be other mechanisms that may explain the group difference instead of depression levels directly.

Provided that information about the CLS is still stable regardless of levels of depression, there may be a difference instead in the method of selection of events to be included. There was a total of 35 events classified as ‘typical’, with a rating of at least 4%, in the Malaysian CLS obtained by Janssen and Haque (2018). However, the CLS task only requires participants to list seven events. Hence, the method, or criterion, used to narrow down 35 events to seven events may be different for individuals with subclinical depression symptoms. People with subclinical depression symptoms may choose events that, while still

passing the threshold, are mentioned less often in the CLS than people who are psychologically healthy.

Besides selection methods, low typicality is theorized to be due to low awareness of societal expectations (Rubin et al., 2009). Previous research has shown that people with higher depression become more disconnected and apathetic towards the expectations of the society (Cruwys Alexander Haslam, Dingle, Haslam, et al., 2014; Matthews et al., 2016; Taylor & Vaughan, 1967). This disconnect from society could potentially decrease the feedback and vicarious experiences involved in the transmission of the CLS. Additionally, individuals with depression have been shown to not keep up with the news, events, and occurrences in society, making their semantic memory and knowledge regarding societal events to be less accurate (Söderlund et al., 2014). These less accurate schematic representations may cause them to select less typical or not typical events when asked about the CLS. To test whether there are differences in the selection of CLS events or differences in the knowledge of the CLS for subclinical depression and PTSD groups and psychologically healthy groups, a second study was conducted.

Study 2

The Current Study

Study 2 aimed to investigate the cognitive mechanism that may explain the differences in the typicality of the CLS between individuals with subclinical levels of depression and psychologically healthy individuals. This study was conducted to test whether there are differences in the selection of events to be included in the CLS among individuals with subclinical depression and PTSD symptoms. This study also investigated whether there are differences in the knowledge of which events are typical and atypical in regards to the

CLS for individuals with subclinical depression and PTSD symptoms. The results of this study could provide further insight into the factors that may be causing differences in culturally shared semantic knowledge that are typically stable across other demographic factors. The findings could also help identify memory-related cognitive differences and difficulties that are experienced by individuals with subclinical depression and PTSD symptoms.

The research questions that we aim to answer in the second study include:

1) Are there differences in the selection of CLS events between individuals with subclinical levels of depression and PTSD and psychologically healthy individuals?
2) Are there differences in the knowledge of typical CLS events between individuals with subclinical levels of depression and PTSD and psychologically healthy individuals?

Based on these research questions and the literature, we hypothesized for the second study that:

1) There will be differences in the selection of typical CLS events between individuals with subclinical levels of depression and PTSD and psychologically healthy individuals
2) The knowledge of typical CLS events of individuals with subclinical levels of depression and PTSD will be different from psychologically healthy individuals

To test both these hypotheses, Malaysian participants were asked whether events were typical events experienced within their culture, and to describe and rate seven significant

events experienced by a prototypical infant from their culture. Participants then answered the Center for Epidemiologic Studies Depression Scale, and the PTSD Checklist for DSM-5.

Method

Participants

Similar to Study 1, a Malaysian sample was used for the second study. Power analysis with a medium effect size of .50, an alpha of .05, and a beta of .20 (to give a power of .80) indicated that 102 participants would be needed to reach statistical significance in an independent-samples t-test. Two-hundred forty-three students from the University of Nottingham Malaysia were recruited for the second study. Thirty-two participants were excluded from the analyses due to errors in answering the CLS task (four listed religious events and commercial holidays; three listed personal experiences; ten listed abstract values and principles; thirteen made errors in categorization of events; two did not complete the task). The remaining 211 participants had a mean age of 20.55 (*SD* = 2.04, range = 17-31), and the sample consisted of 57 males and 154 females. The data was once again viewed as both categorical and on a continuum.

Materials

Cultural Life Script (CLS) knowledge task. A CLS knowledge task was created for the present study by the current researchers to record the knowledge a person has about events that are typical and atypical to the CLS of the culture. Participants were given a list of 60 events, comprising of 35 typical Malaysian CLS events (Janssen & Haque, 2018), 24 atypical events, and 1 ‘others’ option for participants to fill in an event that may not have been present in the list. The 24 atypical events were obtained from a mixture of events below

the 4% cut-off in the Malaysian CLS, events from CLS of different cultures, events from ILS of past studies (Bohn, 2010; Janssen & Haque, 2018; Rubin et al., 2009), and new events that were created by the current researchers. The participants were asked to decide whether each event will take place in a typical life course of a person from their culture ('yes' or 'no').

Cultural Life Script (CLS) task. The CLS task derived from Berntsen and Rubin (2004) was used, similar to Study 1, but in the second study it was targeted to record the selection of CLS events made by individuals. Participants described seven important events that would most likely occur in a prototypical infant's life from their culture from birth to death, and categorized the events they listed into 59 pre-existing options that were also used in the CLS knowledge task (Bohn, 2010; Janssen & Haque, 2018; Rubin et al., 2009). If the event retrieved by the participants did not fit into any of the pre-existing categories, they were asked to categorize the event as 'other'.

Center for Epidemiologic Studies Depression Scale (CES-D) and PCL-5. Similar to Study 1, the PCL-5 (Weathers et al., 2013) was used to measure symptoms of PTSD or trauma (refer to Appendix B). But unlike Study 1, the CES-D scale was used to measure the depression scores instead of the DASS-21 in Study 2. The DASS-21 has a total of four different depression cut-offs (i.e., mild, moderate, severe, and extreme) (Lovibond & Lovibond, 1993). The lowest cut-off (i.e., mild) was used to allocate the subclinical depression groups in Study 1, as it was perceived to most likely reflect the baseline of above average depression scores in a normal population, whereas the other cut-offs possibly reflect differing severities within the above average range. However, there is no empirical evidence for which cut-off would actually be best to identify those with subclinical level of symptoms in normal populations (e.g., mild or moderate cut-off). The CES-D, on the other hand, has been shown to be suitable to measure depression in normal populations, and has one cut-off

score that clearly reflect above average depression symptoms in regards to a normal population (Radloff, 1977). For this reason, the current study (and all subsequent studies in this thesis) used the CES-D scale to measure depression. Despite the difference in measurements used, strong correlations have been found between the DASS-21 and CES-D (Weiss, Aderka, Lee, Beard, & Björgvinsson, 2015), suggesting that the results are still comparable between Study 1 and Study 2.

The CES-D scale (Radloff, 1977) is a 20-item instrument developed to measure the epidemiology of depression symptomology in the general population (refer to Appendix D). It consists of a four-point Likert scale (ranging from 0 to 3), and the depression score is obtained by adding all the items together. Higher total scores represent more and stronger depression symptoms. Although the original cut-off score for the CES-D that indicates a risk of depression is 16 (Radloff, 1977), more recent reviews and meta-analyses have found that a cut-off of 20 is more appropriate for the general population in current times (Vilagut, Forero, Barbaglia, & Alonso, 2016). This scale has a Cronbach's alphas ranging between .85 and .90, and a one-year test-retest reliability ranging between .45 and .70 (Radloff, 1977).

Procedure

This study was approved by the Science and Engineering Research Ethics Committee of the University of Nottingham Malaysia (SJ111019). The study was conducted as an online survey. Participants were first given an information sheet to read, and a consent form and demographic sheet to answer. After they had given their informed consent, participants answered the CLS knowledge task, the CLS task, CES-D, and PCL-5. The order of the CLS knowledge task and the CLS task were counterbalanced. The session took approximately 20-

30 minutes to complete. At the end of the session, the participants were thanked for their contribution, for which they received a small financial reward (RM5).

Scoring

Similar to Study 1, the events generated in the traditional CLS task were compared to the Malaysian CLS in Janssen and Haque (2018)'s study to obtain the typicality scores. The percentage of times each event was mentioned in the Malaysian CLS was used as the respective events' typicality scores but only for typical events (i.e., events mentioned 4% and more times in the Malaysian CLS), whereas the atypical events (i.e., events mentioned less than 4% of the times) were scored as zero (Berntsen & Rubin, 2004; Rubin et al., 2009). Total typicality of CLS was calculated by summing the typicality scores for the seven events generated in the CLS task.

The total number of events rated as being typical, a measure of CLS knowledge, was calculated by summing all the events that had "yes" responses in the CLS knowledge task. To determine the accuracy of CLS knowledge, the number of events correctly identified as being typical and atypical were calculated. The number of events correctly identified as being typical was obtained by adding all the typical events based on the norms of the Malaysian CLS (Janssen & Haque, 2018) that were responded with "yes" in the CLS knowledge task. In a similar manner, the number of events correctly identified as being atypical was obtained by adding all the atypical events in the CLS knowledge task that were answered with a "no".

Results

Cultural Life Script Events *[Descriptives]*

On the traditional CLS task, participants listed seven significant events that would be experienced by a prototypical infant from their culture. Table 2.6 shows the event categories selected by participants. Only 3.1% of the CLS events were categorised as ‘others’, whereas the remaining events were assigned into 55 categories. Based on the norms from Janssen and Haque (2018), 35 of these categories were Malaysian CLS events (representing 78.7% of the events), whereas the remaining 20 categories were atypical. From the total of 55 categories in the current study, 35 categories surpassed the 4% cut-off (Berntsen & Rubin, 2004), whereby 27 of these categories were Malaysian CLS events (Janssen & Haque, 2018) and the other 8 were ‘new’ categories (“own birth”, “adulthood”, “engagement / proposal”, major failure”, “first part-time job”, “death of grandparents”, “eighteenth birthday”, and “twenty-first birthday”).

The Malaysian CLS categories (Janssen & Haque, 2018) and the current study’s CLS categories shared 9 categories in the ten most typical categories listed (“marriage”, “begin childcare”, “university graduation”, “first full-time job”, “having children”, “begin university”, “begin primary school”, “fall in love”, and “own death”). There was strong a positive correlation for the percentage of mentions of the categories between the current study and the Malaysian CLS ($r(57) = .84$, $p < .001$), suggesting that there are large overlaps in the frequency of mentions for the CLS categories of both studies.

The CLS of the current study also shared similarities with the CLS from Study 1. All 43 categories from the CLS in Study 1 also appeared in the CLS of the current study. However, there were 12 categories that were only mentioned in the CLS of Study 2, but not in the CLS of Study 1 (“engagement / proposal”, “major failure”, “eighteenth birthday”, “birth of younger sibling”, “death of sibling or friend”, “getting a pet”, “take post-graduate or professional courses”, “first tooth / teething”, “death of partner”, “hajj / pilgrimage”,

"become an aunt / uncle", and "learning to read and write"). Although 35 categories in the CLS of the current study and 31 categories in the CLS of Study 1 surpassed the 4% threshold, only 29 categories were present in both CLS.

The CLS from Studies 1 and 2 shared 9 categories in the ten most typical categories listed in both studies ("marriage", "begin childcare", "university graduation", "first full-time job", "having children", "begin university", "own birth", "begin primary school", and "own death"). There was also a strong positive correlation for the percentage of mentions of the categories between the CLSs from the Studies 1 and 2 ($r(47) = .96$, $p < .001$), highlighting that there are large overlaps in the frequency of mentions for both CLS.

Typicality of Cultural Life Script Events *[Descriptives]*

On the CLS knowledge task, participants rated whether each event presented was a typical or atypical CLS event in their culture. Table 2.6 shows the percentage of ratings for each event category being a typical CLS event ($M = 78.01$, $SD = 14.93$). The event category that had the highest rating of being a typical CLS event was "adulthood" (96.21%), whereas the event category with the lowest rating was "hajj / pilgrimage" (25.12%). Thirty-two events had a rating of 80% and above ($M = 88.15$, $SD = 4.12$). Twenty-six of these events were Malaysian CLS events according to the norms of Janssen and Haque (2018), and 6 of these events were atypical events. The other 27 events had ratings of less than 80% ($M = 65.98$, $SD = 14.15$). They consisted of 9 Malaysian CLS events (Janssen & Haque, 2018) and 18 atypical events.

Typical events according to the Malaysian CLS (Janssen & Haque, 2018) were more often rated as being a typical event on the CLS knowledge task as compared to the atypical events (M typical = 177.23, $SD = 17.64$; M atypical = 146.17, $SD = 38.03$; $t(29.85) = 3.74$, p

= .001). Although there were no large overlaps, there were similar trends in the ratings of typical events on the CLS knowledge task and frequency of mentions on the traditional CLS task for the respective events in the current study ($r(57) = .54$, $p < .001$). These findings suggest that the CLS events that are considered as typical are consistent across the tasks.

Life Scripts, Depression, and Trauma *[Hypotheses 1 and 2]*

Scoring of subclinical and psychologically healthy groups. Participants were allocated into subclinical and psychologically healthy groups to analyse the data using a categorical approach. Participants who scored a total of 20 and above in the CES-D (Vilagut et al., 2016) were categorized as subclinical depression ($n = 112$; males = 28, females = 84), whereas those who scored a total of 19 and below were categorized as non-depressed ($n = 99$; males = 29, females = 70). The depression scores varied significantly from the cut-off score ($M = 21.89$, $SD = 11.48$, $t(210) = 2.39$, $p = .018$), indicating that the scores were distributed away from the cut-off.

For the PCL-5 (Weathers et al., 2013), individuals that scored a total of 33 and above were categorized as subclinical PTSD ($n = 82$; males = 21, females = 61), whereas those who scored a total of 32 and below were categorized as non-PTSD ($n = 129$; males = 36, females = 93). The trauma scores varied significantly from the cut-off score ($M = 28.68$, $SD = 18.19$, $t(210) = -3.45$, $p = .001$), indicating that the scores were distributed away from the cut-off.

Subclinical and psychologically healthy group differences. To examine differences in CLS typicality and knowledge between subclinical depression and non-depressed groups, and between subclinical PTSD and non-PTSD groups, independent-samples t-tests were conducted (see Table 2.7, Figure 2.7, Figure 2.8). On the traditional CLS task, the subclinical depression and non-depressed groups generated CLS events that have similar typicality

($t(209) = 1.65$, $p = .101$). However, on the CLS knowledge task, although they had similar accuracy in identifying typical CLS events ($t(209) = 1.76$, $p = .079$), the subclinical depression group rated more events as being typical CLS events overall ($t(209) = 2.53$, $p = .012$, $d = 0.35$) and was less accurate in identifying atypical CLS events ($t(209) = -3.22$, $p = .002$, $d = 0.44$) than the non-depressed group. These differences remained significant after applying a Bonferroni correction ($p \leq .013$). The order of tasks did not affect the relation between depression and total CLS typical events, $F(1, 207) = 2.24$, $p = .589$, and depression and accuracy of atypical events, $F(1, 207) = 2.66$, $p = .512$.

Similar to the depression groups, there was no difference in typicality of the CLS events generated for the subclinical PTSD and non-PTSD groups ($t(209) = -0.57$, $p = .569$) on the traditional CLS task. The total number of events rated as being typical CLS events ($t(209) = 1.97$, $p = .051$), and the number of events accurately identified as typical CLS events ($t(209) = 1.03$, $p = .304$) also did not differ between the subclinical PTSD and non-PTSD groups on the CLS knowledge task. However, the subclinical PTSD group was less accurate in identifying atypical CLS events ($t(209) = -2.95$, $p = .004$, $d = 0.41$) than the non-PTSD group, even after Bonferroni corrections ($p \leq .013$). The order of tasks did not affect the relation between trauma and accuracy of atypical events, $F(1, 207) = 0.14$, $p = .712$.

Predictive effects of depression and trauma on CLS and ILS. Looking at the data as a continuum, exploratory linear regression analyses were conducted to investigate the possible predictive effects of depression and trauma severity on CLS typicality and knowledge. Depression severity significantly explained 3.5% of the variance in the accuracy of atypical CLS events ($F(1, 209) = 7.58$, $p = .006$), with higher depression scores predicting lower accuracy in identifying atypical CLS events (*beta* = -.19, $p = .006$). This association was still significant after correcting for family-wise errors ($p \leq .013$). Depression severity did

not significantly predict CLS typicality, total events rated as typical, and accuracy of typical events (*p*s > .05).

Although trauma severity significantly explained 2.2% of the variance in the accuracy of atypical CLS events ($F(1, 209) = 4.78$, $p = .030$, *beta* = -.15), it was no longer a predictor of accuracy of atypical CLS events after Bonferroni corrections ($p \leq .013$). Trauma severity also did not predict CLS typicality, total events rated as typical, and accuracy of typical events (*p*s > .05).

Discussion

The present study aimed to investigate whether there were differences in knowledge of the CLS or differences in selections of CLS events between subclinical depression and PTSD groups and psychologically healthy groups. To investigate these aims, participants completed the traditional CLS task, the newly developed CLS knowledge task, and questionnaires measuring depression and trauma. Overall findings indicate that:

1) There were no differences in typicality of the CLS events (i.e., selection) on the traditional CLS task generated by individuals with subclinical levels depression and PTSD and psychologically healthy individuals (Hypothesis 1 was not accepted).
2) Individuals with subclinical levels of depression rated more events overall as being typical CLS events (i.e., knowledge) than psychologically healthy individuals on the CLS knowledge task (part of Hypothesis 2 was accepted), but there were no differences in overall rating of typical CLS events between those with subclinical levels of PTSD and those who are psychologically healthy (part of Hypothesis 2 was not accepted).

3) Those with subclinical levels of depression and PTSD had similar accuracy in identifying typical CLS events (i.e., knowledge) as those who are psychologically healthy on the CLS knowledge task (part of Hypothesis 2 was not accepted).
4) Individuals with subclinical levels of depression and PTSD had lower accuracy in identifying atypical CLS events (i.e., knowledge) than psychologically healthy individuals on the CLS knowledge task (part of Hypothesis 2 was accepted).

Characteristics of Life Scripts

There were large overlaps in the type of events mentioned and the frequency of those mentions between the CLS in the current study, the CLS from Study 1, and the Malaysian CLS (Janssen & Haque, 2018). Both the knowledge and traditional measures of the CLS in the current study also had similar types and ratings of typical CLS events. Both these findings indicate that the CLS is culturally shared semantic knowledge. Although there were large overlaps and similarities between the three CLS, the CLS from this study, Study 1, and the Malaysian CLS were not one-hundred-percent identical to each other, suggesting that, due to noise, minor variations may exist in this type of semantic knowledge.

In the CLS knowledge task of the current study, more Malaysian CLS events (Janssen & Haque, 2018) than atypical events were rated as being "typical CLS events", whereas more atypical events than Malaysian CLS events were rated as "not typical CLS events". However, the event that had the highest rating of being a typical event ("adulthood") in the CLS knowledge task was not the same as the event that had the highest frequency of mentions in the CLS from the traditional CLS task in the current study, the CLS from Study 1, and the Malaysian CLS ("marriage"). Moreover, despite having the highest rating of being a "typical CLS event" in the CLS knowledge task, the event "adulthood" is not a typical event

according to the norms of the Malaysian CLS (Janssen & Haque, 2018). These findings once again suggest that there are slight variations in the semantic knowledge shared within the culture.

Life Scripts, Depression, and Trauma

CLS are semantic knowledge that is stable and not expected to vary significantly between individuals within the same culture (Berntsen & Rubin, 2004; Binder & Desai, 2011; Janssen & Rubin, 2011; Janssen et al., 2014; Tulving, 1972). In line with the literature, there were no differences in the typicality of the events listed in the traditional CLS task between subclinical depression and PTSD groups and psychologically healthy groups in the current study when looking at the data using a categorical approach. The lack of differences in typicality indicates that the participants selected similar types of events for the CLS regardless of their depression and trauma symptoms. This result matches those of Rubin et al. (2008) but is different from those of Rubin et al. (2009).

There were also no differences in the number of events identified as "typical CLS events" between the subclinical PTSD and non-PTSD groups on the CLS knowledge task. However, there were differences for the depression groups, whereby individuals with subclinical levels of depression rated a higher number of events as being "typical CLS events" than individuals who were psychologically healthy. Further exploration revealed that individuals with subclinical levels of depression and trauma were able to identify typical CLS events as accurately as psychologically healthy individuals but had poorer accuracy in identifying atypical events. This result shows that individuals with subclinical levels of depression mistake more atypical events as being typical CLS events, which explains why they perceive a higher number of events are typically experienced within the Malaysian

society. When viewing the data as a continuum, higher depression severity was found to predict more inaccuracy towards discriminating atypical events from typical events. This increased inaccuracy could be due to those with more depression symptoms becoming less interested and connected with society and its norms (Cruwys Alexander Haslam, Dingle, Haslam, et al., 2014; Matthews et al., 2016; Taylor & Vaughan, 1967), and hence, having higher amounts of inaccurate knowledge of which events are more common and typical in the society (Söderlund et al., 2014).

Although individuals with subclinical levels of PTSD also perceived more atypical events as being typical CLS events, it did not have a large impact on the overall number of events they perceived as typical events when using a categorical approach. This finding suggests that there is a difference, but those with subclinical PTSD symptoms may not differ greatly from people who are psychologically healthy in their abilities to accurately discriminate atypical events. Despite the presence of a group difference, when using a continuous approach, trauma severity did not predict the accuracy of identifying atypical events, indicating that other mechanisms may be underlying the differences in accuracy for the trauma groups. For example, having higher or lower personal meaning attached towards certain events that may influence decisions and perceptions as to whether an event is typical or atypical (Ferrell & Gresham, 1985).

General Discussion

Characteristics of Life Scripts and Life Stories

The ILS overlapped with the CLS in Study 1 and the Malaysian CLS (Janssen & Haque, 2018) in terms of types of events retrieved and frequency of the events being mentioned. The ratings of the characteristics of the CLS (i.e., typicality, importance,

emotional valence, and pressure) were also shown to predict the ratings of similar ILS characteristics. These findings indicate that the CLS is used as a framework for the recall and narration of the ILS (Berntsen & Jacobsen, 2008; Rubin & Berntsen, 2003). Meanwhile, the CLS obtained in Study 1, Study 2, and the Malaysian CLS (Janssen & Haque, 2018) had large overlaps with each other in terms of the types of events listed and frequency of mentions for those events respectively. The three CLSs also shared the same eight or nine events that were mentioned more often, with "marriage" being the event mentioned most often in all three CLSs. These findings provide evidence that CLS is indeed a type of semantic knowledge shared between people of the same culture and is stable within the specified culture.

Despite being a type of semantic knowledge, there were still slight variations in the events and their frequencies between the CLS in Study 1, the CLS in Study 2, and the Malaysian CLS (Janssen & Haque, 2018). There were also variations in identifying CLS events that were typical and atypical when compared to the norms of the Malaysian CLS (Janssen & Haque, 2018). Part of this variation is due to noise which encompases expected variations and standard errors (e.g., individual differences), whereas the other part may be due to societal norms and expectations evolving over time (Ehrlich & Levin, 2005). However, these changes may not be large or explicit, and instead, may manifest as smaller forms of variations. Furthermore, knowledge of societal expectations can be affected by a person's own experiences and memories, which could then further affect the transmission and evolution of those expectations. These reasons may be why the CLSs and its range of typical events are not one-hundred percentage alike despite being from the same culture, but the large overlap signifies that the culturally semantic knowledge is indeed a reasonably stable structure.

Differences in Cultural Life Scripts

The subclinical depression and PTSD groups were shown to have similar ratings as the psychologically healthy groups for the importance, emotional valence, pressure to achieve events, and perceived ability to achieve events of the CLS. The lack of variation in the characteristics of the CLS further corroborates that CLS are culturally shared semantic knowledge that are stable across various factors (Berntsen & Rubin, 2004; Binder & Desai, 2011; Janssen & Rubin, 2011; Janssen et al., 2014; Tulving, 1972). The subclinical PTSD and non-PTSD groups also generated CLS that had similar typicality and were able to accurately identify typical events at a similar level, in line with CLS being a type of semantic knowledge shared within the culture. The absence of difference in CLS typicality indicates that there are no differences in the selection of only seven typical events to be included from the 35 choices of typical CLS events (Janssen & Haque, 2018) for the trauma groups.

However, the subclinical PTSD group had difficulties in identifying atypical events as accurately as the non-PTSD group, perceiving atypical events as typical CLS events instead. These results suggest that individuals with subclinical levels of PTSD may have small differences in their CLS knowledge. Trauma severity did not, however, predict this difference in the knowledge of the CLS, implying that other mechanisms may be involved. Differences in personal experiences, vicarious experiences, personal meaning, and value associated with the events may influence the perceptions, decisions of information to intake, transmissions of the semantic information related to the CLS (Ferrell & Gresham, 1985; Janssen & Haque, 2018), all of which has the potential to affect the overall knowledge base of the CLS.

Despite having these differences in atypical event accuracy, there were no significant increases in the overall events perceived as typical, which suggest that the CLS knowledge of

people with subclinical PTSD may not differ too greatly from people who are psychologically healthy. The lack of differences in CLS typicality also suggests that the difference in CLS knowledge for individuals with subclinical PTSD levels did not have a significant impact on their selection of events to be included into the CLS, or that they were able to accommodate the differences in CLS knowledge that exist.

Individuals with subclinical levels of depression, on the other hand, were found to generated a less typical CLS than the psychologically healthy individuals in Study 1, which contradicts the expectation that the CLS is semantic knowledge that is stable and does not vary within the same culture. Because depression severity did not predict changes in the typicality of the CLS despite the presence of group differences, other mechanisms were theorized to explain the differences, such as differences in selection of typical events to include from the 35 available typical CLS events, and differences in knowledge of CLS events. There were, however, no differences in the typicality of CLS generated by the subclinical depression and non-depressed groups in Study 2, suggesting that the process of selecting typical events to be included into the CLS was similar across the groups, and unlikely to be the mechanism involved in explaining possible differences.

Further investigation revealed that although the subclinical depression groups were able to identify typical events as well as the psychologically healthy groups, they had poorer accuracy in identifying atypical events, whereby they perceived the atypical events as being typical events. This inaccuracy resulted in those with subclinical depression symptoms having a larger number of events they perceived as being typical CLS events. These findings indicate that there are differences in the knowledge of the CLS for individuals with subclinical levels of depression, which may have caused them to include atypical events into the CLS they generated, and hence, coud explain the difference in CLS typicality as seen in

Study 1. The overall results from these studies suggest differences in the typicality of the CLS for individuals with subclinical levels of depression are more likely to be attributed to differences in their knowledge of the CLS rather than differences in selection of typical CLS events.

Individuals who suffer from depression also experience social isolation (Matthews et al., 2016), which could decrease the feedback and vicarious experiences involved in the transmission of the CLS (Janssen & Haque, 2018), and thus, result in them possessing different or inaccurate knowledge regarding the events of the CLS. Moreover, as individuals with higher depression levels become apathetic and disconnected from society over time (Cruwys Alexander Haslam, Dingle, Haslam, et al., 2014; Matthews et al., 2016; Taylor & Vaughan, 1967), they demonstrate lower interest and effort in being updated about the events and occurrences in society, which could in turn also reduce the accuracy of their semantic knowledge of societal events (Söderlund et al., 2014) and cause differences in their knowledge of the CLS.

Although the same CLS task and instructions were used in both Studies 1 and 2, the results obtained in Study 2 on the CLS typicality was different from Study 1. One possible reason for the differences in results between the two studies is the depression measure used. Study 1 used the DASS-21 to measure depression and allocate the subclinical groups, whereas Study 2 used the CES-D instead. Although the DASS-21 is strongly associated to the CES-D (Weiss et al., 2015) and both measurements are based on norms from normal populations (Lovibond & Lovibond, 1993; Radloff, 1977), the cut-off scores for both measurements may not have been parallel to each other. The uncertain parallelism raises the possibility that the allocation of participants into the subclinical depression groups may not

have been identical for both studies, and hence, may explain the difference in results obtained for the typicality of CLS in Studies 1 and 2.

Another possible reason for the difference in results lies in the number of categories provided to participants to categorize the CLS events into. Forty-five categories were provided in Study 1 to categorize the CLS events, whereas 59 events were provided in Study 2 for the same purpose. Both Study 1 and Study 2 used the same 45 categories, but Study 2 had an additional 14 categories included. The additional categories were included in the traditional CLS task of Study 2 to match the categories presented in the CLS knowledge task that was administered in the same study, so the same categories would be presented in both tasks and participants were not pre-empted as to which events were the atypical categories. It is possible that these additional categories and choices may have caused the categorization of events to be more spread out, especially for categories that were under the same umbrella and previously may have been categorized together (e.g., engagement / proposal and marriage; begin university and taking postgraduate courses), which may explain why the results obtained for the CLS typicality in Study 1 was not replicated in Study 2.

Differences in Individual Life Stories

There were differences in ILS characteristics for the subclinical PTSD and non-PTSD groups but not for the subclinical depression and non-depressed groups. Individuals with subclinical depression reported ILS with similar valence as individuals who are psychologically healthy, unlike the results of previous studies using normal (Bohn, 2010; Jørgensen et al., 2012; Rubin et al., 2009) and clinical (Dalgleish et al., 2011; Fromholt et al., 2003; Habermas et al., 2008; Jobson et al., 2018) samples. Although individuals with clinical depression have been shown to have greater ease in recalling negative memories (Anderson

& Evans, 2015; Biedermann et al., 2017, Dalgleish et al., 2011; Dickson & Bates, 2006; Lloyd & Lishman, 1975) and have an increased attentional bias towards negative events (Baert, de Raedt, & Koster, 2010; Dalgleish et al., 2011), individuals with subclinical depression symptoms did not retrieve more negative events. This result suggests that any negative attentional biases and tendencies to retrieve negative memories in individuals with subclinical depression symptoms may not be detrimental enough to affect the retrieval of their life narrative.

Individuals with subclinical PTSD reported a less positive ILS overall for both categorical and continuous approaches, similar to Rubin et al. (2009) but different from Rubin et al. (2008). Past research has shown that those with PTSD do demonstrate negative attentional biases (El Khoury-Malhame et al., 2011; Vythilingam et al., 2007). This negative attentional bias may ease accessibility towards negative events and increases difficulty to focus on positive events, which could explain the smaller proportion of positive ILS events listed by those with subclinical levels of PTSD. However, this negative attentional bias is limited to the ILS and does not extend to the CLS.

There was no difference in importance, perceived ability, and typicality of the ILS events generated by the different groups. The lack of difference or association is similar to several past studies (Bohn, 2010; Jørgensen et al., 2012; Rubin et al., 2008; Rubin et al., 2009, Study 1), but contradicts the results of Habermas et al. (2008) and the older sample in Rubin et al. (2009), whereby there was an association between higher depression and trauma levels with lower ILS typicality.

This lack of association in the current study may be due to similar reasons illustrated by Rubin et al. (2009), whereby the sample is too young and may not have experienced many CLS events yet. Although the ILS task was modified to allow participants to also lists events

they had not experienced but did expect to experience in the future, about two-thirds of the events listed had been experienced. In comparison, for the CLS task, approximately only half the events had been experienced. It may have been easier for participants to recall past events they had experienced over imagining future events they had not yet experienced, leading to a preference in listing experienced events despite the allowances made to the task. Hence, the modified ILS task may not have been sufficient to reduce the effect of age and experience on the generation of ILS events. The limited experience of typical CLS events and the ease of recalling experienced events may also explain why the typicality of the ILS does not mimic the typicality of the CLS, although CLS is believed to be the underlying framework of ILS narration. Bohn (2010) further suggested that a lack of association may be due to the less idealistic nature of an ILS in comparison to the CLS. ILS reflect events which are central and personally meaningful, which may not necessarily overlap with the idealistic events typically listed in the CLS, even if the individual has knowledge about the CLS (Berntsen & Rubin, 2002, 2004).

The difference in emotional valence of the ILS but not typicality indicates that all groups may list a similar range of events, but individuals with subclinical PTSD symptoms attach more negative emotions to the same events. For example, both groups might mention university graduation as an ILS event, but the event might have been less positive for people with subclinical PTSD symptoms than for people who are psychologically healthy. This suggestion was corroborated by the subclinical PTSD group rating individual typical ILS events as more negative. Although the negative ratings were not significantly higher at the individual event level, it is likely to have greater effect when added together to form the ILS. Individuals with trauma symptoms have been noted to have negative and pessimistic attribution tendencies towards the past and future (Beck, Rush, Shaw, & Emery, 1979;

Elwood, Hahn, Olatunji, & Williams, 2009; Gray, Pumphrey, & Lombardo, 2003; Lehmann, 1997; Paunovic, 1998; Substance Abuse and Mental Health Services Administration, 2014), which may explain why the subclinical PTSD group rated typically positive events (experienced and expect to experience) as more negative.

There was a further difference of pressure to fulfil the ILS events, with the subclinical PSTD group perceiving more pressure. However, there was no difference in pressure observed for the subclinical depression and non-depressed groups. People with subclinical PTSD experienced significantly more pressure to achieve the events in the ILS but not the events in the CLS when viewed as categorical groups and on a continuum. Pressure to achieve ILS events refers to both pressure from society as well as family and friends, in comparison to pressure to achieve CLS events that only refers to pressure from society. Hence, the difference in ILS pressure but not CLS pressure may be due to the additional influence of family and friends. Traumatic events are more central and defining for people with high trauma (Berntsen et al., 2011; da Silva et al., 2016; Lloyd & Lishman, 1975). It is possible that family, friends, and society may place emphasis and pressure the individual with trauma symptoms to achieve significant, positive, and central events in the ILS, as an attempt to move on and bring back a sense of normality for the traumatized individual and replace the traumatic events from being a central event. Furthermore, expectations towards ILS from one's immediate surroundings could have greater weight due to personal importance, value, and closeness towards the relations with and opinions of those individuals, which is also likely to induce higher feelings of pressure to meet those expectations.

Societal Identification

Collectivism, or how much one views themselves as part of the society (Triandis, 1995), was found to strengthen the association between depression and CLS typicality, but only at low levels of collectivism. This moderation means when an individual has symptoms of depression and low collectivism, the likelihood that this individual will generate a less typical CLS increases. Having high collectivism, however, does not weaken this relation or serve as a protective factor against those with depression generating an atypical CLS. Having low identification and bonds with society is likely to further reduce the connection one has with society, and the awareness and value of these societal expectations (Fukushima et al., 2009). This disconnect, in addition to the social disconnect typically experienced by people with depression symptoms (Cruwys Alexander Haslam, Dingle, Haslam, et al., 2014; Matthews et al., 2016; Taylor & Vaughan, 1967), may result in the formation of less accurate schematic representations (Söderlund et al., 2014), as previously mentioned. Hence, differences in CLS knowledge for people with more depression symptoms that were observed in the current results – which were discussed in the previous sections – may be related to having lower collectivism, causing them to select atypical events as part of the CLS. However, collectivism did not moderate the association between trauma and CLS typicality, as well as the associations of depression and trauma with CLS pressure.

Collectivism was also found to strengthen the relation between depression and trauma with ILS pressure, when collectivism is at moderate and high levels. The relation between depression and ILS pressure was initially not significant but became significant upon adding the influence of collectivism. Individuals with higher depression and trauma symptoms who have average or stronger collectivism will experience higher pressure to achieve events in the ILS. However, having lower levels of collectivism does not weaken these associations. Having higher collectivism indicates that individuals have more knowledge of the societal

expectations and possibly place more value towards these expectations as they feel more bound towards the society and their norms (Ajzen, 1991; Fukushima et al., 2009; Triandis, 1995), increasing the pressure of those with depression and trauma to achieve ILS events. Collectivism did not serve as a moderator for depression and trauma with ILS typicality.

Upon further investigation of the dimension of collectivism involved, vertical collectivism was found to specifically moderate the associations previously mentioned. Vertical collectivism refers to acceptance of hierarchies and inequalities within a society and the willingness to sacrifice personal goals to meet the group goals even if it is against one's personal values, as a sense of duty to the society (Triandis & Gelfland, 1998). Vertical collectivism has been observed more in Asian communities and is a risk factor for people in these communities to develop depression (Ayçiçeği Dinn & Caldwell-Harris, 2016). Having low vertical collectivism means that individuals do not go out of their way to behave in accordance with group norms and do not place high value on group expectations (Triandis, 2000), which may explain its strengthening effects on the relation between higher depression and lower CLS typicality. High vertical collectivism, which is an increase in consciously attempting to adhere with group norms (Triandis, 2000), also explains its strengthening effects on the associations between higher depression and trauma with higher ILS pressure.

Implications

This study provides insight into the differences in the recall of both episodic and semantic components of autobiographical memory for subclinical depression and PTSD states. The findings suggest that there are other cognitive processes that may underlie the recall of CLS, and that these processes differ for individuals with subclinical levels of depression. More research needs to be conducted in this area to further understand and build a

more concrete theoretical framework of CLS, which will also contribute to greater understanding of recall of the ILS.

The findings also suggest that perceptions and values attached for similar events differ for those with subclinical levels of PTSD, and this difference can be applied into clinical work. In the context of therapy, working on reconceptualizing and reframing negative memories to become more neutral or even positive could help to create a less negative life narrative, which could potentially manage or prevent the subclinical levels of trauma from escalating to clinical levels (e.g., Kar, 2011; Lely, Smid, Jongedijk, Knipscheer, & Kleber, 2019).

Moreover, the results highlight the role of societal identification for people with higher depression and trauma. Having too low societal identification results in less awareness of societal norms and, hence, less typical CLS events, whereas having too high societal identification results in more value towards meeting societal norms, and thus induces higher pressure towards ILS events. Instilling an average or healthy level of societal identification could help those with higher depression and trauma be more in touch with society without being overwhelmed by its expectations (e.g., Cruwys, Alexander Haslam, Dingle, Jetten, et al., 2014; Muldoon et al., 2019).

Limitations

Like any study, the current one had some limitations. One limitation is different depression measurements were used for both studies. Although the depression measures were correlated with each other and the results were comparable, there may be still be small differences in the measurements, such as the cut-off scores, that could have affected the results obtained. Besides having different measurements, differences in categories in the CLS

task for both studies is also a limitation. Having different types and amounts of categories provided for categorization could result in differences in how participants categorize the CLS events they generated, which could, in turn, affect measures such as typicality of the CLS. Future studies should control and standardize aspects of the tasks and measurements used.

Another limitation was that the study only tested participants younger than 30 years old. Although the ILS task was modified in an attempt to reduce this bias, the participants' lack of life experience may still have limited the types of events generated. It is unclear whether the findings of this study would also be replicated in more experienced samples. Although these samples are more difficult to recruit, future research should attempt to include them to address this limitation.

Measuring the CLS and ILS using only quantitative methods may be another limitation. Participants in the current study briefly wrote the events and categorized it into existing categories. This method was used to simply the measurement and provide more validity to the results. However, using this method without incorporating qualitative methods limits the depth and breadth of the data obtained, as well as the opportunity to obtain more insight into the nuances and differences that may be observed in the CLS and ILS recorded. Future research could incorporate qualitative methods in addition to quantitative methods to obtain data that is more holistic and multidimensional.

Conclusions

The similarity of characteristics of CLS events regardless of depression and trauma levels indicates that the CLS are culturally shared semantic knowledge. Although the CLS are stable structures, this study found a small difference in the typicality of CLS events for groups who reported subclinical levels of depression symptoms. Further investigation showed

that these differences in typicality is likely to be attributed to these individuals having differences in their knowledge of CLS events. The findings from these studies indicate that there are small differences in information processing of the CLS for individuals with subclinical levels of depression.

Despite the subclinical PTSD group listing less positive ILS events, there was no difference in typicality of ILS. This finding indicates that individuals with subclinical PTSD symptoms list similar events in their ILS as psychologically healthy individuals, but those with subclinical PTSD attach more negative emotions to typically positively rated events, trends that were observed upon further analysis. The subclinical PTSD group also experienced higher pressure to achieve events in the ILS but not the events in the CLS. This difference was attributed to the extra pressure and expectations from significant people, such as family and friends. The findings from these studies demonstrate that knowledge of both CLS and ILS events are shared, but individuals with subclinical levels of PTSD may perceive, value, and attach different meanings to the events.

The amount of societal identification was found to strengthen associations of depression with the typicality of CLS events and depression and trauma with the pressure to achieve ILS events. These results suggest that how much one views themselves as part of the society has an impact on the awareness towards societal expectations and the importance placed in adhering to societal norms.

Chapter 3: Depression, Trauma, and Overgeneral Memory

Besides episodic and semantic aspects, another facet of autobiographical memory is the type of memory recalled. Often, people recall specific memories, but other types of memories can also be recalled. Overgeneral autobiographical memories (OGM) refer to difficulties recalling autobiographical memories that involve a specific event that happened at a certain place and at a certain time. Populations experiencing clinical depression and PTSD tend to recall fewer specific memories and more OGM, even during remission of symptoms. Similar associations with memory specificity have also been observed in high depression and trauma groups from the normal population, although these associations have not been studied as extensively in normal populations as compared to clinical populations. How these associations within the normal population may be affected by the emotional valence and intensity of cues has not been tested yet.

The CaR-FA-X model proposes that the underlying mechanisms for the depression-OGM and trauma-OGM relations are rumination, functional avoidance, and executive functioning. Studies have shown that rumination, avoidant coping, and executive functions relate independently to depression, trauma, and memory specificity. Rumination (i.e., overall and brooding) and higher order executive functions have been shown to mediate and moderate the relations of depression and trauma with specific memories and OGM, but whether avoidant coping and basic level executive functions (i.e., inhibition and verbal working memory) will also mediate or moderate those associations has not been examined. The findings from this study can be used to create more focused interventions for the memory deficits experienced by individuals with subclinical depression and PTSD symptoms.

Background

Specificity of Autobiographical Memories

Autobiographical memories are typically specific, which means that they refer to events that occurred at a certain place and time and lasted no longer than one day (Williams et al., 2007), such as “I went to the local theme park with my friends last Saturday”. However, individuals with psychopathology symptoms, poorer mental health, and cognitive deficits tend to recall autobiographical memories that are general summaries of events, events that lasted longer than a day, and events that lack specific details (Ono et al., 2016; Sumner, 2012; Williams & Broadbent, 1986). This tendency, known as Overgeneral Autobiographical Memory (OGM), is characterized by recalling autobiographical memories with lower specificity, higher categoric traits, and higher inability to recall required memories (Sumner, 2012; Sumner et al., 2010).

Overgeneral memories can be further divided into categorical and extended memories (Liu et al., 2016; Sumner, 2012; Warne, Caseras, & Rice, 2020; Williams & Dritschel, 1992). Categorical memories are memories of events that occurred many times, or summaries of repetitive events, or memories without a distinct place or time (e.g., “attending lectures at university” or “driving to work”), whereas extended memories are memories of one event that had a duration of more than one day (e.g., “I went on holiday with my family to Paris for a week”).

OGM and lower specific memories are used interchangeably in the literature to refer to the same impairments in memory specificity (e.g., Ros et al., 2017; Sumner, 2012; Sumner et al., 2010, 2014). However, they tend to be operationally defined or conceptualized differently when autobiographical memories are measured or categorized for specificity. Lower specific memories refer to either retrieving fewer specific memories, or retrieving events that have fewer or missing details about the time and place the event occurred, the

people involved, and phenomenological details (e.g., weather, clothes, emotions, thoughts) (e.g., Dalgleish, Rolfe, Golden, Dunn, & Barnard, 2008; Kleim & Ehlers, 2008; Sumner et al., 2014). OGM, on the other hand, is associated with events that have less specific details (i.e., specific memories), are general summaries of events (i.e., categorical memories), events that lasted longer than a day (i.e., extended memories), or general semantic information (i.e., semantic associations). OGM has been operationally defined as either singular or various combinations of those memory categories (e.g., Debeer et al., 2009; Liu et al., 2016; Raes, Verstraeten, Bijttebier, Vasey, & Dalgleish, 2010).

OGM and Depression

Individuals with depression symptoms from clinical and normal populations have been found to exhibit a higher recall of OGM (e.g., Liu et al., 2016; Romero, Vazquez, & Sanchez, 2014) and categorical memories (e.g., Dritschel, Kao, Astell, Neufeind, & Lai, 2011; Park, Goodyer, & Teasdale, 2002; Raes et al., 2010; Ridout et al., 2016), and a lower recall of specific memories (e.g., Dalgleish et al., 2007; Dritschel et al., 2011; Haque, Juliana, Khan, & Hasking, 2014; Hitchcock et al., 2019; Ridout et al., 2016). However, these relations were not always found; several studies did not find any association between depression and OGM and specific memories (e.g., Beyderman & Young, 2016; Hermans et al., 2004; Peters, Wessel, Merckelbach, & Boon-Vermeeren, 2002).

Although there is evidence for the existence of the relation between depression and OGM and specific memories, the direction of this relationship is less clear. Kleim and Ehlers (2008) found that having depression symptoms lead to the reduction of specific memories recalled, and having prolonged difficulties in recalling specific autobiographical memories subsequently predicted the worsening in the severity of depression. In addition to the

maintenance of depressive disorders, OGM has also been shown to serve as a vulnerability in the development of depressive symptoms (Liu et al., 2016; Van Daele, Griffith, Van den Bergh, & Hermans, 2014; Warne et al., 2020). These findings suggest that a bidirectional relation exists between depression and OGM and specific memories. However, OGM is not affected by the severity of depression for those with clinical depression, provided that the symptoms are already within the clinical range (Lievaart, van der Heiden, & Geraerts, 2013).

Cues of various mediums (i.e., verbal and pictures) and valences (i.e., positive and negative) are able to elicit impairments in memory specificity among clinically depressed individuals (Champagne et al., 2016; Park et al., 2002; Ricarte et al., 2011; Ridout et al., 2016). However, lower recall of specific memories and higher OGM tendencies and categorical memories were observed more when negative cues were presented as compared to positive cues (Park et al., 2002; Ricarte et al., 2011; Matsumoto, Takahashi, & Kawaguchi, 2020), likely caused by the increase in negative attentional bias experienced by people with depression symptoms (Baert et al., 2010; Dalgleish et al., 2011; Everaert, Duyck, & Koster, 2014).

Impairments in memory specificity for those with clinical depression have also been observed across cultures. Although Dritschel et al. (2011) found that Taiwanese participants were more overgeneral and less specific in memory retrieval as compared to British participants, the depressed groups across both samples retrieved more categorical and fewer specific memories than the non-depressed groups. These findings suggest that the recall of OGM and lower specific memories by individuals with clinical depression are stable across culture and type and valence of cues, but negative cues tend to trigger poorer memory specificity.

OGM and Trauma

Individuals with trauma symptoms from clinical and normal populations exhibit a lower recall of specific memories (e.g., Humphries & Jobson, 2012; Nixon, Ball, Sterk, Best, & Beatty, 2013) and a higher recall of categorical memories (e.g., Schönfeld & Ehlers, 2006, 2017; Schönfeld et al., 2007). However, a lack of association between trauma symptoms in normal populations and specific memories have also been observed (e.g., Raymaekers, Smeets, Peters, & Merckelbach, 2010). These impairments in memory specificity for people with PTSD affect both episodic and semantic components of autobiographical memory (Moradi et al., 2008).

Trauma symptoms have been shown to relate to OGM and specific memories, but similar to depression, the direction of the relation is less clear. Exposure to traumatic events and experiencing higher trauma symptoms predicted a decrease in the recall of specific memories and an increase in the recall of OGM (Kleim & Ehlers, 2008; Zheng & Gray, 2018). This direction was further corroborated by the findings of Sutherland and Bryant (2007), who showed that following successful interventions to reduce PTSD symptoms, the specificity of recalled autobiographical memories also improved. At the same time, more difficulty in recalling specific memories among those with trauma symptoms has been shown to predict the subsequent increases in trauma symptoms to clinical levels (Kleim & Ehlers, 2008). These findings suggest that a bidirectional relation also exists between trauma and OGM and specific memories.

The duration of trauma symptoms has an effect of the specificity of memories. Higher OGM and lower specific memories were observed in individuals with prolonged trauma symptoms but not acute trauma exposure (Hitchcock, Nixon, & Weber, 2014; Nixon et al., 2013), which is categorized as trauma symptoms experienced in the first month following a

traumatic incident (American Psychiatric Association, 2013), although this effect of symptom duration was not always observed (Kleim & Ehlers, 2008). The severity of PTSD or trauma symptoms also affects memory specificity but not in the expected manner of higher symptom severity causing more impairments. Opposite to that, higher PTSD and trauma symptoms was discovered to relate to less OGM and higher generation of specific memories instead (Bunnell & Greenhoot, 2012; Schönfeld et al., 2007). This finding was theorized to be due to lower utilization of avoidant coping techniques for the trauma, which meant there was also less avoidance in cognitive aspects, such as accessing autobiographical memories, and hence, less obstruction to access the details of the memories.

Various types (i.e., word and pictures) and valences (i.e., positive and negative) of cues are able to elicit memory specificity impairment among those with trauma symptoms from clinical and normal samples (Kleim & Ehlers, 2008; Schönfeld & Ehlers, 2006). However, lower specific memories were more evident when presented with negative cues as compared to positive cues for those with trauma symptoms from normal samples (Zheng & Gray, 2018), which can be attributed to people with trauma symptoms having higher negative attentional bias (El Khoury-Malhame et al., 2011; Vythilingam et al., 2007).

Similar to depressive populations, poor memory specificity has been observed across cultures for people from the normal population with higher trauma. Humphries and Jobson (2012) showed that despite the Chinese participants being generally less specific in memory retrieval than British participants, the high trauma groups of both samples retrieved fewer specific memories than the low trauma groups. These findings suggest that the recall of OGM and lower specific memories are stable across culture and cues for people with trauma symptoms, but negative cues trigger more impairments in memory specificity.

Cognitive Mechanism of Overgeneral Memory

The generation of OGM instead of specific memories has been theorized to largely relate back to the Self Memory System (SMS) model (Conway & Pleydell-Pearce, 2000), which was described in greater detail in Chapter 1. To retrieve specific memories generatively, the memory search process within the autobiographical knowledge base needs to be completed and reach the bottom level of the hierarchy, which is the event-specific knowledge level. Generation of OGM is believed to occur when the memory search is cut-off prior to reaching the event-specific knowledge level and is not able to be completed (Williams et al., 2006).

For premature memory truncation to be a possible explanation for the production of OGM and fewer specific memories as observed in depressed and traumatized populations, these groups need to exhibit differences or impairments in the memory search hierarchy. Haque et al. (2014) investigated this hierarchical search process in clinically depressed and non-depressed groups. Non-depressed individuals were able to carry on the search process all the way from the top level to the bottom level to retrieve specific memories, whereas individuals with depression had a tendency to truncate the search process at the general events level, which corresponds with their difficulties in retrieving specific memories. The finding suggests that early cut-off in the memory search hierarchy is indeed a possible explanation for the OGM and lower specific memories seen in people with depression symptoms, and potentially in people with trauma symptoms too.

Williams et al. (2006) suggested that this premature halting of the memory search process was due to insufficient cognitive resources. Building upon the SMS model, Williams et al. (2006, 2007) developed the CaR-FA-X model in an attempt to explain the relation between psychopathology, such as depression and PTSD, and poorer memory specificity. The

CaR-FA-X model proposes that there are three mechanisms that underlie the relation between psychopathology and OGM: capture and rumination (CaR), functional avoidance (FA), and executive functioning (X). The CaR-FA-X model theorises that the insufficient cognitive resources which cause OGM arise from higher capture and rumination, higher functional avoidance, and poorer executive functioning (Williams, 2006; Williams et al. 2007). Individuals with depression and trauma tend to have existing low cognitive resources, and the mechanism proposed in this model further reduces the already low cognitive resources available for the search process, increasing the likelihood of OGM.

Rumination

The first component of the CaR-FA-X model is rumination, which refers to persistent and continuous thoughts regarding the individuals' difficulties, symptoms, and factors that led to or resulted from their current state (Williams et al., 2007). According to the Response Style Theory, rumination is characterized by self-reflection and repetitive focus on negative emotions (Nolen-Hoeksema, 1991). From this characterization, rumination can be further divided into the components of reflection and brooding (Debeer et al., 2009; Treynor, Gonzalez, & Nolen-Hoeksema, 2003). Reflection is the ability to reduce depressive symptoms and feelings by turning inward to conduct cognitive problem solving and is perceived to be more adaptive. Brooding is the tendency to compare their situation and symptoms to others and standards set by themselves and to negatively criticize themselves for the difference in situations and inability to achieve those set standards. Brooding is perceived to be more maladaptive. Continuous thinking about all these areas is believed to reduce cognitive resources available for memory searches, which may cause premature truncation of the memory search process (Williams et al., 2007).

Watkins (2004) proposed that rumination is alternatively divided into the components of conceptual-evaluative and experiential. The conceptual-evaluative subtype is the tendency to compare their situation to standards set by themselves and to focus on the difference in situations, which matches Treynor et al.'s (2003) description of brooding. The experiential subtype refers to awareness of experiences that occur at the current moment. Although the description of experiential appears to be reflective in nature, it does not match Treynor et al.'s (2003) description of reflection which involves cognitive problem solving. Unlike Watkins's (2004) rumination subtypes that were derived theoratically, the subtypes of rumination discussed by Treynor et al. (2003) were obtained from a posthoc factor analysis. Literature has subsequently further supported the existence of brooding and reflection as the two subtypes of rumination and have used these two subtypes in numerous studies related to autobiographical memory (e.g., Debeer et al., 2009; Romero et al., 2014; Schoofs, Hermans, & Raes, 2010).

The retrieval of OGM and lower specific memories in depressed samples are associated with rumination, whereby brooding and reflection either relate to or predict poorer memory specificity (Crane, Barnhofer, Visser, Nightingale, & Williams, 2007; Raes, Hermans, Williams, Demyttenaere et al., 2006; Romero et al., 2014; Watkins & Teasdale, 2001; Watson et al., 2013; Wessel et al., 2014). Rumination was found to mediate the relations of OGM and lower specific memories with the worsening of depression symptoms at future follow-ups in clinically depression populations (Liu et al., 2016; Raes, Hermans, Williams, Beyers et al., 2006). However, Raes, Hermans, Williams, Beyers et al. (2006) found these relations in response to only negative cues. Using a sample of undergraduate students, Debeer et al. (2009) showed that brooding mediated the association between lower specific memories and higher depression, whereas reflection was unrelated. The results from

these studies show that OGM and lower specific memories play a role in the existence and maintenance of depression symptoms, but their effects can be explained by rumination, and specifically by the brooding component. Besides serving as a mediator, rumination has also been suggested to moderate memory specificity in clinically depressed samples (King et al., 2010). In the study by Smets, Griffith, Wessel, Walschaerts, and Raes (2013), rumination was not able to predict OGM on its own but was able to do so when depression was present. This result suggests that depression and rumination need to be present together to cause higher OGM tendencies.

Higher rumination also contributed to more OGM retrieval in PTSD groups but not non-PTSD groups (Schönfeld & Ehlers, 2006). Kleim and Ehlers (2008) found that rumination partially mediated the relation between lower specific memories and the development of PTSD at future follow-ups in normal populations, but Hitchcock et al. (2014) did not replicate this mediation finding when using a sample of children. This finding suggests that lower specific memories contribute to the worsening of trauma symptoms, but its effects could be explained by rumination.

Functional Avoidance

The second component of the CaR-FA-X model is functional avoidance (or affect regulation), which is a passive aversion towards negative memories, by halting the memory search process to remain at a general description level devoid of negative affect instead of completing the memory search process all the way to the bottom (Williams, 2006; Williams et al., 2007). Truncating the search at that higher level prevents the retrieval of specific details related to the memory, including negative emotions attached to the memory. This interruption in retrieval serves as an emotion regulation strategy and enables the individual to

continue functioning and achieving current goals without being influenced by the negative emotions of the memory. Because functional avoidance serves as a protection against negative memories and their negative affect, the recall of negative memories is expected to be slower and more difficult than the recall of positive memories (Ridout et al., 2016). The literature in this area includes avoidance, disengagement, denial, and suppression coping styles as measures of functional avoidance. These terms are used interchangeably to refer to coping that utilizes aversions and dissociations from certain behaviours, cognitions, and emotions (Carver, Scheier, & Weintraub, 1989; Sahler & Carr, 2009).

The diagnostic criteria for PTSD consist of an avoidance domain, which constitutes of avoiding memories, stimuli, emotions, and thoughts associated with the traumatic event (American Psychiatric Association, 2013). Having more symptoms in this domain has been shown to associate with lower specific memories (Dalgleish et al., 2008; Robinson & Jobson, 2013), although there are also results that show the opposite, whereby higher avoidance relates to higher specific memories (Moradi et al., 2008). Higher PTSD symptoms together with avoidance towards negative cues also predicted lower specificity in autobiographical memories (Bunnell & Greenhoot, 2012). Schönfeld et al. (2007) found that PTSD groups recalled more OGM, but only when they were asked to avoid or suppress traumatic memories. Schönfeld and Ehlers (2006) found that higher cognitive avoidance predicted higher OGM only in the PTSD group; however, the avoidance did not explain any unique variance in OGM. These results suggest that although avoidant coping predicts higher OGM and lower specific memories in samples with PTSD, it may not be able to explain relations between trauma and OGM.

The functional avoidance theory is argued as being less relevant for depressed populations despite their tendencies to engage in avoidant behaviours. Functional avoidance

is used to protect oneself from negative memories, but because depressed samples also show OGM tendencies for positive memories, this mechanism was thought to be not as relevant in underlying the relation (Williams et al., 2007). Although the depressed group in the study by Ridout et al. (2016) generated more categorical memories and less specific memories as compared to the non-depressed group, they retrieved negative memories faster than positive memories, indicating a lack of support for the functional avoidance theory for depressed populations. However, Biedermann et al. (2017) found that individuals with depression only had greater difficulty recalling details of memories from periods of adversity, suggesting that there may be some utilization of functional avoidance among those with depression depending on the type of memory recalled. Relations with memory specificity in depressed samples may also depend on the type of avoidant coping used. Behavioural avoidance has been shown to relate to less specific memories in depressed samples (Watson et al., 2013), whereas cognitive avoidance was unrelated (Sweeney, 2015). These findings indicate that although there are instances when avoidant coping is used in the depression and memory specificity relations, there are also instances when it is not used.

Executive Functioning

The third component of the CaR-FA-X model is executive functioning. There is no formal agreement for the definition of executive functioning, components that fall in this area, and measurements for said components (Packwood, Hodgetts, & Tremblay, 2011). However, a large body of literature has encompassed executive functioning as “a set of cognitive processes that are responsible for the planning, initiation, sequencing, and monitoring of complex goal-directed behaviour in the face of distracting information” (Dalgleish et al., 2007, p. 25). Executive functions are effortful and purposeful processes and

are viewed as more difficult and taxing as compared to automatic and instinctual cognitive processes (Diamond, 2013). Executive resources are needed to perform any goal orientated tasks, and hence, the executive control theory states that poor executive functioning and low resource capacity are the reasons that the memory search process cuts off at the general description level (Dalgleish et al., 2007, 2008; Rutherford, 2009; Williams et al., 2007).

Executive functioning can be divided into basic executive functioning and higher-order executive functioning. Basic or core domains of executive functioning are executive functioning involved in handling less complex information and achieving simple goals (Vestberg, Reinebo, Maurex, Ingvar, & Petrovic, 2017). Examples of basic executive functioning are inhibition and verbal working memory (Diamond, 2013; Neshat-Doost et al., 2008; Snyder, 2013). Inhibition is the ability to screen and suppress task irrelevant information and responses, whereas verbal working memory involves maintaining and manipulating verbal-based information during a certain span of time. It is theorized that during the memory search process, inhibition is needed to suppress other memories which may be associated but are not the target memory, whereas working memory is needed to check whether the retrieved memory matches the goal of the retrieval (Williams et al., 2007). Thus, deficits in one of these domains of executive functioning may hinder the memory retrieval process.

Higher-order domains of executive functioning (e.g., planning, verbal fluency, category fluency, fluid intelligence, and updating) are combinations of two or more basic executive functions, and is used for manipulating larger amounts of information and achieving more complex goals (Diamond, 2013; Neshat-Doost et al., 2008; Snyder, 2013; Vestberg et al., 2017). Higher-order executive functions have mixed relations to memory specificity. In clinical samples, verbal fluency has been shown to mediate the relation

between higher depression and lower specific memories (Dalgleish et al., 2007), whereas category fluency was found to not mediate but moderate the relations of depression and trauma with OGM (Valentino, Bridgett, Hayden, & Nuttall, 2012). However, verbal fluency has also been shown to not relate to memory specificity in clinically depressed samples (Raes, Hermans, Williams, Demyttenaere, et al., 2006; Watson et al., 2013).

Looking at the basic executive functioning that make up those higher-order executive functioning, there are mixed findings for the associations between inhibition and memory specificity in depressed and traumatized samples. Self-reported perceptions of poorer inhibition abilities have been shown to mediate the relation between higher depression and more categorical memories in normal samples (Raes et al., 2010), whereas inhibition did not serve as mediators in clinical depression samples (Burns, 2014). Inhibition has also been shown to be unrelated to OGM and depression in clinical samples and trauma in clinical and normal samples (Hitchcock et al., 2014; Valentino et al., 2012). The findings suggest that the relations between depression and memory specificity in normal samples can be explained by inhibition but they are unrelated for samples with clinical depression and for clinical and normal samples with trauma symptoms.

Besides inhibition, poorer working memory has been found to be associated with the recall of fewer specific autobiographical memories and fewer categorical memories in samples with clinical depression and remitted depression but not in normal samples with depression symptoms (Haddad, Harmer, & Williams, 2014; Raes, Hermans, Williams, Demyttenaere, et al., 2006; Ros, Latorre, & Serrano, 2009). Working memory was also unrelated to OGM and trauma in clinical and normal samples (Hitchcock et al., 2014; Schönfeld et al., 2007). The results indicate that working memory is associated to memory

specificity in clinically depressed populations, but not in normal populations with depression symptoms or in clinical and normal populations with trauma symptoms.

The CaR-FA-X model

Williams (2006) theorised that when all three components of the CaR-FA-X model are present, there is a higher probability that depression and trauma will lead to poor memory specificity. Sumner et al. (2014) investigated memory specificity, brooding (CaR), intensity of episodic stressors (FA), avoidant coping (FA), and verbal fluency (X) in a remitted depression group and a non-depressed group. Fewer specific memories for individuals with remitted depression was predicted by interactions between low brooding and low verbal fluency, whereas interaction between high brooding and low verbal fluency predicted fewer specific memories for the non-depressed group. Episodic stressors and avoidant coping were not related to memory specificity for both groups. Meanwhile, Watson et al. (2013) tested specificity of memories, rumination (CaR), behavioural avoidance (FA), and verbal fluency (X) for groups with and without depression. Fewer specific memories were observed for the depressed group as compared to the non-depressed group. Higher rumination and behavioural avoidance related to less specific memories only for the depressed group, whereas verbal fluency was unrelated to memory specificity for both groups.

Fisk et al. (2019) studied memory specificity in adolescent high and low depression groups from the normal sample, along with rumination (CaR), functional avoidance (FA), inhibition (X), working memory (X), and verbal fluency (X). High depression groups retrieved memories that were less specific, had higher rumination, and poorer working memory and verbal fluency as compared to the low depression group. Both groups did not differ on functional avoidance and inhibition scores. Although not tested directly, the

difference in scores led the researchers to conclude that rumination, working memory, and verbal fluency may explain lower memory specificity observed in the high depression group. These results support the CaR component predicting or associating with lower specific memories in populations with higher depression from clinical and normal populations, whereas there were mixed results for the FA and X components. There is, however, no literature testing all three components of the CaR-FA-X model together in samples with trauma symptoms.

Study 3

The Current Study

The purpose of the current study was to investigate whether the specificity of the autobiographical memories generated by individuals with subclinical depression and PTSD symptoms are different as compared to psychologically healthy individuals, and how these relations differ according to the characteristics of the word cues. The current study also aimed to gain more insight into the mechanisms that may underlie the relations between subclinical levels of depression and PTSD and memory specificity.

Autobiographical memories and the specific details of those memories are also used in problem solving, socialization, creating self-concepts, and emotion regulation (Bluck et al., 2005; Fivush, 2011; Pasupathi, 2003), and difficulties retrieving specific memories could affect these functions negatively. By having a better understanding into the underlying mechanisms of OGM, clinical interventions targeting these subclinical populations could address the mechanisms that influence memory recall directly, which could, in turn, reduce impairments in autobiographical memory specificity, and hence, improve their quality of life.

Past studies have found that in normal samples, depression groups retrieved fewer specific memories and more extended and categorical memories than non-depressed groups (Fisk et al., 2019; Romero et al., 2014), and there were associations between depression severity and higher OGM and fewer specific memories (Dalgleish et al., 2007; Raes et al., 2010). Similarly, in normal samples, high trauma groups retrieved fewer specific memories than non-trauma groups (Humphries & Jobson, 2012), and trauma severity was associated with fewer specific memories (Zheng & Gray, 2018).

In terms of the valence of word cues used, negative cues elicited poorer memory specificity than positive cues for those with trauma symptoms from normal populations (Zheng & Gray, 2018). However, at the time of this study, the effects of the valence of word cues on memory specificity of those with subclinical levels of depression have not been tested. Although cues of higher intensity or arousal have generally been associated with the retrieval of more specific memories (Sheldon & Donahue, 2017), the effects of the intensity of word cues on memory specificity of those with subclinical levels of depression and PTSD have not been studied.

All three components of the CaR-FA-X model are related to depression and trauma and memory specificity (e.g., Fisk et al., 2019; Sumner et al., 2014; Watson et al., 2013), but it is not known whether this model serves as the underlying mechanism for memory specificity changes in subclinical and normal samples. Rumination has been shown to mediate the associations of OGM and lower specific memories with higher depression and trauma in clinical samples (Kleim & Ehlers, 2008; Liu et al., 2016; Raes, Hermans, Williams, Beyers et al., 2006). These associations between depression and trauma and memory specificity have been shown to be bidirectional, but whether rumination will still serve as a mediator or moderator for the opposite direction of depression and trauma with OGM and

lower specific memories, and in a normal sample, is not known. In terms of the subcomponents of rumination, brooding has been shown to mediate the relation between lower specific memories and depression in normal samples (Debeer et al., 2009), but whether brooding will still mediate the relation in the opposite direction of depression and trauma with OGM and lower specific memories is also not yet known. Moreover, whether functional avoidance will mediate or moderate the relations of depression, trauma, and memory specificity has not been tested.

Higher order executive functioning mediates and moderates the relations between depression and trauma and memory specificity in clinical samples (Dalgleish et al., 2007; Valentino et al., 2012). Mediation and moderation analyses on basic executive functioning (i.e., inhibition and verbal working memory) as underlying the relations of depression and trauma with memory specificity in normal populations have not been explored in detail yet. Although inhibition was shown to mediate relations between depression and categorical memory in normal samples (Raes et al., 2010), the inhibition measure was obtained from a self-report questionnaire instead of experimentally, and hence, may not reflect accurate inhibition abilities. Furthermore, associations of all three components of the CaR-FA-X model with depression and memory specificity has been tested together (Fisk et al., 2019; Sumner et al., 2014; Watson et al., 2013), but the mediating and moderating role of the CaR-FA-X components on the relations between depression and trauma and memory specificity have yet to be tested in the same sample. Hence, possible interactions that may exist between the various components have not been established.

Several research questions that we aim to answer in this study based on the past literature include:

1) Are there differences in the specificity of autobiographical memories between individuals with subclinical levels of depression and PTSD and psychologically healthy individuals?
2) Does the emotional valence and intensity of cues have an effect on the relations of depression and trauma with memory specificity?
3) Will the components of the CaR-FA-X model (i.e., rumination, functional avoidance, and executive functioning) mediate or moderate the relations of depression and trauma with memory specificity?
4) For executive function component of the CaR-FA-X model, will basic-level executive functioning (i.e., inhibition, verbal working memory) mediate or moderate the relations of depression and trauma with memory specificity?

Based on the previous findings, we hypothesized that

1) Individuals with subclinical levels of depression and PTSD will demonstrate higher OGM tendencies and retrieve fewer specific memories than psychologically healthy individuals.
2) Higher OGM and fewer specific memories will be retrieved by individuals with subclinical levels of depression and PTSD symptoms when the word cue is negative.
3) Higher OGM and fewer specific memories will be retrieved by individuals with subclinical levels of depression and PTSD symptoms when the word cue has higher intensity.
4) Rumination will mediate or moderate the relations of depression with OGM and specific memories and the relations of trauma with OGM and specific memories. In terms of subcomponents, brooding will serve as a mediator or moderator for the

relations of depression and trauma with OGM and specific memories, whereas reflection will not mediate or moderate any of the relations.

5) Functional avoidance will mediate or moderate the relations of trauma with OGM and specific memories but not the relations of depression with OGM and specific memories.
6) Inhibition and verbal working memory will mediate or moderate the relations of depression with OGM and specific memories but not the relations of trauma with OGM and specific memories.

To test these hypotheses, participants were asked to describe memories of events in response to 12 emotional cue words, which they subsequently categorized. Participants then completed the Digit Span and Flanker tasks, followed by the Center for Epidemiologic Studies Depression Scale, PTSD Checklist for DSM-5, Rumination Response Scale – Short Form (RRS-SF), and COPE Inventory.

Method

Participants

Power analysis with a medium effect size of .50, an alpha of .05, and a beta of .20 (to give a power of .80) indicated that 102 participants would be needed to reach statistical significance in an independent-samples t-test. For this study, 123 students from the University of Nottingham Malaysia were recruited. Four participants were excluded from the analyses due errors in memory description (three did not provide descriptions of memories, and one provided one-word descriptions), and one participant was excluded for failing to categorize the memories. The remaining 118 participants had a mean age of 20.33 (*SD* =

1.62, range = 18-27), and the sample consisted of 37 males and 81 females. One-hundred participants were Malaysians and 18 were non-Malaysians (4 Sri Lankan, 4 Indian, 2 Singaporean, 1 Bangladeshi, 1 British, 1 Bruneian, 1 Chinese, 1 Indonesian, 1 Jordanian, 1 Kenyan, and 1 Pakistani). The data in the current study is conceptualized as categorical groups, as well as existing on a continuum.

Materials

Autobiographical Memory Test (AMT). The AMT (Williams & Broadbent, 1986) is a task that elicits autobiographical memories using word cues. A total of 12 cue words (refer to Appendix E) were presented that differed in emotional valence and intensity (Russell, 1980; Warriner, Kuperman, & Brysbaert, 2013): 3 low arousal positive (i.e., "satisfied", "calm", and "relaxed"), 3 high arousal positive (i.e., "happy", "excited", and "surprised"), 3 low arousal negative (i.e., "bored", "sad", and "depressed"), and 3 high arousal negative (i.e., "distressed", "afraid", and "angry"). The cue words were presented in the fixed order of high arousal positive, low arousal negative, high arousal negative, and low arousal positive for each cycle, running a total of 3 cycles.

The words were shown on the screen, one at a time, and participants were given 1 minute and 30 seconds to retrieve and describe a memory via typing it into the space provided. Similar to previous studies testing memory specificity in normal populations, the minimal-instructions version of the AMT was used (Debeer et al., 2009; Humphries & Jobson, 2012). Participants were only instructed to generate a memory for each cue word, with no further indication about the specificity of memory to be retrieved, and no examples or practice items were given. This version of the task was used because these instructions have been found to be able to better detect OGM in normal samples (Debeer et al., 2009).

After participants had retrieved all 12 memories, they were presented the memories back one-by-one, and were required to categorize them based on categories of specificity (i.e., specific, categorical, extended, semantic association, and omission), as obtained and defined from previous studies (e.g., Beyderman & Young, 2016; Debeer et al., 2009). Specific memories were defined as one event that had happened at a particular time and place and that had lasted less than one day (e.g., "last night, I had dinner at a café with my classmates"). Categorical memories included events that occurred repeatedly, summaries of a number of similar events, or events that did not have a distinct time or place (e.g., "I went swimming every Tuesday" or "I went grocery shopping"). Extended memories were described as one event that last longer than one day (e.g., "we went backpacking through Europe for two weeks"). Semantic associations were categorized as any verbal or schematic associations, descriptions of the cue word, or name of persons, animals or objects, or future thoughts (e.g., "eating cookies makes me happy", "being with family", or "graduating in a few weeks"). If no event was recalled or no response was given, it was categorized as an omission (e.g., "I don't know"). Descriptions and examples for each memory category were given to the participants for the categorization part of the task to enable them to categorize their memories accordingly. The reason participants were asked to categorize their own memories is because the memories belong to them and hence, they know how specific the memories are and how many details are attached to the memories. This personal knowledge was perceived to be able to increase the reliability of the categorization of memory specificity.

The Digit Span task. The Digit Span task assesses verbal working memory. This task involves presenting digits to participants and have them recall the sequence immediately in the same order of presentation, with the number of digits presented (i.e., span) increasing

gradually. Higher final span reflects larger verbal working memory capacity. This task has a Cronbach's alpha ranging between .74 and .93 and a two-week test-retest reliability ranging between .39 and .89 (de Paula, Malloy-Diniz, & Romano-Silva, 2016; Gignac, Reynolds, & Kovacs, 2019; Woods et al., 2011).

All instructions, fixation points, and digits in the Digit Span task were presented as black in the font Arial, against a white background, on a screen resolution of 1600 x 900 (refer to Appendix F). A cross (+) was used as the fixation point at the centre of the screen [0,0], and was presented for 1 second with a size of 2cm x 2cm. The stimuli, which consisted of digits ranging between 1 and 9 were similarly presented at the centre of the screen [0,0] for 1 second per number, with a size of 3cm x 3cm. Each trial involved digits being shown in a predetermined order on the screen, one at a time. Participants were required to recall the digits and the order shown per trial and to type the digits in order in the space provided when prompted. The practice trial consisted of two trials of 2-digit spans, for which participants were given feedback on whether their response was correct or incorrect. The spans in the experimental trials ranged between 2 and 9 digits, with two trials for each span, adding to a total of 16 trials (refer to Appendix G). Spans were presented hierarchically, starting with Span 2 (twice), all the way to Span 9. No feedback was provided for the experimental trials. When both trials within a span were answered incorrectly, the scoring was cut off, with all subsequent spans immediately scored as incorrect regardless of the answers provided. The final span, which is the longest span prior to this cut-off, can range between 2 and 9.

The Flanker task. The Flanker test (Eriksen & Eriksen, 1974) is a task that assesses inhibition of task-irrelevant stimuli and responses. This task involves identifying the direction of the stimulus (or arrow) in the centre, while inhibiting the direction of the other stimuli (or arrows) located on the left and right side of the centre stimulus (arrow). Congruent trials, in

which the centre stimulus has the same direction as the other stimuli, serve as baseline measurements, whereas incongruent trials, in which the centre stimulus has a different direction as the other stimuli, serve as inhibition measurements. Fewer errors and shorter response times indicate larger inhibition capacity. The RT cost (i.e., the difference between the RT of congruent and incongruent trials) has a Cronbach's alpha ranging between .53 and .68 and a test-retest reliability ranging between .40 and .91, whereas the error cost (i.e., the difference in the number of errors in congruent and incongruent trials) has a Cronbach's alpha ranging between .27 and .32 and a one-month test-retest reliability ranging between .58 and .72 (Hedge, Powell, & Sumner, 2018; Wöstmann et al., 2013).

Similar to the Digit Span task, instructions and fixation points in the Flanker task were displayed using black Arial font on a white background with a 1600 x 900 resolution (refer to Appendix H). The fixation point (+) was 2cm x 2cm and presented at the centre [0,0] for 0.8 seconds. The stimuli were presented at the centre [0,0] of the screen at a size of 575 x 159 pixels. It consisted of arrow heads pointing to the left (<) or right (>), with each trial involving 5 arrow heads being shown on the screen (refer to Appendix I). Participants were required to identify the direction of the middle arrow head (arrow head number 3). The stimuli were presented indefinitely until participants provided a response. They had to press the "left arrow key" if the middle arrow pointed left, or the "right arrow key" if the middle arrow pointed right. A total of 8 randomized practice trials and 80 randomized experimental trials were run (i.e., practice: 4 congruent and 4 incongruent; experiment: 40 congruent and 40 incongruent). The number of stimuli with arrow heads that is pointing to the left is equal to the number that is pointing to the right (e.g., 20 congruent left and 20 congruent right).

CES-D and PCL-5. Similar to the Study 2 in the previous chapter, the Center for Epidemiologic Studies Depression Scale (CES-D) (Radloff, 1977) was used to measure

depression symptomology in the general population (refer to Appendix D). Also similar to studies in the previous chapter, the PTSD Checklist for DSM-5 (PCL-5) (Weathers et al., 2013) was used to measure PTSD or trauma symptoms (refer to Appendix B).

Rumination Response Scale – Short Form (RRS-SF). The RRS-SF (Treynor et al., 2003) is a 10-item instrument developed to measure ruminative tendencies. It consists of a four-point Likert scale (1-4) (refer to Appendix J), and total rumination score is obtained by adding all the items together. The higher the total score, the higher the rumination tendencies. Summing items of the brooding subscale provides a brooding score, whereas summing items of the reflection subscale provides a reflection score. This scale has a Cronbach's alpha of .77 for the brooding subscale, and .72 for the reflection subscale.

COPE Inventory. The COPE Inventory (Carver et al., 1989) is a 60-item instrument developed to measure types of coping responses. It consists of a four-point Likert scale (1-4) (refer to Appendix K). In the current study, only the 16 items that make up the subscales of mental disengagement, denial, behavioural disengagement, and substance abuse were administered. The mental disengagement subscale measures cognitive distractions used to avoid thinking about stressors, problems, and affected goals; the denial subscale measures tendencies of acting as if the stressor is not real; the behavioural disengagement subscale measures reductions in efforts to deal with the stressor and achieve affected goals; and the substance abuse subscale measures the usage of alcohol and drugs to reduce distress. An avoidant-coping factor is obtained by summing items from the subscales of mental disengagement, denial, behaviour disengagement, and substance abuse (Litman, 2006; Sumner et al., 2014). Higher scores represent a stronger avoidant coping style. This scale has a Cronbach's alpha of .71. for the denial subscale, .65 for the behavioural inhibition subscale,

.45 for the mental disengagement subscale, and .92 for the substance abuse scale (Carver et al., 1989; Fontaine, Manstead, & Wagner, 1993).

Procedure

This study was approved by the Science and Engineering Research Ethics Committee of the University of Nottingham Malaysia (AM270318). The study was conducted using a desktop computer in a research lab within the University. Participants were first given an information sheet to read and a consent form and demographic sheet to answer. Participants begun the experiment by answering the AMT, followed by completing the Digit Span task and Flanker task. Last, participants answered the CES-D Scale, PCL-5, RRS-SF, and COPE Inventory. The order of the tasks was fixed, as listed above. The session took approximately 50-60 minutes to complete. At the end of the session, the participants were thanked and given a small financial reward (RM15) for their participation.

Scoring

Total specific memories were calculated by summing the number of memories categorized as specific by the participants. Similarly, total categorical, extended, semantic, and omissions were obtained by adding the number of categorical, extended, semantic, and omissions categorized, respectively. Total overgeneral memory was calculated by summing the categorical and extended memories (Sumner, 2012; Williams & Dritschel, 1992).

The scoring for the Digit Span task was cut off when both trials of a span were answered incorrectly. The final span was then calculated as the length of the last sequence accurately recalled prior to this cut-off. Higher final span reflects higher verbal working memory capacity.

Although previous studies using executive functioning tasks have focused on either only measuring reaction time or measuring number of errors (Hitchcock et al., 2014; Valentino et al., 2012) for basic executive functioning, Dalgleish et al. (2007) suggested using both measures to be able to encapsulate executive functioning better. One reason for this suggestion may be the speed-accuracy trade-off theory, which states that performance in task accuracy (or errors) and the response speed (or reaction time to complete the task) are interdependent components (Heitz, 2014). For these reasons, the current study uses these two measures for the inhibition component.

Cost errors and cost RT in the Flanker task were used as indices of inhibition. Total errors for each condition was first obtained by summing the trials that had incorrect responses. Cost errors was then calculated by subtracting total errors of the incongruent condition with total errors of the congruent condition. Mean RT of correct trials for each condition was calculated by excluding the RT of all trials with incorrect responses and all correct trials with less than 100 ms and averaging the RT of trials with correct responses. Cost RT was then obtained by subtracting mean RT of correct trials for incongruent condition with mean RT of correct trials for congruent condition. Less cost errors and shorter cost RT reflect better inhibition.

Because the Flanker task resulted in two final measures (i.e., Flanker cost error and Flanker cost RT), a principle component analysis was run on these two measures to create a composite inhibition score. The analysis revealed the presence of one inhibition component, explaining 100% of the variance. Hence, the composite inhibition score was obtained by adding the Z-scores of Flanker cost error and Flanker cost RT.

Results

Autobiographical Memory Specificity *[Descriptives]*

Participants were asked to retrieve memories in response to emotional cue words of different valences and intensities, and then were required to categorize each memory as either specific, categorical, extended, semantic, or omission. Majority of the memories retrieved were specific (37.3%), followed by categorical (30.4%). A smaller amount of memories was extended memories (19.0%), semantic associations (8.1%), and omissions (5.3%). Out of 12 recalled memories, the maximum total specific memories retrieved were 9, whereas a maximum total of 11 categorical memories were retrieved, and a maximum total of 10 for extended memories. Of the sample, 2.5% were unable to recall any specific memories. Pearson correlation coefficients were calculated to look at the associations within the various memory specification categories (see Table 3.1).

Positive cues elicited mostly specific memories (44.2%), followed by categorical (28.0%), whereas negative cues elicited mostly categorical memories (32.8%), followed by specific (30.4%). There were fewer extended memories (positive: 15.8%; negative: 22.2%), semantic associations (positive: 6.6%; negative: 9.5%), and omissions (positive: 5.4%; negative: 5.2%) retrieved for both positive and negative cues. High intensity cues generated specific memories (44.1%) highest, and then categorical memories (23.3%), whereas low intensity cues generated categorical memories (37.4%) highest, followed by specific memories (30.5%). Both high and low intensity cues generated less extended memories (high: 19.4%; low: 18.6%), semantic associations (high: 8.5%; low: 7.6%), and omissions (high: 4.8%; low: 5.8%).

Memory Specificity, Depression, and Trauma *[Hypothesis 1]*

Scoring of subclinical and psychologically healthy groups. To examine the data from a categorical approach, participants who scored a total of 20 and above in the CES-D (Vilagut et al., 2016) were categorized as subclinical depression (n = 57; males = 14, females = 43), whereas those who scored a total of 19 and below were categorized as non-depressed (n = 61; males = 23, females = 38). The depression scores did not vary significantly from the cut-off score (M = 20.87, SD = 9.91, $t(117) = 0.96$, p = .340), indicating the scores clustered around the cut-off.

For the PCL-5 (Weathers et al., 2013), individuals that scored a total of 33 and above were categorized as subclinical PTSD (n = 33; males = 11, females = 22), whereas those who scored a total of 32 and below were categorized as non-PTSD (n = 85; males = 26, females = 59). The trauma scores varied significantly from the cut-off score (M = 25.24, SD = 15.15, $t(117) = -5.57$, $p < .001$), indicating that the scores were distributed away from the cut-off.

Subclinical and psychologically healthy group differences for memory specificity. To examine differences in memory specificity between subclinical depression and non-depressed groups and between subclinical PTSD and non-PTSD groups, independent-samples t-tests were conducted (see Table 3.2, Figure 3.1, and Figure 3.2). There were no differences in the number of specific memories ($t(116) = -1.57$, p = .119), OGM ($t(116) = 1.72$, p = .088), categorical memories ($t(116) = 1.52$, p = .132), extended memories ($t(116) = 0.01$, p = .994), semantic associations ($t(116) = 0.82$, p = .417), and omissions ($t(116) = -1.12$, p = .266) retrieved by the subclinical depression and non-depressed groups.

The subclinical PTSD and non-PTSD groups retrieved similar numbers of OGM ($t(116) = 1.04$, p = .299), categorical memories ($t(116) = 0.56$, p = .579), extended memories ($t(116) = 0.50$, p = .618), and omissions ($t(116) = -0.99$, p = .322). Although the subclinical PTSD group retrieved fewer specific memories ($t(116) = -2.25$, p = .027) and more semantic

associations ($t(43.25) = 2.25$, $p = .029$) than the non-PTSD group, both differences were no longer significant after applying the Bonferroni correction ($p \leq .008$).

Predictive effects of depression and trauma on memory specificity. Besides taking a categorical approach, we also treated depression and trauma as continuous variables. Exploratory linear regression analyses were conducted to test the predictive effects of depression and trauma severity on memory specificity. Although depression severity explained 4.8% of the variance in specific memories ($F(1, 116) = 5.85$, $p = .017$, *beta* = -.22), and 4.1% of the variance in semantic associations ($F(1, 116) = 4.93$, $p = .028$, *beta* = .20), it was no longer a significant predictor of both memory specificities after applying Bonferroni corrections ($p \leq .008$). Depression severity also did not explain other memory specificity categories (ps > .05).

Trauma severity significantly explained 6.8% of the variance in semantic associations ($F(1, 116) = 8.46$, $p = .004$) even after Bonferroni correction ($p \leq .008$), whereby higher trauma symptoms predicted more semantic associations (*beta* = .26, $p = .004$). Although trauma severity explained 4.2% of the variance of specific memories ($F(1, 116) = 5.03$, $p = .027$, *beta* = -.20, $p = .027$), it was no longer a significant predictor of specific memories after applying a Bonferroni correction ($p \leq .008$). Trauma severity also did not explain other memory specificity categories (ps > .05).

Subclinical and psychologically healthy group differences for CaR-FA-X components. Besides memory specificity, independent-samples t-tests were also conducted to test differences in components of the CaR-FA-X model between subclinical depression and non-depressed groups and between subclinical PTSD and non-PTSD groups (see Table 3.2). The subclinical depression group had higher rumination ($t(116) = 3.15$, $p = .002$) and avoidant coping ($t(116) = 3.18$, $p = .002$) levels than the non-depressed group. These

differences remained significant after applying a Bonferroni correction ($p \leq .013$). There were no differences in inhibition and final span between the subclinical depression and non-depressed groups (ps > .05).

The subclinical PTSD group had higher levels of rumination ($t(116) = 5.27$, $p \leq .001$) and avoidant coping ($t(40.48) = 4.99$, $p \leq .001$), and lower final span ($t(116) = -2.66$, $p = .009$) than the non-PTSD group. After applying a Bonferroni correction ($p \leq .013$), these differences were still significant. There was no difference in inhibition levels between the subclinical PTSD and non-PTSD groups ($p = .153$).

Valence and Intensity of Cues *[Hypotheses 2 and 3]*

Depression groups and memory specificity. To test the effects of valence and intensity of cues on the specificity of memory recalled between subclinical depression and non-depressed groups, and between subclinical PTSD and non-PTSD groups, mixed-design multivariate analyses of variance were conducted. There was no interaction between depression groups and valence of cues, with subclinical depression and non-depressed groups retrieving similar numbers of specific memories ($F(1,116) = 0.27$, $p = .603$), OGM ($F(1,116) = 0.82$, $p = .776$), categorical memories ($F(1,116) = 0.56$, $p = .456$), extended memories ($F(1,116) = 1.71$, $p = .194$), semantic associations ($F(1,116) = 0.01$, $p = .915$), and omissions ($F(1,116) = 0.14$, $p = .705$) for both positive and negative cues. Depression groups and intensity of cues also did not interact, with subclinical depression and non-depressed groups retrieving similar numbers of specific memories ($F(1,116) = 0.03$, $p = .857$), OGM ($F(1,116) = 0.01$, $p = .912$), categorical memories ($F(1,116) = 0.60$, $p = .440$), extended memories ($F(1,116) = 0.62$, $p = .432$), semantic associations ($F(1,116) = 1.49$, $p = .225$), and omissions ($F(1,116) = 3.25$, $p = .074$) for both high and low intensity cues.

Trauma groups and memory specificity. Similarly, trauma groups and cue valence did not have an interaction, with subclinical PTSD and non-PTSD groups retrieving similar numbers of specific memories ($F(1,116) = 0.51$, $p = .475$), OGM ($F(1,116) = 0.09$, $p = .770$), categorical memories ($F(1,116) = 0.10$, $p = .754$), extended memories ($F(1,116) = 0.00$, $p = .951$), semantic associations ($F(1,116) = 1.83$, $p = .179$), and omissions ($F(1,116) = 1.08$, $p = .300$) for both positive and negative cues. There was also no interaction between trauma groups and cue intensity, with subclinical PTSD and non-PTSD groups also retrieving similar numbers of specific memories ($F(1,116) = 0.12$, $p = .726$), OGM ($F(1,116) = 0.24$, $p = .623$), categorical memories ($F(1,116) = 0.07$, $p = .794$), extended memories ($F(1,116) = 0.14$, $p = .708$), semantic associations ($F(1,116) = 2.69$, $p = .104$), and omissions ($F(1,116) = 0.00$, $p = .990$) for both high and low intensity cues.

Mediators of Depression, Trauma, and Memory Specificity *[Hypothesis 4, 5, and 6]*

To investigate the associations between rumination, avoidant coping, and executive functioning with depression, trauma, and memory specificity (see Table 3.1), Pearson correlation coefficients were calculated. As depression and trauma predicted specific memories and semantic associations but not OGM, prior to Bonferroni corrections, only correlations with specific memories and semantic associations will be discussed here.

Higher levels of rumination were associated with higher levels of depression ($r(116) = .54$, $p < .001$) and higher levels of trauma ($r(116) = .59$, $p < .001$). However, there were no linear relations between rumination and specific memories ($r(116) = -.16$, $p = .085$) and semantic associations ($r(116) = .16$, $p = .087$). Higher levels of avoidant coping was associated with higher levels of depression ($r(116) = .51$, $p < .001$) and higher levels of trauma ($r(116) = .64$, $p < .001$). However, there were no linear relations between avoidant

coping and specific memories ($r(116) = -.09$, $p = .363$) and semantic associations ($r(116) = .17$, $p = .060$).

There were no linear relations between depression and inhibition ($r(116) = .08$, $p = .365$) and final span ($r(116) = -.07$, $p = .434$). Higher levels of trauma were associated with lower final span ($r(116) = -.23$, $p = .013$) but not with inhibition ($r(116) = .13$, $p = .178$). There were no significant correlations between specific memories and inhibition ($r(116) = .02$, $p = .853$) and final span ($r(116) = -.10$, $p = .288$). There were also no significant associations between semantic associations and inhibition ($r(116) = -.00$, $p = .978$) and final span ($r(116) = -.03$, $p = .792$). Due to the lack of relations to both variables in each relation, no components of the CaR-FA-X model could be tested as mediators for the relations of depression and trauma with specific memories and semantic associations.

Moderators of Depression, Trauma, and Memory Specificity *[Hypothesis 4, 5, and 6]*

To test the effects of the CaR-FA-X model on the relations of depression and trauma with memory specificity, moderation analyses were conducted. Exploratory moderation analyses were performed for the relations of depression and trauma with categorical memories, extended memories, semantic associations, and omissions despite them not being included in the hypotheses. Although there are no relations for depression and trauma with OGM, categorical memories, extended memories, and omissions, exploratory moderation analyses were still conducted to test whether these relations would become significant upon the addition of the moderator. All components of the CaR-FA-X model were tested as moderators for the exploratory moderation analyses, due to its exploratory nature.

Moderation analyses for depression and trauma and specific memories.

Rumination ($\Delta R^2 = .00$, $p = .801$), avoidant coping ($\Delta R^2 = .00$, $p = .956$), inhibition ($\Delta R^2 = .01$,

p = .357), and final span (ΔR^2 = .00, p = .929) were found not to moderate the relation between depression and specific memories. Similarly, the relation between trauma and specific memories were also not moderated by rumination (ΔR^2 = .01, p = .406), avoidant coping (ΔR^2 = .00, p = .865), inhibition (ΔR^2 = .01, p = .401), and final span (ΔR^2 = .00, p = .491).

Moderation analyses for depression and trauma and OGM. For the relation between depression and OGM, rumination (ΔR^2 = .02, p = .095), avoidant coping (ΔR^2 = .01, p = .392), inhibition (ΔR^2 = .00, p = .609), and final span (ΔR^2 = .00, p = .576) were found not to moderate the relation. Rumination (ΔR^2 = .00, p = .835), avoidant coping (ΔR^2 = .00, p = .862), inhibition (ΔR^2 = .00, p = .734), and final span (ΔR^2 = .01, p = .366) also did not moderate the relation between trauma and OGM.

Moderation analyses for depression and trauma and categorical memories. Rumination (ΔR^2 = .02, p = .183), avoidant coping (ΔR^2 = .02, p = .171), inhibition (ΔR^2 = .01, p = .407), and final span (ΔR^2 = .00, p = .651) were shown to not moderate the relations between depression and categorical memories. Similarly, the relation between trauma and categorical memories were also not moderated by rumination (ΔR^2 = .00, p = .693), avoidant coping (ΔR^2 = .00, p = .869), inhibition (ΔR^2 = .00, p = .502), final span (ΔR^2 = .01, p = .317).

Moderation analyses for depression and trauma and extended memories. For the relation between depression and extended memories, rumination (ΔR^2 = .00, p = .843), avoidant coping (ΔR^2 = .01, p = .418), inhibition (ΔR^2 = .00, p = .612), and final span (ΔR^2 = .02, p = .197) were shown to not moderate the relation. Rumination (ΔR^2 = .01, p = .422), avoidant coping (ΔR^2 = .00, p = .990), inhibition (ΔR^2 = .00, p = .617), and final span (ΔR^2 = .00, p = .792) also did not moderate the relation between trauma and extended memories.

Moderation analyses for depression and trauma and semantic associations.

Rumination was found to moderate the relation between depression and semantic associations (ΔR^2 = .07, *B* = .01, *SE* = .00, *p* = .004). Depression predicted semantic associations more strongly when rumination levels increased. However, this moderation effect was only present at high rumination levels. In terms of the subcomponents of rumination, the relation between depression and semantic associations was moderated by both brooding (ΔR^2 = .04, *B* = .01, *SE* = .00, *p* = .022) and reflection (ΔR^2 = .06, *B* = .01, *SE* = .00, *p* = .005). When brooding and reflection increased, depression more strongly predicted semantic associations, but these effects occurred only at high brooding and reflection levels. Inhibition moderated the relation between depression and semantic associations (ΔR^2 = .04, *B* = .03, *SE* = .02, *p* = .035), whereby depression predicted semantic associations more strongly when deficits in inhibition increased, but only at high deficit levels. Avoidant coping (ΔR^2 = .01, *p* = .267) and final span (ΔR^2 = .00, *p* = .526) did not moderate the depression and semantic associations relation.

Similar to depression, rumination moderated the relation between trauma and semantic associations (ΔR^2 = .03, *B* = .00, *SE* = .00, *p* = .043). Trauma predicted semantic associations more strongly when rumination levels increased, but this moderation effect only took place at high rumination levels. In terms of the subcomponents of rumination, brooding (ΔR^2 = .03, *p* = .061) and reflection (ΔR^2 = .02, *p* = .090) did not independently moderate the relation between trauma and semantic associations. Inhibition functioned as a moderator of the relation between trauma and semantic associations (ΔR^2 = .04, *B* = .02, *SE* = .01, *p* = .023). Trauma predicted semantic associations more strongly when deficits in inhibition increased, at both moderate and high deficiency levels. Avoidant coping (ΔR^2 = .00, *p* = .645) and final span (ΔR^2 = .00, *p* = .971) were not moderators of the relation between trauma and semantic associations.

Moderation analyses for depression and trauma and omissions. For the depression and omissions relation, rumination (ΔR^2 = .00, p = .854), avoidant coping (ΔR^2 = .00, p = .818), inhibition (ΔR^2 = .03, p = .063), and final span (ΔR^2 = .00, p = .977) did not moderate the relation. Rumination (ΔR^2 = .00, p = .568), avoidant coping (ΔR^2 = .00, p = .952), inhibition (ΔR^2 = .03, p = .062), and final span (ΔR^2 = .00, p = .770) also did not moderate the trauma and omissions relation.

Discussion

The present study investigated the associations between subclinical depression and PTSD levels with memory specificity, and how intensity and valence of cues affects those relations. The study also tested CaR-FA-X components as the underlying mechanisms of the depression and trauma with memory specificity relations. To investigate these aims, participants completed the AMT, Digit span test, and Flanker task, along with measures of depression, trauma, rumination, and avoidant coping. Overall findings indicate that:

1) There were no differences in the specificity of memory between individuals with subclinical depression and PTSD and psychologically healthy individuals (Hypothesis 1 was not accepted). However, higher trauma severity predicted the generation of more semantic associations.
2) Valence and intensity of cues did not have any effect on memory specificity for individuals with subclinical depression and PTSD and psychologically healthy individuals (Hypotheses 2 and 3 were not accepted).
3) Rumination did not mediate or moderate the relations of depression and trauma with specific memories and OGM (Hypothesis 4 was not accepted). However, rumination moderated the relations of depression and trauma with semantic associations. Higher

rumination strengthened the relations between higher depression and trauma and higher semantic associations. The subcomponents of rumination, brooding and reflection, independently moderated the relation between depression and semantic associations but not the relation between trauma and semantic associations.

4) Functional avoidance did not mediate or moderate the relations of depression (part of Hypothesis 5 was accepted) and trauma (part of Hypothesis 5 was not accepted) with specific memories and OGM.
5) Inhibition and working memory did not mediate or moderate the relations of depression (part of Hypothesis 6 was not accepted) and trauma (part of Hypothesis 6 was accepted) with specific memories and OGM. However, inhibition moderated the relations of depression and trauma with semantic associations. More deficits in inhibition strengthened the relations between higher depression and trauma and higher semantic associations.

Memory Specificity, Depression, and Trauma

In the current study, there were no differences in any of the categories of memory specificity between subclinical depression and non-depressed groups when the data was viewed from a categorical approach. The lack of differences was different from Fisk et al. (2018) and Romero et al. (2014), who found differences in specific, extended, and categorical memories between depressed and non-depressed groups in a normal sample. Similarly, from a continuous approach, depression severity also did not predict changes in the categories of memory specificity. This finding matched several past studies that used a normal sample (Hermans et al., 2004; Peters et al., 2002; Raymaekers et al., 2010), but was also different from a number of past studies that found depression severity related to specific memories and

OGM (Dalgleish et al., 2007; Raes et al., 2010). The current findings were also different from studies testing group differences using clinical samples (Dritschel et al., 2011; Hitchcock et al., 2019; Park et al., 2002; Ridout et al., 2016; Watson et al., 2013) and studies that tested the relation in the opposite direction (Debeer et al., 2009; Kleim & Ehlers, 2008; Liu et al., 2016).

Similar to the findings with depression, when taking a categorical approach, there were no differences in the memory specificity categories between subclinical PTSD and non-PTSD groups. These results were different from the results of Humphries and Jobson (2012), who found differences in specific memories between high trauma and non-trauma groups in a normal sample. Using the continuous approach, trauma severity did not predict changes in all categories of memory specificity except semantic associations, which was different from Zheng and Gray (2018) who showed trauma severity predicted fewer specific memories in normal samples. The current results were different from studies on group differences in clinical samples (Nixon et al., 2013; Schönfeld & Ehlers, 2006, 2017; Schönfeld et al. 2007) and studies that tested the relation in the opposite direction (Kleim & Ehlers, 2008).

There were also no effects of emotional valence or intensity of the cues on memory specificity between subclinical depression and non-depressed groups, and between subclinical PTSD and non-PTSD groups. The current finding is different from Matsumoto et al. (2020) and Zheng and Gray (2018)'s results of negative cues eliciting higher categorical memories in high depression groups and fewer specific memories in high trauma groups from the normal population. The lack of effect of valence of cues is also different from the results of clinical studies (Park et al., 2002; Ono et al., 2016; Ricarte et al., 2011; Schönfeld & Ehlers, 2006).

Rumination, avoidant coping, inhibition, and working memory did not mediate or moderate the relations of depression and trauma with specific memories and OGM. Hence, the CaR-FA-X model was not supported as the underlying mechanisms of the relations of depression and trauma with specific memories and OGM. These results are different from past studies that found evidence for rumination as a mediator in samples with clinical levels of depression and PTSD (Kleim & Ehlers, 2008; Liu et al., 2016; Raes, Hermans, Williams, Beyers et al., 2006) and inhibition as a mediator in clinically depressed samples (Raes et al., 2010). However, it should be noted that the studies that found rumination functioning as a mediator tested the relation in the opposite direction of the current study (i.e., OGM and memory specificity – depression and trauma). This difference in direction, in addition to the past studies using clinical samples may explain why these findings were not replicated.

However, exploratory analyses showed that rumination and inhibition function as moderators by strengthening the relations of higher depression and trauma with more semantic associations. In terms of subcomponents, both brooding and reflection functioned independently as moderators for the depression and semantic association relation, whereas brooding and reflection were not able to function independently as moderators for the trauma and semantic association relation.

Possible Explanations for Different Findings

The results of the current study did not replicate the results of past studies on the groups differences in memory specificity, relations of depression and trauma severity and memory specificity, and effects of valence of cues on memory specificity. One possible explanation is that Asian samples have been noted to retrieve less specific and more categorical memories overall as compared to Caucasian samples, regardless of depression and

trauma levels (Dritschel et al., 2011; Humphries & Jobson, 2012; Wang, 2009). As the sample of the current study consists of mostly Asians, there is a possibility that without being instructed to retrieve specific memories, these individuals may have retrieved autobiographical memories in a more naturalistic style that is less specific and more categorical. However, this lack of specificity may not necessarily reflect an inability or difficulty in retrieving specific memories with which depression and trauma have been associated with and could therefore explain the lack of associations between depression and trauma and memory specificity.

Another explanation is the type of AMT used to elicit autobiographical memories. The minimal instruction version of the AMT was used in the current study, which Debeer et al. (2009) found to be a better method to detect and measure OGM in normal populations, as compared to the original or specific instruction version of the AMT. Individuals with depression symptoms from normal populations were found to be able to retrieve specific memories when specifically instructed to, but not on an automatic basis, which is the reason minimal instructions AMT was found to better detect memory specificity in this population (Debeer et al., 2009). Although the minimal instruction AMT functions well in normal populations, it may not have been sufficient or sensitive enough to capture OGM tendencies and deficits in memory specificity in subclinical populations, who experience significantly higher symptoms than those typically associated with normal populations. Instead the specific version of the AMT that contains specific instructions which are more suited for clinical populations may be a better tool to capture the OGM tendencies, as subclinical populations share similar symptoms and difficulties as clinical populations but at lower severity (Ji, 2012). As individuals with more clinical or severe depression tend to have difficulties recalling specific memories regardless of instructions (Debeer et al., 2009), the specific

instruction AMT may be able to better distinguish the people who can retrieve specific memories when specifically instructed to (e.g., average depression and trauma symptoms, non-disordered groups) from those who are unable to do so even when instructed (e.g., above average depression and trauma symptoms, subclinical depression and PTSD groups).

Both possible reasons suggest that providing more specific instructions for memory retrieval may be more suitable for samples that have subclinical symptoms and consists of more Asians than Caucasians. Therefore, a second study was conducted using more specific instructions for memory retrieval to reduce effects of culture and task sensitivity.

Study 4

The Current study

Study 4 aimed to test whether memory specificity between individuals with subclinical levels of depression and PTSD and psychologically healthy individuals would be different when specific instructions are given for autobiographical memory recall instead of minimal instructions. The results of this study could be applied into clinical settings, by highlighting whether the way clinicians ask for narration of memories of people with depression and trauma symptoms could produce different narration and details, which could in turn affect the course of treatment. Changes in amount of details remembered could also increase or decrease utilization of the functions of autobiographical memory.

Besides changes in instructions, there were also changes in the executive functioning tasks in Study 4. In contrast to Study 3, the Flanker test and the Digit Span task which measured inhibition and verbal working memory, respectively, were replaced by the Stop Signal task and the n-back task. The reason the tasks were changed was to improve the reliability of the inhibition and verbal working memory measures, which could in turn

improve the reliability of the findings on the relations tested. Higher number of trials in tasks have been shown to improve the reliability of the measure (e.g., Kelemen, Weinberg, Alford, Mulvey, & Kaeochinda, 2006; Salo, Grimshaw, & Viitasalo, 1997). For this reason, the executive functioning tasks selected for Study 4 (i.e., Stop Signal = 240 trials; n-back = 180 trials) were tasks that had higher number of trials than the tasks in Study 3 (i.e., Flanker = 80 trials; Digit Span = 16 trials). Despite the difference in tasks used, correlations have been found between the Flanker and Stop Signal tasks, and between the Digit Span and n-back tasks (Hedge et al., 2018; Redick & Lindsey, 2013), suggesting that the results are still comparable between Study 3 and 4.

For Study 4, the research questions were the same as in Study 3. One research question was, however, added, which was whether using specific instructions to elicit memory will result in more specific memories being retrieved in samples that have subclinical level of symptoms and consists of more Asian participants. We hypothesized that

1) The specific version of the AMT will elicit more specific memories than the minimal version of the AMT (from Study 3).
2) Individuals with subclinical levels of depression and PTSD will demonstrate higher OGM tendencies and retrieve fewer specific memories than psychologically healthy individuals.
3) Higher OGM and fewer specific memories will be retrieved by individuals with subclinical levels of depression and PTSD symptoms when the word cue is negative.
4) Higher OGM and fewer specific memories will be retrieved by individuals with subclinical levels of depression and PTSD symptoms when the word cue has higher intensity.

5) Rumination will mediate or moderate the relations of depression with OGM and specific memories, and the relations of trauma with OGM and specific memories. In terms of subcomponents, brooding will serve as a mediator or moderator for the relations of depression and trauma with OGM and specific memories, whereas reflection will not mediate or moderate any of the relations.
6) Functional avoidance will mediate or moderate the relations of trauma with OGM and specific memories, but not the relations of depression with OGM and specific memories.
7) Inhibition and verbal working memory will mediate or moderate the relations of depression with OGM and specific memories, but not the relations of trauma with OGM and specific memories.

To test these hypotheses, participants described and categorized memories of events in response to 12 emotional cue words. Participants then completed the Stop Signal and n-back tasks, followed by the Center for Epidemiologic Studies Depression Scale, PTSD Checklist for DSM-5, Rumination Response Scale – Short Form (RRS-SF), and COPE Inventory.

Method

Participants

Similar to Study 3, power analysis indicated that 102 participants would be needed to reach statistical significance in an independent-samples t-test. For the fourth study, 139 students from the University of Nottingham Malaysia were recruited. No participants were removed because there were no errors in answering the memory task. The participants had a

mean age of 19.96 (*SD* = 1.70, range = 17-26), and the sample consisted of 34 males and 105 females. One-hundred twenty-two of the participants were Malaysians and 17 were non-Malaysians (2 Korean, 2 Sri Lankan, 2 Indian, 2 Pakistani, 1 Singaporean, 1 British, 1 Bruneian, 1 Chinese, 1 Indonesian, 1 Bangladeshi, 1 Jordanian, 1 Ugandan, and 1 Zambian). In a similar manner as Study 3, the data is viewed as both categorical groups and existing on a continuum.

Materials

Questionnaires and AMT. Similar to Study 3, the CES-D (Radloff, 1977) was used to measure depression symptomology in the general population (refer to Appendix D), the PCL-5 (Weathers et al., 2013) was used to measure PTSD or trauma symptoms (refer to Appendix B), the RRS-SF (Treynor et al., 2003) was used to measure rumination levels (refer to Appendix J), and the COPE Inventory (Carver et al., 1989) was used to measure avoidant coping levels (refer to Appendix K). The AMT (Williams & Broadbent, 1986) was used again to elicit autobiographical memories, using the same 12 cue words as Study 3 (refer to Appendix E). Instead of the minimal-instructions version, the standard or specific version of the AMT was used, which contains more specific instructions. Participants were instructed to retrieve specific autobiographical memories that had occurred at a particular time and place and had lasted less than a day, for each cue word given. Prior to beginning the actual task, participants were given examples of specific memories and less specific memories using four cue words (i.e., “water”, “book”, “sun”, and “cookie”). Following the same procedure as Study 3, after describing the memories in the spaces provided, participants were presented the descriptions back one at a time and had to categorize them into the different categories of specificity.

Stop Signal Task. The Stop Signal task is used to assess inhibition towards irrelevant stimuli and responses. This task involves providing a response to stimuli as fast as possible, except when the inhibitory stimuli or "stop signal" is shown, to which participants would need to inhibit their responses. However, the presentation of the stop signal is not consistent across trials, with the time taken for the stop signal to appear (i.e., the stop signal delay) following a one-up / one-down staircase design. When participants are able inhibit their responses accurately towards the stop signal, the stop signal delay becomes longer, whereas when participants are not able to inhibit their responses accurately, the stop signal delay becomes faster. Longer stop signal delays are more difficult to inhibit as compared to faster stop signal delays. This design enables the Stop Signal Reaction Time (SSRT) to be obtained, which is the time taken for the individual to inhibit their responses when necessary. Lower SSRT means the individual took a shorter time to successfully inhibit the responses and reflects higher inhibition abilities. This task has Cronbach's alpha ranging between .29 and .61, and a one-month test-retest reliability of .65 (Weafer, Baggott, & de Wit, 2013; Wöstmann et al., 2013).

The Stop Signal task used in this study was taken from de Vries and Geurts (2014). All instructions and fixation points were shown in black font against a green background (refer to Appendix L). The fixation points were presented at the centre, with the inter-stimulus interval randomized for each trial, at either 1750 ms, 1875 ms, 2000 ms, 2125 ms, or 2250 ms, to reduce the predictability of when the stimuli will appear. The stimuli which were 240 x 219 pixels and presented at the centre, consisted of a yellow dog and a red dog, with each facing either left or right (refer to Appendix M). During a go trial, a yellow dog appeared, and participants had to identify the direction the dog was facing, by pressing the "Z' key when the dog was facing left and the "/" key when the dog was facing right. During a

stop trial, the yellow dog turned red, and this stop sign indicated that the participants had to refrain from providing any response, and wait for the next stimuli (i.e., yellow dog) to appear. The next trial automatically commenced once a response was given, or after 1200 ms if no response was given.

The stop signal delay (i.e., time taken for the yellow dog to change into the red dog in stop- trials) started at 300 ms, with 50 ms being added to the time for every correct response on the stop trial, and 50 ms being deducted from the time for every incorrect response on the stop trial. The total time per trial is 1200 ms, with the go stimuli being shown for 1200 ms in go-trials. For stop trials, the go stimuli were shown according to the duration of the stop signal delay for the trial and the stop stimuli was shown with the remainder of time after deducting the stop signal delay from the total 1200 ms. There was one practice block and three experimental blocks, with each block consisting of 56 go trials and 24 stop trials, totalling to 80 trials per block. The practice block therefore contained a total of 80 trials, whereas the experimental block contained a total of 240 trials. For each trial, accuracy and RT were recorded.

n-back task. The n-back task assesses verbal working memory. This task involves stimuli being presented one at a time and participants having to indicate whether the stimulus shown was the same stimulus that was shown previously. The “n” in n-back refers to how many stimuli shown previously is the current stimulus being referenced to. A 1-back task requires participants to recall whether the current stimulus shown is the same as the immediate previous stimulus, whereas a 2-back task requires them to recall whether the current stimulus is the same as the stimulus presented two stimuli ago. Higher accuracy and shorter RT of correct responses reflects higher working memory capacity. The 2-back task is viewed as more difficult, because it requires higher storage capacity for more stimuli and

higher updating efforts as compared to the 1-back task. Thus, better performance on the 2-back task reflects an even higher working memory capacity. This task has Cronbach's alphas ranging between .54 and .84 and a six-week test-retest reliability of .64 for accuracy score and .79 for RT (Kane, Conway, Miura, & Colflesh, 2007; Soveri et al., 2016).

The n-back task used in the current study was also taken from de Vries and Geurts (2014). All instructions and fixation points were shown in black font against a white background (refer to Appendix N). Fixation points were presented at the centre and the inter-stimulus interval ranged between 900 ms to 1100 ms to make the stimuli appearance unpredictable. Fifteen neutral stimuli that were 200 x 200 pixels were presented at the centre of the screen for 1000 ms (refer to Appendix O). The three conditions were 0-back, 1-back, and 2-back. The 0-back was used as a baseline measure, whereby participants have to press "W" if the stimulus was a car and "O" if stimulus was not a car. In the 1-back, participants had to press "W" if the current stimulus was the same as the previous stimulus and "O" if the current stimulus was different from the previous stimulus. For the 2-back, participants had to press "W" if the current stimulus was the same as the stimulus shown two stimuli ago and "O" if the current stimulus was different from the stimulus shown two stimuli two ago. The next trial automatically commenced once a response was given, or after 1000 ms if no response was given. There was one practice block and four experimental blocks, with each block containing the three conditions (i.e., 0-back, 1-back, and 2-back) and each condition consisting of 15 trials (i.e., 5 trials where "W" is correct, and 10 trials where "O" is correct). The practice block had therefore a total of 45 trials, and the experimental block had a total of 180 trials. For each trial, accuracy and RT were recorded.

Procedure

This study was approved by the Science and Engineering Research Ethics Committee of the University of Nottingham Malaysia (AM270318). The study was conducted using a desktop computer in a research lab within the University. Participants were first given an information sheet to read and a consent form and demographic sheet to answer. Participants began the experiment by answering the AMT, followed by completing the Stop Signal task and n-back task. Last, participants answered the CES-D Scale, PCL-5, RRS-SF, and COPE Inventory. The order of the tasks was fixed, as listed above, with only the Stop Signal task and n-back task being counterbalanced. The session took approximately 55-65 minutes to complete. At the end of the session, the participants were thanked and given a small financial reward (RM15) for their participation.

Scoring

Similar to Study 3, the total specific memories, categorical memories, extended memories, semantic associations, and omissions were obtained by adding the number of memories categorized under each respective category. The total OGM was similarly obtained by adding the categorical and extended memories (Sumner, 2012; Williams & Dritschel, 1992).

In the Stop Signal task, SSRT was used as the measure of inhibition. The SSRT was calculated using go-trial RTs and stop-trial RTs, in term of distributions, and responses for stop-trials, in terms of probability (de Vries & Geurts, 2014). Lower SSRT reflects higher inhibition abilities.

In the n-back task, cost accuracy and cost RT were used as indices of working memory. Total accuracy for each condition was first obtained by summing the trials with correct responses. Cost 2-back-1-back accuracy was then calculated by subtracting total

accuracy of the 2-back condition with total accuracy of the 1-back condition, whereas cost 2-back-0-back accuracy was obtained by subtracting total accuracy of the 2-back condition with total accuracy of the 0-back condition. Mean RT of correct trials for each condition was calculated by excluding the RT of all trials with incorrect responses and all correct trials with less than 100 ms and averaging the RT of trials with correct responses. Cost 2-back-1-back RT was obtained by subtracting 2-back mean RT with 1-back mean RT, whereas cost 2-back-0-back accuracy was obtained by subtracting 2-back mean RT with 0-back mean RT. Higher cost accuracies and lower cost RTs reflect higher verbal working memory.

Because there are four final cost measurements for accuracy and RT from the n-back task, principle component analysis was performed on these four measures to create composite scores. The analysis revealed the presence of two components, with working memory accuracy (i.e., cost 2-back-1-back accuracy and cost 2-back-0-back accuracy) explaining 75.4% of variance and working memory RT (i.e., cost 2-back-1-back RT and cost 2-back-0-back RT) explaining 24.6% of variance. Hence, the composite working memory accuracy score was obtained by adding the Z-scores of cost 2-back-1-back accuracy and cost 2-back-0-back accuracy, whereas composite working memory RT score was obtained by adding the Z-scores of cost 2-back-1-back RT and cost 2-back-0-back RT. Another principle component analysis was performed on the composite working memory accuracy and composite working memory RT to create an overall working memory composite. The second analysis revealed that both composites could be combined into one component. Therefore, the overall working memory composite was obtained by subtracting composite working memory accuracy with composite working memory RT.

Results

Autobiographical Memory Specificity *[Descriptives]*

Majority of the memories that were retrieved were specific (57.5%), followed by extended (16.5%) and categorical (15.1%). A smaller amount of the memories was semantic associations (6.7%) and omissions (4.2%). Out of the 12 recalled memories, the maximum total specific memories retrieved were 12, whereas a maximum total of 7 categorical memories and semantic associations were retrieved, and a maximum total of 5 extended memories and omissions were retrieved. Participants were able to recall a minimum of two specific memories. Pearson correlation coefficients were calculated to look at the associations within the various memory specification categories (see Table 3.3).

Both positive and negative cues elicited mostly specific memories (positive: 63.6%; negative: 51.4%), followed by extended (positive: 13.6%; negative: 19.5%) and categorical (positive: 13.0%; negative: 17.3%) memories. There were fewer semantic associations (positive: 6.4%; negative: 7.0%), and omissions (positive: 3.6%; negative: 4.8%) retrieved for both positive and negative cues. Both high and low intensity cues also elicited mostly specific memories (positive: 63.3%; negative: 51.7%). High intensity cues generated more extended (15.3%), followed by categorical (11.0%) memories, whereas low intensity cues generated more categorical (19.2%), followed by extended (17.7%) memories. Both high and low intensity cues generated less semantic associations (high: 6.8%; low: 6.5%), and omissions (high: 3.5%; low: 4.9%).

Instructions of Memory Recall *[Hypothesis 1]*

To investigate whether memory specificity differs according to the instructions of memory recall and whether there is an interaction with depression and trauma, between-subjects analyses of variance were conducted on the different categories of memory

specificity in Study 3 and Study 4 (see Figure 3.3). There was a main effect of type of instructions on specific memories ($F(1,253) = 71.28$, $p < .001$, Cohen's $d = .22$), OGM ($F(1,253) = 68.04$, $p < .001$, Cohen's $d = .21$), and categorical memories ($F(1,253) = 65.44$, $p < .001$, Cohen's $d = .21$). When given specific recall instructions, participants recalled more specific memories (specific: $M = 6.88$, $SE = 0.19$; minimal: $M = 4.47$, $SE = 0.21$) and fewer OGM (specific: $M = 3.82$, $SE = 0.17$; minimal: $M = 5.93$, $SE = 0.19$) and categorical memories (specific: $M = 1.83$, $SE = 0.15$; minimal: $M = 3.65$, $SE = 0.17$) than when given minimal instructions. However, there was no main effect of instructions on extended memories ($F(1,253) = 2.25$, $p = .135$), semantic associations ($F(1,253) = 1.06$, $p = .303$), and omissions ($F(1,253) = 1.14$, $p = .288$). There were also no significant interactions between instructions and depression and trauma on all memory specificity categories, suggesting the effect of instructions influenced individuals with depression and PTSD symptoms and psychologically healthy individuals similarly.

Memory Specificity, Depression, and Trauma *[Hypothesis 2]*

Scoring of subclinical and psychologically healthy groups. To analyse the data using a categorical approach, participants who scored a total of 20 and above in the CES-D (Vilagut et al., 2016) were categorized as subclinical depression ($n = 65$; males = 14, females = 51), whereas those who scored a total of 19 and below were categorized as non-depressed ($n = 74$; males = 20, females = 54). The depression scores did not vary significantly from the cut-off score ($M = 20.45$, $SD = 10.94$, $t(138) = 0.48$, $p = .632$), indicating the scores clustered around the cut-off.

For the PCL-5 (Weathers et al., 2013), individuals that scored a total of 33 and above were categorized as subclinical PTSD ($n = 53$; males = 14, females = 39), whereas those who

scored a total of 32 and below were categorized as non-PTSD (n = 86; males = 20, females = 66). The trauma scores varied significantly from the cut-off score (M = 27.35, SD = 16.73, $t(138) = -3.98$, $p < .001$), indicating that the scores were distributed away from the cut-off.

Subclinical and psychologically healthy group differences for memory specificity. To examine differences in memory specificity between subclinical depression and non-depressed groups and between subclinical PTSD and non-PTSD groups, independent-samples t-tests were conducted (see Table 3.4, Figure 3.4, and Figure 3.5). The subclinical depression and non-depressed groups retrieved similar numbers of specific memories ($t(137) = -1.12$, p = .266), OGM ($t(137) = 1.71$, p = .089), categorical memories ($t(137) = 1.71$, p = .089), extended memories ($t(137) = 0.78$, p = .438), semantic associations ($t(137) = 0.14$, p = .886), and omissions ($t(135.41) = -1.17$, p = .244).

There were no differences in extended memories ($t(137) = 0.90$, p = .372), and omissions ($t(127.58) = -1.43$, p = .157) retrieved between the subclinical PTSD and non-PTSD groups. Although the subclinical PTSD group retrieved fewer specific memories ($t(137) = -2.39$, p = .018), and higher OGM ($t(137) = 2.14$, p = .034), categorical memories ($t(137) = 2.21$, p = .029), and semantic associations ($t(137) = 2.01$, p = .046) than the non-PTSD group, these differences were no longer significant after applying Bonferroni corrections ($p \leq .008$).

Predictive effects of depression and trauma on memory specificity. Exploratory linear regression analyses were conducted to test the predictive effects of depression and trauma severity on memory specificity, as a way of examining the data from a continuous approach. Although depression severity significantly explained 2.8% of the variance in specific memories ($F(1, 137) = 3.98$, p = .048, $beta$ = -.17), 3.5% of the variance in OGM ($F(1, 137) = 4.95$, p = .028, $beta$ = .19), and 3.0% of the variance in categorical memories

($F(1, 137) = 4.18$, $p = .043$, *beta* = .17), it was no longer a significant predictor of those memory specificity categories after applying Bonferroni corrections ($p \leq .008$). Depression severity also did not explain other memory specificity categories ($ps > .05$).

Trauma severity significantly explained 5.0% of the variance in OGM ($F(1, 137) = 7.19$, $p = .008$) even after Bonferroni correction ($p \leq .008$), whereby higher trauma symptoms predicted the retrieval of more OGM (*beta* = .22, $p = .008$). Although trauma severity explained 4.2% of the variance in specific memories ($F(1, 137) = 5.60$, $p = .016$, *beta* = -.21) and 4.7% of the variance in categorical memories ($F(1, 137) = 6.80$, $p = .010$, *beta* = .22), it was no longer a significant predictor of both memory specificity categories after applying a Bonferroni correction ($p \leq .008$). Trauma severity also did not explain other memory specificity categories ($ps > .05$).

Subclinical and psychologically healthy group differences for CaR-FA-X components. Independent-samples t-tests were also performed to test differences in the CaR-FA-X components between subclinical depression and non-depressed groups and between subclinical PTSD and non-PTSD groups (see Table 3.4). The subclinical depression group had higher rumination ($t(137) = 6.68$, $p \leq .001$) and avoidant coping ($t(137) = 3.67$, $p \leq .001$) levels than the non-depressed group, even after applying a Bonferroni correction ($p \leq .013$). There were no differences in SSRT and working memory between the subclinical depression and non-depressed groups ($ps > .05$).

Similarly, the subclinical PTSD group had higher levels of rumination ($t(137) = 6.35$, $p \leq .001$) and avoidant coping ($t(88.71) = 5.61$, $p \leq .001$) than the non-PTSD group. After Bonferroni corrections ($p \leq .013$), these differences were still present. There was no difference in SSRT and working memory levels between the subclinical PTSD and non-PTSD groups ($ps > .05$).

Valence and Intensity of Cues *[Hypotheses 3 and 4]*

Depression groups and memory specificity. To test the effects of the valence and intensity of cues on the specificity of memory recalled between subclinical depression and non-depressed groups and between subclinical PTSD and non-PTSD groups, mixed-design multivariate analyses of variances were conducted. There was no interaction between depression groups and the valence of cues, with subclinical depression and non-depressed groups retrieving similar numbers of specific memories ($F(1,137) = 0.01$, $p = .936$), OGM ($F(1,137) = 1.42$, $p = .236$), categorical memories ($F(1,137) = 0.39$, $p = .533$), extended memories ($F(1,137) = 0.71$, $p = .401$), semantic associations ($F(1,137) = 1.85$, $p = .176$), and omissions ($F(1,137) = 0.60$, $p = .439$) for both positive and negative cues.

Depression groups and intensity of cues also did not have any interaction, with subclinical depression and non-depressed groups retrieving similar numbers of specific memories ($F(1,137) = 0.24$, $p = .623$), OGM ($F(1,137) = 0.18$, $p = .672$), categorical memories ($F(1,137) = 0.22$, $p = .640$), extended memories ($F(1,137) = 0.01$, $p = .925$), semantic associations ($F(1,137) = 0.64$, $p = .426$), and omissions ($F(1,137) = 0.73$, $p = .394$) for both high and low intensity cues.

Trauma groups and memory specificity. Trauma groups and the valence of cues did not interact, with subclinical PTSD and non-PTSD groups retrieving similar numbers of specific memories ($F(1,137) = 0.03$, $p = .872$), OGM ($F(1,137) = 0.35$, $p = .558$), categorical memories ($F(1,137) = 0.18$, $p = .675$), extended memories ($F(1,137) = 1.08$, $p = .301$), semantic associations ($F(1,137) = 0.04$, $p = .836$), and omissions ($F(1,137) = 2.08$, $p = .152$) for both positive and negative cues.

There was also no interaction between trauma groups and cue intensity, with subclinical PTSD and non-PTSD groups retrieving similar numbers of specific memories ($F(1,137) = 0.30$, $p = .585$), OGM ($F(1,137) = 0.00$, $p = .960$), categorical memories ($F(1,137) = 0.02$, $p = .889$), extended memories ($F(1,137) = 0.04$, $p = .838$), and omissions ($F(1,137) = 3.46$, $p = .065$) for both high and low intensity cues. However, there was an interaction effect between trauma groups and intensity of cues on semantic associations retrieved ($F(1,137) = 5.29$, $p = .023$), whereby the subclinical PTSD group retrieved more semantic associations for low intensity cues ($M = 0.64$, $SD = 1.08$) than high intensity cues ($M = 0.43$, $SD = 0.64$) and the non-PTSD group retrieved more semantic associations for high intensity cues ($M = 0.40$, $SD = 0.83$) than low intensity cues ($M = 0.23$, $SD = 0.59$). After adjusting the results with a Bonferroni correction ($p \leq .008$), the interaction was no longer significant.

Mediators of Depression, Trauma, and Memory Specificity *[Hypotheses 5, 6, and 7]*

Correlations with mediating variables. To investigate the associations between rumination, avoidant coping, and executive functioning with depression, trauma, and memory specificity (see Table 3.3), Pearson correlation coefficients were calculated. As depression and trauma predicted specific memories, OGM, and categorical memories prior to Bonferroni corrections, only correlations with specific memories, OGM, and categorical memories will be discussed here.

Rumination was associated with depression ($r(137) = .59$, $p < .001$) and trauma ($r(137) = .65$, $p < .001$). However, there were no linear relations between rumination and specific memories ($r(137) = -.14$, $p = .103$), OGM ($r(137) = .16$, $p = .058$), and categorical memories ($r(137) = .13$, $p = .141$). Avoidant coping correlated with depression ($r(137) = .41$,

$p < .001$) and trauma ($r(137) = .56$, $p < .001$). Avoidant coping also related to OGM ($r(137) = .18$, $p = .032$), but not to specific memories ($r(137) = -.12$, $p = .159$) and categorical memories ($r(137) = .16$, $p = .061$).

There were no linear relations between SSRT and depression ($r(137) = .05$, $p = .598$) and trauma ($r(137) = .05$, $p = .567$). There were also no significant correlations between SSRT and specific memories ($r(137) = .06$, $p = .517$), OGM ($r(137) = .03$, $p = .822$), and categorical memories ($r(137) = -.03$, $p = .706$). Similarly, there were no linear relations between working memory and depression ($r(137) = -.03$, $p = .747$) and trauma ($r(137) = -.11$, $p = .186$). There were also no associations between working memory and specific memories ($r(137) = .08$, $p = .345$), OGM ($r(137) = -.02$, $p = .855$), and categorical memories ($r(137) = -.15$, $p = .072$). Due to the lack of relations with both depression and memory specificity, and both trauma and memory specificity, rumination, inhibition, and working memory could not be tested as mediators. Hence, only avoidant coping can be tested as a mediator for the relations of depression and trauma with OGM.

Mediation analyses for depression and OGM. To examine avoidant coping as a mediator of depression and OGM, a hierarchical regression was conducted with avoidant coping (entered in the first step) and depression (entered in the second step) as independent variables, and OGM as the dependent variable. Adding depression did not result in a significant increase in the explained variance ($\Delta R^2 = .015$, $p = .145$), but the outcome of the Sobel test was not significant ($Z = 1.31$, $p = .190$). Avoidant coping did not mediate the relation between depression and OGM.

Mediation analyses for trauma and OGM. Another hierarchical regression was conducted to test whether avoidant coping would mediate the trauma and OGM relation, whereby avoidant coping (entered in the first step) and trauma (entered in the second step)

were the independent variables, and OGM was the dependent variable. Avoidant coping also did not function as a mediator for the trauma and OGM relation. Adding trauma did not significantly increase the explained variance (ΔR^2 = .021, p = .081), and, similarly, the results of the Sobel test were not significant (Z = 0.82, p = .414).

Moderators of Depression, Trauma, and Memory Specificity *[Hypotheses 5, 6, and 7]*

To test the effects of the CaR-FA-X model on the relations of depression and trauma with specific memories and OGM, moderation analyses were conducted. Similar to Study 3, exploratory moderation analyses were also carried out for the relations of depression and trauma with categorical memories, extended memories, semantic associations, and omissions. All components of the CaR-FA-X model were tested as moderators. None of the 48 moderation analyses suggested that any of the four CaR-FA-X components acted as a moderator for the relations between depression and trauma and memory specificity.

Moderation analyses for depression and trauma and specific memories. Rumination (ΔR^2 = .00, p = .609), avoidant coping (ΔR^2 = .01, p = .370), inhibition (ΔR^2 = .00, p = .761), and working memory (ΔR^2 = .01, p = .173) were all found not to moderate the relation between depression and specific memories. Similarly, the relation between trauma and specific memories were also not moderated by rumination (ΔR^2 = .00, p = .991), avoidant coping (ΔR^2 = .00, p = .479), inhibition (ΔR^2 = .00, p = .797), and working memory (ΔR^2 = .00, p = .494).

Moderation analyses for depression and trauma and OGM. For the relation between depression and OGM, rumination (ΔR^2 = .01, p = .415), avoidant coping (ΔR^2 = .00, p = .603), inhibition (ΔR^2 = .00, p = .699), and working memory (ΔR^2 = .01, p = .175) were found not to moderate the relation. Rumination (ΔR^2 = .01, p = .334), avoidant coping (ΔR^2 =

.01, p = .414), inhibition (ΔR^2 = .00, p = .890), and working memory (ΔR^2 = .01, p = .371) also did not moderate the relation between trauma and OGM.

Moderation analyses for depression and trauma and categorical memories. Rumination (ΔR^2 = .01, p = .181), avoidant coping (ΔR^2 = .00, p = .865), inhibition (ΔR^2 = .00, p = .535), and working memory (ΔR^2 = .00, p = .859) did not function as moderators for the relation between depression and categorical memories. The relation between trauma and categorical memories were not moderated by rumination (ΔR^2 = .02, p = .090), avoidant coping (ΔR^2 = .01, p = .408), inhibition (ΔR^2 = .00, p = .609), and working memory (ΔR^2 = .00, p = .909).

Moderation analyses for depression and trauma and extended memories. For the relation between depression and extended memories, rumination (ΔR^2 = .00, p = .879), avoidant coping (ΔR^2 = .00, p = .564), inhibition (ΔR^2 = .00, p = .953), and working memory (ΔR^2 = .02, p = .072) were found not to moderate the relation. Similarly, rumination (ΔR^2 = .00, p = .781), avoidant coping (ΔR^2 = .00, p = .723), inhibition (ΔR^2 = .00, p = .760), and working memory (ΔR^2 = .01, p = .237) also did not moderate the relation between trauma and OGM.

Moderation analyses for depression and trauma and semantic associations. Rumination (ΔR^2 = .00, p = .857), avoidant coping (ΔR^2 = .01, p = .258), inhibition (ΔR^2 = .00, p = .544), and working memory (ΔR^2 = .00, p = .927) were shown to not moderate the relation between depression and semantic associations. The relation between trauma and semantic associations were also not moderated by rumination (ΔR^2 = .00, p = .760), avoidant coping (ΔR^2 = .00, p = .662), inhibition (ΔR^2 = .01, p = .364), and working memory (ΔR^2 = .00, p = .696).

Moderation analyses for depression and trauma and omissions. For the relation between depression and omissions, rumination (ΔR^2 = .00, p = .458), avoidant coping (ΔR^2 = .00, p = .714), inhibition (ΔR^2 = .01, p = .383), and working memory (ΔR^2 = .00, p = .596) did not to moderate the relation. Rumination (ΔR^2 = .02, p = .080), avoidant coping (ΔR^2 = .00, p = .559), inhibition (ΔR^2 = .01, p = .403), and working memory (ΔR^2 = .00, p = .803) also did not moderate the trauma and omissions relation.

Discussion

The present study aimed to investigate the associations between depression and trauma and memory specificity, and the CaR-FA-X model as the underlying mechanism, when using specific instructions instead of minimal instructions in the AMT. The effects of emotional valence and intensity of the cues on memory specificity were also tested. To investigate these aims, participants completed the specific version of the AMT, Stop Signal task, and n-back task, in addition to measures of depression, trauma, rumination, and avoidant coping. Overall findings indicate that:

1) Individuals who were given specific memory recall instructions retrieved more specific memories and fewer OGM and categorical memories than individuals who were given minimal memory recall instructions (Hypothesis 1 was accepted). Depression and trauma symptoms did not affect the relation between memory recall instructions and memory specificity.
2) There were no differences in the specificity of memory between individuals with subclinical depression and PTSD and psychologically healthy individuals (Hypothesis 2 was not accepted). However, higher trauma severity predicted the generation of more OGM.

3) Valence and intensity of cues did not have any effect on memory specificity for individuals with subclinical depression and PTSD and psychologically healthy individuals (Hypotheses 3 and 4 were not accepted).
4) Rumination did not mediate or moderate the relations of depression and trauma with specific memories and OGM (Hypothesis 5 was not accepted).
5) Functional avoidance, as expected, did not mediate or moderate the relations of depression with specific memories and OGM (part of Hypothesis 6 was accepted), but, unexpectedly, it also did not mediate or moderate the relations of trauma with specific memories and OGM (part of Hypothesis 6 was not accepted).
6) Inhibition and working memory, as expected, did not mediate or moderate the relations of trauma with specific memories and OGM (part of Hypothesis 7 was accepted), but, unexpectedly, they also did not mediate or moderate the relations of depression with specific memories and OGM (part of Hypothesis 7 was not accepted).

In the current study, there were no differences in any of the categories of memory specificity between subclinical depression and non-depressed groups when viewing the data from a categorical approach, unlike the results of other studies that also used normal samples (Fisk et al., 2019; Romero et al., 2014), and studies that used clinical samples (Dritschel et al., 2011; Hitchcock et al., 2019; Park et al., 2002; Ridout et al., 2016; Watson et al., 2013). Similar to some past studies that used a normal sample (Hermans et al., 2004; Peters et al., 2002; Raymaekers et al., 2010), the current study found depression severity did not explain changes in memory specificity when using a continuous approach. However, this result also contradicts several past studies that used normal samples (Dalgleish et al., 2007; Raes et al.,

2010), and studies that tested the relation in the opposite direction (Debeer et al., 2009; Kleim & Ehlers, 2008; Liu et al., 2016).

Contradictory to previous studies using normal samples (Humphries & Jobson, 2012) and clinical samples (Nixon et al., 2013; Schönfeld & Ehlers, 2006, 2017; Schönfeld et al. 2007), the current study found no differences in any of the categories of memory specificity between subclinical PTSD and non-PTSD groups. Trauma severity in the current study did not significantly predict specific memories, unlike the results of studies testing normal samples (Zheng & Gray, 2018) and studies testing the relation in the opposite direction (Kleim & Ehlers, 2008). However, unlike the categorical approach, higher trauma severity was shown to significantly predict higher OGM tendencies when using a continuous approach.

The emotional valence or intensity of the cues had no effects on the memory specificity between subclinical depression and non-depressed groups and between subclinical PTSD and non-PTSD groups. The current finding is different from similar studies that used normal samples (Matsumoto et al., 2020; Zheng & Gray, 2018) and clinical samples (Park et al., 2002; Ono et al., 2016; Ricarte et al., 2011; Schönfeld & Ehlers, 2006).

Rumination, avoidant coping, inhibition, and working memory were not mediators or moderators for the relations of depression and trauma with memory specificity. Hence, the CaR-FA-X model was not supported as the underlying mechanisms of the relations of depression and trauma with memory specificity. This finding does not match the literature that tested the mediators on the relation in the opposite direction and those that used clinical samples (Kleim & Ehlers, 2008; Liu et al., 2016; Raes et al., 2010; Raes, Hermans, Williams, Beyers et al., 2006).

General Discussion

Memory Retrieval Instructions

The results of the current study showed that instructions given for memory recall can affect the specificity of the subsequent recalled memories. Giving clearer instructions to retrieve specific memories and providing examples of expected memories (i.e., Study 4) resulted in individuals retrieving more specific memories and a reduction in the OGM and categorical memories retrieved as compared to those who only received minimal instructions and no examples (i.e., Study 3). It may be possible that those in the minimal instruction condition may have been less clear about the type of memories they were expected to recall, which is why they did not recall as many specific memories as the specific instruction condition, where the expectations to recall specific memories were clearly outlined.

Asian samples tend to automatically retrieve autobiographical memories in a less specific and more overgeneral manner as compared to Western samples (Dritschel et al., 2011; Humphries & Jobson, 2012; Wang, 2009), and a larger number of participants in the current studies were Asians. Having specific instructions in the AMT appeared to counter their naturalistic style of retrieval (i.e., Study 3) to become less overgeneral and more specific (i.e., Study 4). This finding suggests that individuals from Asian samples are capable of retrieving specific memories despite their automatic or naturalistic retrieval styles, but only when explicitly instructed to do so.

Differences in Memory Specificity

Despite the increase in specific memories and decrease in OGM and categorical memories from Study 3 to Study 4, there were no differences in memory specificity between subclinical depression and non-depressed group and between subclinical PTSD and non-

PTSD groups for both Studies 3 and 4. Changing the memory retrieval instructions did not alter the results regarding depression and trauma, indicating that memory specificity for individuals with subclinical depression and PTSD symptoms and psychological healthy individuals does not depend on how specific or minimal the retrieval instructions are. However, which type of AMT (i.e., specific or minimal) may be better suited for subclinical populations cannot be ascertained from the current results.

The current findings did not match the results of studies using clinical samples, which suggests that memory impairments in terms of specificity only occur at more severe and diagnosable levels of depression and PTSD. Although the subclinical depression and PTSD groups in the current study did exceed the cut-offs for above average depression and trauma levels, it still may not have been severe enough to reach clinical levels and the impairments associated with clinical levels yet. Because individuals with subclinical levels of depression and PTSD do not suffer difficulties recalling specific memories, they would be able to still utilize and benefit from the functions associated with autobiographical memories (Bluck et al., 2005, Fivush, 2011; Pasupathi, 2003), which in turn could also improve their functionality and serve as a protective factor from developing more symptoms.

Although Fisk et al. (2019) and Romero et al. (2014) also used normal samples, they found that the higher depression group retrieved fewer specific memories and more extended and categorical memories, whereas both current studies did not. Fisk et al. (2019) and Romero et al. (2014) only included the lower quartile for their low depression group and omitted the participants that had scores close to the clinical cut-off, causing the groups to be more polarized from each other. Omitting those median-range participants, relative to the clinical cut-off may be a reason that Fisk et al. (2019) and Romero et al. (2014) were able to obtain differences in memory specificity whereas the current studies were not able to.

Another difference between the current studies and Fisk et al. (2019) that could explain the difference in results obtained is the age of the samples, whereby the current studies tested only young adults and Fisk et al. (2009) tested only adolescents. The difference in results of memory specificity could suggest that experiencing above average depression symptoms at younger ages may be more detrimental to the recall of autobiographical memories but experiencing above average depression symptoms as adults may not have as much of an impact of memory specificity during autobiographical memory recall.

The current study also did not replicate Humphries and Jobson (2012)'s finding of fewer specific memories in the high trauma group than low trauma group despite similarly testing normal samples. Whereas the current studies allocated the subclinical PTSD and psychologically healthy groups using the clinical cut-off obtained from the questionnaire used, Humphries and Jobson (2012) used a median split to allocate their high and low trauma groups. This difference in grouping methods may explain why Humphries and Jobson (2012) obtained group differences but the current studies did not.

The Influence of Valence and Intensity of Cues

There were no differences in memory specificity between the groups regardless of the emotional valence and intensity of cues for both Studies 3 and 4. Previous studies that have found negative cues causes poorer memory specificity for individuals with clinical depression (Park et al., 2002; Ricarte et al., 2011). On the other hand, the samples from the current studies were from the normal population and may not have suffered from severe depressive symptoms or the negative attentional bias that typically accompanies those severe symptoms (Baert et al., 2010). The absence of attention and resources being captured due to negative stimuli (Beck, 1995; Feng et al., 2015) may explain the lack increase in OGM for the

subclinical depression group when negative cues were presented. However, Matsumoto et al., (2020) similarly used a normal sample but found that the higher depression group retrieved higher categorical memories for negative cues, unlike the current studies. One possible explanation for the difference in results is that Matsumoto et al. (2020) only included the lower quartile for their low depression group and omitted the participants that had median levels scores close to the clinical cut-off, which may have resulted in the different associations observed.

Although Zheng and Gray (2018) showed negative cue words related to poorer memory specificity in normal samples with trauma symptoms, they did not test this effect in relation to severity of trauma symptoms or subclinical group differences as tested in the current studies. Those with higher levels of trauma have been shown to exhibit more attentional bias when the cues were threatening and related to the traumatic event (Bryant & Harvey, 1997; Pineles, Shipherd, Mostoufi, Abramovitz, & Yovel, 2009). The cues shown in the current studies were negative but may not have been viewed as threatening by the individuals with subclinical levels of PTSD, which is why they did not retrieve memories any differently in the presence of these cues. As the effect of negative cues on memory specificity has been seen in more often in clinical samples (Park et al., 2002; Ono et al., 2016; Ricarte et al., 2011; Schönfeld & Ehlers, 2006), it is also possible that the negative attentional bias experienced by people with trauma symptoms (El Khoury-Malhame et al., 2011; Vythilingam et al., 2007) is only severe enough to impair memory specificity once the trauma symptoms reaches clinical levels.

Depression and Trauma as Predictors

In Study 4, having higher severity of trauma predicted higher OGM tendencies, although there were no differences in OGM for subclinical PTSD and non-PTSD groups. This finding suggests that, with a categorical approach, there are no observable memory specificity differences upon crossing the subclinical PTSD threshold, but, with a continuous approach, a higher amount of trauma symptoms could be one of the many predictors that contributes to the development of OGM. However, both depression and trauma severity did not predict specific memories.

In Study 3, depression and trauma severity did not predict specific memories and OGM. However, higher trauma severity predicted the generation of more semantic associations, despite the lack of difference in semantic associations between subclinical PTSD and non-PTSD groups. Similar to the results regarding OGM in Study 3, crossing the subclinical PTSD threshold does not result in observable memory specificity changes, but higher trauma symptoms could contribute to the development of semantic associations.

The SMS model proposed the retrieval of autobiographical memories uses a hierarchical search (Conway & Pleydell-Pearce, 2000; Rutherford, 2009), starting with semantic associations (i.e., conceptual themes) in the upper levels, progressing to categorical and generic memories (i.e., general events), before finally reaching specific memories (i.e., event-specific knowledge). In line with this model, the findings of Study 3 indicate that individuals with more symptoms of trauma tended to halt their memory search process at the very top level –conceptual themes– instead of the typical categorical level –general events– (as seen in Study 4), leading to higher generation of semantic associations.

The different AMT instructions in Study 3 and Study 4 may have potentially caused the truncation of the memory search to occur at different levels for those with higher trauma symptoms. It is possible that minimal instructions, which are less clear, resulted in truncation

higher up in the search hierarchy, but specific instructions which clearly indicate the need for completion of the memory search process, pushed the memory search process further to the general events level, but not all the way to the event-specific knowledge due to insufficient cognitive resources (Williams et al., 2006).

Semantic associations have been proposed to be a higher order OGM despite not existing on the same levels in the memory hierarchy, because it similarly uses summarizing of events and contain fewer details and less emotional intensity (Raes, Hermans, Williams, & Eelen, 2007). Debeer et al. (2009) did not find associations between depression and OGM, as measured by categorical memories, but the relation became significant after adding semantic associations as an index of OGM, further suggesting that semantic association are a type of higher order OGM. Viewing semantic associations as a higher order OGM, trauma severity can be argued to overall predict overgeneral styles of retrieval across both studies (i.e., higher-order OGM in Study 3 and OGM in Study 4).

Although OGM and specific memories have been shown to be unidimensional (Griffith et al., 2012), are used interchangeably in the literature, and both components are related to each other in the current studies, the associations of OGM to depression and trauma were not alike to the associations of specific memories to depression and trauma in the current studies. In Study 4, trauma severity did not predict specific memories but did predict OGM, and similarly in Study 3, trauma severity did not predict specific memories but did predict a higher order OGM (i.e., semantic associations). The findings of both studies indicate that these components of memory specificity should not be used interchangeably when testing against depression and trauma but should instead be treated as independent components that could have different types of associations.

The CaR-FA-X model

Although those with subclinical depression and PTSD symptoms had higher rumination tendencies, rumination did not mediate or moderate the relations of depression and trauma with specific memories and OGM for both studies. Studies that have found rumination was the underlying mechanism (Kleim & Ehlers, 2008; Liu et al., 2016; Raes, Hermans, Williams, Beyers, et al., 2006) only found it in relations tested in the opposite direction of the current associations (i.e., specific memory and OGM – depression and trauma). When taken together, the current findings indicate that rumination does not function as the underlying mechanism of the associations in the directions tested in the current studies, and instead may only underlie the associations in the opposite direction. However, besides testing the associations in the opposite direction, those past studies used clinical samples (Kleim & Ehlers, 2008; Liu et al., 2016; Raes, Hermans, Williams, Beyers, et al., 2006). Hence, another alternative explanation is in normal populations, rumination is not sufficiently high to underlie the associations between depression, trauma, and memory specificity.

Functional avoidance also did not mediate or moderate the relations of depression and trauma symptoms with memory specificity for both studies, despite individuals with subclinical depression and PTSD symptoms utilizing more avoidant coping strategies. Avoidant coping style has been shown to be triggered when recalling distressing memories, or when the cues presented were threatening, as a form of self-protection from unpleasant memories and emotions (Debeer et al., 2012; Debeer, Raes, Hermans, & Williams, 2011; Hermans et al., 2004; Raes, Hermans, Williams, & Eelen, 2006). Hence, one possible explanation for the lack of relation is that the type of cues used in this study did not elicit sufficiently threatening or distressing memories that would require the functional avoidance mechanism.

Inhibition and verbal working memory did not mediate or moderate the relations of depression and trauma with specific memories and OGM. Raes et al. (2010) found inhibition was a significant mediator for depression and memory specificity, but they used self-reported perceptions of inhibition abilities instead of experimentally obtained inhibition like the current studies did. This finding suggests that there may be discrepancies between performance-based and self-perception inhibition abilities, which may further affect its function as the underlying mechanism. Despite including the number of errors as well as the reaction time as measurements in the executive functioning tasks as suggested by Dalgleish et al. (2007), the current study was still unable to find significant associations for the executive functioning tasks with depression, trauma, and memory specificity.

Inhibition and verbal working memory are basic-level executive functioning, which may not be sufficient to serve as underlying mechanisms independently for the depression, trauma, and memory specificity relations. Higher-order executing functioning, which are made up of several basic-level executive functioning, have been shown to mediate or moderate the depression and trauma and memory specificity relations (Dalgleish et al., 2007; Valentino et al., 2012), indicating that a combination of deficits in more than one basic-level executive functioning may be needed to impair the specificity of memory. Having greater deficits in more than one domain of executive functioning is also associated with reduced overall cognitive resources, which has been further associated with higher OGM tendencies (Dalgleish et al., 2007; Williams et al., 2006). The results from both current studies do not support the CaR-FA-X model as the underlying mechanisms of depression and trauma with OGM and lower specific memories in normal samples.

Although the model does not explain the associations, the presence of some components of the CaR-FA-X model does still affect several of the depression, trauma, and

memory specificity relations. Rumination and inhibition strengthened the relation of depression and trauma with semantic associations when minimal retrieval instructions were given (i.e., Study 3) but not when specific instructions were given (i.e., Study 4). Only at high levels of rumination, more attention is likely to be captured, leaving less cognitive resources for memory search, and increasing the probability that these people with depression and trauma will truncate the search at conceptual themes level and generate semantic associations (Conway & Pleydell-Pearce, 2000; Haque & Conway, 2001; Williams et al., 2006, 2007).

Brooding and reflection independently strengthened the relation between depression and semantic associations but not the relation between trauma and semantic associations. Although previous studies showed that brooding was maladaptive and reflection was more often adaptive (Crane et al., 2007; Debeer et al., 2009; Romero et al., 2014), the current findings suggest that both components of rumination are maladaptive towards memory specificity of people with higher depression. Reflection may involve fewer negative thoughts and criticism as compared to brooding, but it still involves thoughts surrounding the problem (Debeer et al., 2009; Treynor et al., 2003), which do similarly take up cognitive resources when done at high levels.

For inhibition, only high impairments strengthened the relation between depression and semantic associations, whereas moderate and high impairments strengthened the relation between trauma and semantic associations. These impairments in inhibition reduces the suppression of irrelevant memories and ruminative thoughts that use up cognitive resources, leaving less resources for memory search, resulting in higher chance that people with depression and trauma will truncate the search at conceptual themes level and the generate semantic associations (Williams et al., 2007). However, it appears those with higher levels of trauma are more easily susceptible to the effects of these impairments as compared to those

with higher levels of depression. The other components of the CaR-FA-X model did not have an effect on the remaining relations between depression, trauma, and memory specificity across both studies.

Implications

These two studies provide insight into the relation between subclinical depression and PTSD, and memory specificity, and the factors that influence these relations. There are numerous psychotherapy interventions that use the recall of specific memories or details of personal events (e.g., cognitive behavioural therapy, narrative therapy, psychodynamic therapy) to gain better understanding into the individuals' concerns and find exceptions to contradict inaccurate beliefs and thoughts individuals have (Beck, 1995; Corey, 2013). As individuals with subclinical levels of depression and PTSD do not have impairments in memory specificity, there is a higher likelihood that the specific-memory aspects of these interventions would be effective in these populations. Having these individuals recall more negative or intense memories would similarly not reduce the effectiveness of the specific-memory-aspects of the interventions. Furthermore, in the context of general psychotherapy, providing more specific instructions and examples regarding the memories that need to be retrieved, especially when dealing with individuals that automatically narrate autobiographical memories in less specific manners, such as individuals from Asian backgrounds, could help increase the details of memories narrated.

The findings suggest that trauma symptoms do contribute to the development of more overgeneral styles of memory. Hence, managing or reducing individuals' symptoms of trauma via psychotherapy could help improve memory specificity, and in turn allow

individuals to benefit from the functions associated with autobiographical memories, such as improving problem solving, bonding, self-concepts, and emotion regulation.

The current results did not support the CaR-FA-X model as the underlying mechanism between depression, trauma, and memory specificity in normal samples. More research is needed to explore other dimensions of the CaR-FA-X model (e.g., other measures of functional avoidance, other levels of executive functioning), as well as test other factors that may explain associations between these variables in this population. Although it did not explain the associations, the findings of this study indicate that rumination and poor inhibition still increase the likelihood of the retrieval of more overgeneral types of memory. Hence, reframing and reducing maladaptive thoughts and self-schema via psychotherapy to reduce rumination levels (Querstret & Cropley, 2013) and engaging in cognitive exercises to improve inhibition abilities (e.g., Maraver, Bajo, & Gomez-Ariza, 2016) could reduce the likelihood that individuals with higher levels of depression and trauma will retrieve more overgeneral types of memory.

Limitations

One limitation of this study is the automatic narration styles of individuals was not taken into account. Narration style can differ according to a person's cultural background (Dritschel et al., 2011; Humphries & Jobson, 2012), tendencies to respond differently to emotional stimuli (Brosch, Pourtois, & Sander, 2010), and individual differences. However, the current study did not measure the baseline narration style or specificity levels for neutral cues to compare against the specificity levels for the experimental word cues. Future studies can include a baseline measurement of specificity or narration by incorporating neutral word cues in the memory recall task.

In terms of the methodology, one limitation is that the executive functioning tasks used were not tested for reliability and validity in this research. Literature has suggested that these types of tasks may not be pure measurements of the respective executive function, and instead measure more than one type of executive functioning (Packwood et al., 2011). Thus, it is not clear to what degree the tasks used in the current studies actually measure the domain of executive functioning that they are supposed to measure, and how specific the measurement is to only one domain of executive functioning.

Last, the experimental tasks used to measure executive functioning of individuals in the current study may not reflect executive functioning used in daily living. Executive functioning in daily life are more complex and involves global cognition, which are not captured or reflected in experimental tasks (Javanovski, 2011; Vaughan & Giovanello, 2010). Future studies could include a questionnaire that measures executive functioning levels and difficulties in daily living, in addition to the experimental tasks.

Conclusions

There were no differences in memory specificity between individuals with subclinical depression and PTSD and psychologically healthy individuals, indicating that there were no impairments in memory specificity. The lack of differences in memory specificity were observed regardless of memory retrieval instructions given and the valence and intensity of cues presented. Trauma severity predicted the generation of semantic associations when the retrieval instructions were minimal and the retrieval of OGM when the retrieval instructions were specific. The findings suggest that there are no differences in semantic associations and OGM upon crossing the subclinical PTSD threshold but having higher trauma symptoms does seem to contribute to the development of more overgeneral styles of retrieval.

Rumination, avoidant coping, inhibition, and verbal working memory did not mediate or moderate the relations of depression and trauma with specific memories and OGM. However, higher rumination and stronger impairment in inhibition strengthened the relations of higher depression and trauma with the generation of more semantic associations when minimal retrieval instructions were given. The subcomponents of rumination, brooding and reflection independently moderated the relation between depression and semantic associations but not the relation between trauma and semantic associations. The Car-FA-X model does not seem to be the underlying mechanism for the relations of depression and trauma with memory specificity, but the presence of the CaR and X components are still detrimental to memory retrieval for those with higher depression and trauma symptoms.

Chapter 4: Depression, Trauma, and Psychological Distance

In addition to episodic aspects, semantic aspects, and types of memory, subjective feelings are another facet of autobiographical memories. One common subjective feeling that autobiographical memories might elicit is psychological distance. Psychological distance is the subjective perception regarding how far away and long ago a memory or an event feels from the present and from the current self, independent of the actual temporal distance (Ross & Wilson, 2002; Van Boven & Caruso, 2015). Typically, people perceive themselves to be closer to positive memories and further away from negative memories, but Janssen et al. (2015) found that individuals with higher depression levels perceived themselves to be further away from positive memories whereas individuals with higher trauma levels perceived themselves to be nearer to negative memories. However, the effect the objective age of the memory may have on these associations have not been studied. The mechanisms underlying these relations have also not been investigated yet. Memory phenomenology, such as recollective experience, vantage perspective, emotional intensity, and centrality, have been shown to relate to psychological distance, but whether these phenomenological characteristics, as well as emotion regulation strategies, could be its underlying mechanisms has not been tested.

Background

Temporal Information of Memory Recall

The recall of autobiographical memories involves many types of phenomenological information, such as sensory information, emotions, cognition, and temporal information (Friedman, 2004; Rubin, 2005). One type of temporal information that can exist in the recall

of autobiographical memories is distance, which refers to the temporal distance or length of time, as measured from when the event took place to the current time (Friedman, 1993, 2004) (e.g., “the gathering with my childhood friends took place 4 weeks ago”). With the present as the point of reference, how far away the events feel, how accessible the event is, and how strongly the event is recalled are also reflective of temporal distance.

The temporal information, distance, can be further broken down into three different constructs: objective time / distance, perceived objective time / distance, and psychological distance (Van Boven & Caruso, 2015). The first type of distance information, objective time or distance, is the actual numeric distance of the time the event occurred or will occur from the present time (e.g., “the trip took place six days ago”). The second type of distance information, perceived objective time or distance, is the subjective perception about the objective time the event occurred or will occur from the present time (e.g., “I think we went on the trip 3 days ago”). When asked for the objective time, the person aims to estimate the objective time with as much accuracy as possible, and therefore, is not aware that their estimation may not be accurate. The last type of distance information, psychological distance is the subjective perception regarding the perceived distance and closeness an event feels from the present and from the current self (e.g., “it feels like we just went on the trip yesterday”).

Psychological Distance

Specifically, psychological distance refers to how far away versus how close the event feels from the current time, how long ago versus how recent the event feels from the current time, and how far away versus how close the self that experienced the events feels from the current self, independent of the objective time and distance (Ross & Wilson, 2002; Van

Boven & Caruso, 2015). Events could be accurately perceived as occurring when they did, or they could be perceived differently from when they actually occurred. An example for the former would be if an event occurred one month ago and feels like it occurred one month ago (i.e., the psychological distance is similar to the objective distance). Examples for the latter would be if the event occurred one year ago but feels like it occurred five years ago (i.e., event feels older and further than it actually is), or if the event occurred one year ago but feels like it occurred three months ago (i.e., event feels more recent and closer than it actually is).

People can simultaneously recall the perceived objective time and psychological distance about an event. They may think that an event happened three months ago (i.e., perceived objective time) while at the same feel that the event happened six months ago (i.e., psychological distance). Whereas people when describing perceived objective time may not be aware of their inaccurate estimates of time, people when describing psychological distance, on the other hand, are aware that their estimate of time is purely subjective.

Van Boven and Caruso (2015) proposed a tripartite foundation for psychological distance. This framework suggest that the psychological distance of events can be formed or changed from the interactions between the language used to describe the time, the physiological and psychological experiences (e.g., emotions) surrounding the event, and the goals that the individual is currently working towards. Events that used language depicting spatial closeness (e.g., “nearly here”), had more physiological and psychological experiences (e.g., higher emotional intensity), and had higher probability of achieving goals successfully were perceived to feel psychologically closer overall.

Certain types or characteristics of events tend to feel closer over other types. In general, people tend to feel closer to memories and events that encompass successes and match their current self-concepts, but feel further away from memories and events that

encompass failures, do not match their current self-concepts, and contain parts of their self that they no longer identify with (Demiray & Janssen, 2015; Libby & Eibach, 2011; Ross & Wilson, 2002). Psychological distance also varies depending on the objective age of the memories. People feel closer to events that are more recent and further from events that are older (Janssen et al., 2015; Ross & Wilson, 2002).

One aspect of memory recall that psychological distance relates to bidirectionally is the accessibility of memories. Memories of events are easier to access and retrieve when the event feels closer but becomes more difficult to retrieve when the event feels further (Öner & Gülgöz, 2018). At the same time, feelings of closeness further increase when memories are easier to access and recall, whereas feelings of distance increase when memories become more difficult to access.

Past research has found that psychological distance is related to self-esteem (Demiray & Freund, 2017; Demiray & Janssen, 2015; Ross & Wilson, 2002). Individuals with higher self-esteem felt closer to memories of successes and achievements that involved themselves, indicating a self-enhancement function. The findings of the relations between self-esteem and psychological distance of negative memories were mixed, with some studies showing those with higher self-esteem distancing themselves from memories of failures (Demiray & Freund, 2017; Ross & Wilson, 2002), whereas other studies showing no associations between the variables (Demiray & Janssen, 2015). However, for both memories of successes and failures, individuals with low self-esteem did not show self-enhancement functions, with no relations between self-esteem and psychological distance (Demiray & Freund, 2017; Ross & Wilson, 2002). Although psychological distance has been shown to relate to perceptions of the self, its relations with clinical disorders and psychological distress areas are less clear.

Depression, Trauma, and Psychological Distance

Kross, Gard, Deldin, Clifton, and Ayduk (2012) examined how increasing or reducing distance when recalling extremely sad events would affect thoughts and emotions in groups with and without clinical depression. The clinically depressed group that distanced themselves from the sad event were found to exhibit fewer negative emotions and depressive thoughts, as compared to the clinically depressed group that focused on and reflected about the sad event. However, this finding was not replicated in the non-depressed groups, leading the researchers to suggest that distancing only brings benefits at high levels of depression.

Janssen et al. (2015) investigated the relations between depression, trauma, and psychological distance of most positive and negative events in an undergraduate student sample. Higher levels of depression were associated with feeling more distant from positive events. Conversely, higher levels of trauma were associated with feeling closer to negative events. The inability of those with more depression symptoms to feel closer and utilize the self-enhancement function of positive memories, as well as the inability of those with more trauma symptoms to distance themselves from negative events could be reflective of maladaptive coping and emotion regulation.

Gross and John (2003) discussed two types of emotion regulation strategies; cognitive reappraisal and expressive suppression. Cognitive reappraisal is a strategy that is viewed as adaptive and involves changing one's perceptions, meanings, and thoughts about an event, which in turn changes the emotions associated to the event. Meanwhile, expressive suppression is a strategy that is perceived as maladaptive and constitutes inhibiting, avoiding, or repressing any behaviours or actions that involve expressing the emotions that one is experiencing. Cognitive reappraisal has been associated with increase in positive memories

for self-enhancement, whereas expressive suppression is linked to increased accessibility to negative memories (Newman & Lindsay, 2009; Wisco & Nolen-Hoeksema, 2010).

Depression and trauma symptoms have been associated with having poor cognitive reappraisal (e.g., Boden et al., 2013; Dryman & Heimberg, 2018; El Haj et al., 2020; Shepherd & Wild, 2014) and using higher expressive suppression (e.g., Boden et al., 2013; Moore, Zoellner, & Mollenholt, 2008; Shepherd & Wild, 2014). Hence, it is possible that the difficulties in feeling closer and utilizing the self-enhancement function of positive memories for individuals with higher depression can be explained from having fewer positive memories to begin with, due to their poor cognitive reappraisal abilities. Individuals with higher trauma could have a higher use of expressive suppression, leading to increased accessibility to negative memories, which may explain their difficulties in distancing themselves from those negative experiences. However, these mechanisms have not been tested yet.

Although being able to distance oneself from negative events and reduce distance from positive events have been shown to be beneficial, the mechanisms that may underlie and explain the associations of depression and trauma with psychological distance have not been established clearly. Besides poor emotion regulation, other factors that are suggested to influence psychological distance are phenomenological characteristics of the retrieved memory. Phenomenological characteristics in this context refer to subjective traits experienced and properties of memory during recall, which are part of the event-specific knowledge level in the SMS (Conway & Pleydell-Pearce, 2000; Rubin et al., 2003; Mitchell, 2016). The phenomenology of memories are believed to influence the experience of the recall (Sutin & Robins, 2007), by either enabling the person to feel like they are experiencing the recalled event as when it occurred and connecting to the self in the memory, or limiting the person to feel like they are experiencing the event as if watching a movie or listening to a

story told by someone else. The former would result in the event feeling psychologically closer, as if it just happened, whereas the latter would result in opposite feelings, as if it happened a long time ago. Examples of phenomenological characteristics that could influence memory recall are recollective experience, vantage perspective, emotionality, and centrality, (e.g., Libby & Eibach, 2002, 2011; Janssen et al., 2015; Sutin & Robins, 2007).

Recollective Experience

One phenomenological characteristic of memory that could influence psychological distance is recollective experience, which is an individual's ability to mentally travel back to the event and the extent to which they are can relive or re-experience the event in the present (Brewer, 1986). It also includes having more details in the memory, which in turn relates to higher feelings of vividness when experiencing the memory (Brewin, 2001; Rubin, Feldman, & Beckham, 2004; Talarico, LaBar, & Rubin, 2004). Events that are recent and positive tend to be recalled with stronger feelings of recollective experience, whereas remote and negative memories are generally recalled with lower recollective experience (D'Argembeau & Van der Linden, 2004; Talarico et al., 2004).

Past findings have shown associations between recollective experience and psychological distance. Kross et al. (2012) found that lower recollective experience related to feeling further away from negative memories. In addition to those findings, Janssen et al. (2015) found that higher recollective experience predicted higher feelings of closeness for positive memories but not negative memories. These studies suggest that recollective experience does relate to psychological distance, but the results about its variations according to the valence of the memory are still mixed.

Besides psychological distance, depression and trauma symptoms have also been associated with recollective experience. Upon experiencing a sad mood induction, individuals with remitted depression retrieved positive memories that were less vivid than non-depressed individuals, but there were no differences in vividness for negative memories (Werner-Seidler & Moulds, 2011). Opposite to those findings, higher depression scores in normal samples were related to the recall of negative memories with higher vividness, but they were unrelated to the recollective experience of positive memories (Knyazev, Savostyanov, Bocharov, & Kuznetsova, 2017). However, there are also findings that show no differences in vividness for positive, negative, and self-defining memories, as well as recent and remote memories between clinically depressed and non-depressed groups (Kuyken & Howell, 2007; Söderlund et al., 2014).

The recall of ILS events, most positive memories, most stressful memories, and word cued memories were tested in PTSD and non-PTSD groups (Rubin, Dennis, & Beckham, 2011), and high and low trauma groups in an undergraduate student sample (Rubin et al., 2008). The PTSD group retrieved memories that had higher levels of reliving than the non-PTSD group for all memories, whereas high and low trauma groups did not differ in reliving for all memories. Within PTSD samples, higher trauma scores were also related to higher vividness, higher reliving, and more details for all memories regardless of valence (Rubin et al., 2004; Schönfeld & Ehlers, 2017).

The results show that there are mixed findings for the associations between depression and trauma and recollective experience. Although there was no difference in recollective experience between recent and remote memories, depression related to higher recollective experience in negative memories of normal populations but lower recollective experience in positive memories of clinical populations. Meanwhile, trauma related to higher recollective

experience for all memories in clinical populations but did not relate to recollective experience in normal populations. From these findings, it can be theorized that recollective experience may serve as an underlying mechanism for the associations of depression and trauma with psychological distance.

Vantage Perspective

Another phenomenological characteristic is vantage perspective, which refers to the viewpoint that a person sees when they recall a memory. There are two types of perspective, which are field and observer perspective. Field perspective involves viewing the memory from a first-person point of view or as the person originally experiencing the memory, whereas observer perspective involves viewing the memory from a third-person point of view or from the standpoint of an audience or an outsider. Previously, field perspective was seen as the opposite end of observer perspective on the vantage perspective spectrum, with high field perspective automatically indicating low observer perspective (Nigro & Neisser, 1983; Robinson & Swanson, 1993). However, field perspective and observer perspective are no longer viewed as mutually exclusive components (Butler, Rice, Wooldridge, & Rubin, 2016; Rice & Rubin, 2009), with memories being able to be recalled from both perspectives.

Recent events tend to be recalled using more field perspective, but remote memories were recalled using observer perspective (Kuyken & Moulds, 2009; Nigro & Neisser, 1983; Talarico et al., 2004). Both positive and negative memories are recalled with field perspective, but positive memories were recalled with higher field perspective (D'Argembeau, Comblain, & Van der Linden, 2003; Talarico et al., 2004). However, vantage perspectives have also been shown to not differ with valence (Sutin & Robins, 2010).

Vantage perspective is shown to relate to psychological distance. Higher field perspective predicted higher feelings of closeness regardless of the valence of the memory (Crawley, 2010; Gu & Tse, 2016; Janssen et al., 2015; Kross et al., 2012; Libby & Eibach, 2002, 2011; Sutin & Robins, 2010). Although most studies found that memories recalled using an observer perspective were found to be psychologically further away regardless of the valence of the memory (Crawley, 2010; Gu & Tse, 2016; Kross et al., 2012; Libby & Eibach, 2002, 2011; Sutin & Robins, 2010), Janssen et al. (2015) found that higher observer perspective predicted higher feelings of closeness for negative memories, but not positive memories. One possible reason for this difference in results may be because Janssen et al. (2015) measured field perspective and observer perspective separately, unlike the other studies that measured field perspective and observer perspective as opposite ends of one variable. The results of these studies suggest field perspective relates to feelings of closeness overall, but there are still mixed results for the associations of observer perspective and psychological distance across valence, depending on how field perspective and observer perspective are measured.

Meanwhile, vantage perspective was associated with depression symptoms. Individuals with recurrent depression recalled recent memories using more field perspective and older memories using more observer perspective (Kuyken & Moulds, 2009), which is similar to past findings in non-depressed samples (Nigro & Neisser, 1983; Talarico et al., 2004). Additionally, higher depression levels in this sample was associated with recalling positive memories using more observer perspective and less field perspective (Kuyken & Moulds, 2009). Depression groups in clinical and normal samples similarly recalled positive memories with higher observer perspective and lower field perspective when compared with non-depressed groups (Bergouignan et al., 2008). However, there were no associations

between depression and vantage perspective for negative memories (Bergouignan et al., 2008; Kuyken & Moulds, 2009; Nelis, Debeer, Holmes, & Raes, 2013). Another study showed no differences in vantage perspectives for both memory valences between the remitted depression and non-depressed groups (Werner-Seidler & Moulds, 2011).

Unlike depression, vantage perspective did not appear to relate to trauma groups from normal populations for both positive and negative memories (Rubin et al., 2008). Contradictory to this finding, people with PTSD have been shown to recall memories, regardless of valence, more often from an observer perspective than from a field perspective (Van den Broeck, 2014). It should be noted, however, that the sample used in this study had a comorbid diagnosis of BPD, which may have attributed to the differences in vantage perspective. When recalling traumatic memories, people with higher symptoms of PTSD more often recall those memories from an observer perspective than from a field perspective (Berntsen, Willert, & Rubin, 2003; Kenny et al., 2009). However, because traumatic memories tend to have different phenomenology than memories of other valences (Porter & Birt, 2001), this finding may not be applicable to non-traumatic memories.

The results indicate that those with depression retrieved recent and remote memories using the typical vantage perspectives associated with those events. More observer perspective and less field perspective were used when recalling positive memories in depressed groups from clinical and normal populations, whereas there were no associations between depression and vantage perspective for negative memories. Trauma and vantage perspective had mixed findings, with clinical populations demonstrating potentially more observer perspective across valence, whereas normal populations did not differ in their vantage perspective. Hence, it is possible that vantage perspective may serve as an underlying mechanism for the relations of depression and trauma with psychological distance.

Emotion Intensity

Emotional intensity is also a phenomenological characteristic that could influence psychological distance and refers to the strength of the positivity or negativity of the event when it is recalled. The emotional intensity of remote memories is lower than the emotional intensity of recent memories, with remote negative memories having lower emotional intensity than remote positive memories (Skowronski, Walker, Henderson, & Bond, 2014; Walker & Skowronski, 2009). However, emotional intensity does not differ between recent positive and negative memories.

Emotional intensity has also been shown to relate to psychological distance. Mei, Li, and Wang (2018) manipulated how emotional the memories were narrated and observed that emotional intensity was a moderator for the relation between valence and psychological distance. Negative events were perceived to feel further than positive events, especially when the memory had lower emotional intensity rather than higher emotional intensity. Van Boven, Kane, McGraw, and Dale (2010) had used similar methodology as Mei et al. (2018) and demonstrated that higher emotional intensity caused events to feel closer regardless of valence. Despite this relation, emotional intensity was unable to independently predict psychological distance (Janssen et al., 2015). The findings suggest that emotional intensity is able to moderate and predict psychological distance but may not be able to uniquely explain changes in psychological distance.

The emotional intensity of memory is associated with depression and trauma symptoms. Clinical depression groups have been observed to recall recent negative memories with higher emotional intensity than remote negative memories when compared to non-depressed groups (Söderlund et al., 2014). Higher depression scores also relate to the recall of

negative memories with higher emotional intensity in normal samples but not in samples with clinical depression and remitted depression (Knyazev et al., 2017; Rottenberg, Joormann, Brozovich, & Gotlib, 2005; Werner-Seidler & Moulds, 2011). There were no associations between depression and emotional intensity for positive memories in clinical and non-clinical samples. The PTSD group retrieved all memories with higher emotional intensity than the non-PTSD group, whereas high trauma groups from the normal population retrieved only important and negative memories with higher emotional intensity as compared to low trauma groups (Rubin et al., 2008, 2011).

The results highlight that there were associations between higher depression and higher emotional intensity for negative memories in normal populations, but no associations for depression and emotional intensity of negative memories in clinical populations and of positive memories in clinical and normal populations. However, negative memories that were recent were recalled with higher emotional intensity than negative memories that were remote for depressed groups. The results also indicate that high trauma groups from clinical populations retrieve positive and negative memories with higher emotional intensity, but those from non-clinical populations only do so for negative memories. These findings suggest that emotional intensity could underlie the relations of depression and trauma with psychological distance.

Event Centrality

An additional phenomenological characteristic that might affect psychological distance is the centrality of event, which refers to how relevant and important the event is towards their current self-concept and life narrative (Berntsen & Rubin, 2006). It also refers to how much the event is used as a point of reference for making meaning of past and present

events and expectations of the future. Positive events tend to have higher centrality, whereas negative events often have lower centrality (Rubin, Berntsen, Deffler, & Brodar, 2019; Zaragoza Scherman, Salgado, Shao, & Berntsen, 2015). Remote events are viewed as more central to a person's life, whereas recent events are viewed as less central (Rubin et al., 2019). However, this direction of the association was only seen for positive memories, and the opposite was observed for negative memories, with recent events being more central than remote events (Berntsen et al., 2011). Centrality of event is also related to the psychological distance of the event. Centrality was shown to predict feeling closer to positive memories but did not predict the psychological distance of negative memories (Janssen et al., 2015).

Centrality of event has been shown to relate to depression and trauma symptoms. Higher depression scores in normal populations were shown to relate to the recall of negative memories with higher centrality (Berntsen & Rubin, 2006; Boals, 2014; Wamser-Nanney, Howell, Schwartz, & Hasselle, 2018; Zaragoza Scherman et al., 2015). Similarly, individuals with higher trauma symptoms related to higher event centrality of negative memories for clinical and non-clinical samples when compared to individuals with lower trauma symptoms (Berntsen & Rubin, 2006; Boals, 2014; da Silva et al., 2016; Wamser-Nanney et al., 2018; Zaragoza Scherman et al., 2015). These relations were not replicated for positive memories.

These findings indicate that higher depression in normal populations and higher trauma in clinical and normal populations relates to perceiving that negative events are more central to a person's life, but there were no associations for positive memories. Thus, centrality of event may function as an underlying mechanism for the relations of depression and trauma with psychological distance.

Study 5

The Current Study

The purpose of the current study was to investigate how individuals with subclinical depression and PTSD symptoms may differ from psychologically healthy individuals in the psychological distance attached to positive and negative events, and how these relations differ for recent and remote events. The current study also aimed to explore whether emotion regulation strategies and phenomenology of autobiographical memories may underlie the relations of depression and trauma with psychological distance.

The outcomes from this study could provide insight into the differences in subjective feelings of distance attached to different types of events, and the potential implications towards areas, such as distancing and the self-enhancement function of autobiographical memory. Moreover, the emotion regulation strategies and phenomenological characteristics that could play a role in changing these distances in individuals with depression and trauma would be able to be identified, which could be applied into clinical settings. Manipulating relevant emotion regulation strategies and phenomenological traits of memories in therapy could change the psychological distances associated to the memory. Being able to make positive events feel closer and negative events feel further away could tap into the distancing effects and self-enhancement function of memory, which could then improve self-esteem and mood (Demiray & Freund, 2017) and possibly reduce the severity of depression and trauma symptoms (Kross et al., 2012).

The relations of depression and trauma with psychological distance have been shown to differ according to the valence of the recalled memory, whereby higher levels of depression have been shown to relate to feeling further away from positive memories and higher levels of trauma related to feeling closer to negative memories (Janssen et al., 2015). Although psychological distance has been shown to be influenced by the objective age of the

memory, with people feeling closer to recent events and further from remote events (Janssen et al., 2015; Ross & Wilson, 2002), whether the psychological distance of those with subclinical depression and PTSD symptoms will differ according to objective age of the memory has not been investigated. Furthermore, the interactions between depression and trauma with the valence and objective age of memory on psychological distance has not been tested.

Although the relations between depression and trauma and psychological distance have been established, the mechanisms that may explain those relations have not been studied. Changes in phenomenological characteristics of memories, such as recollective experience, vantage perspective, emotional intensity, and centrality, have been shown to relate to changes in psychological distance (Crawley, 2010; Gu & Tse, 2016; Janssen et al., 2015; Kross et al., 2012; Libby & Eibach, 2002, 2011; Mei et al., 2018; Sutin & Robins, 2010; Van Boven et al., 2010). Changes in memory phenomenology also relate to depression (Bergouignan et al. 2008; Berntsen & Rubin, 2006; Boals, 2014; Knyazev et al., 2017; Kuyken & Moulds, 2009; Nelis et al., 2013; Wamser-Nanney et al., 2018; Werner-Seidler & Moulds, 2011; Zaragoza Scherman et al., 2015) and trauma (Berntsen & Rubin, 2006; Boals, 2014; da Silva et al., 2016; Rubin et al., 2004, 2008, 2011; Van den Broeck, 2014; Wamser-Nanney et al., 2018; Zaragoza Scherman et al., 2015). However, all these relations (i.e., depression and memory phenomenology; trauma and memory phenomenology; memory phenomenology and psychological distance) have only been tested independently, and all three components have not been tested together yet. Therefore, despite these phenomenological traits having relations with the three components, it is not known whether the phenomenological characteristics could explain or influence the relations between depression and trauma and psychological distance. Furthermore, the past studies on vantage

perspective (except Janssen et al. 2015) did not investigate field and observer perspective as two separate components, and whether viewing the components separately would produce similar relations is unclear. The past studies on recollective experience, vantage perspective, and centrality mentioned above, meanwhile, did not take both the emotional valence and objective age of the memories into account. Hence, how the relations with these components will vary according to both valence and objective age of the memory has not been studied.

The differences in psychological distance observed for those with higher depression and trauma symptoms were theorized to be reflective of poorer emotion regulation. Although the relations between emotion regulation strategies and psychological distance have not established, cognitive reappraisal and expressive suppression have been noted to relate to depression and trauma (Boden et al., 2013; Dryman & Heimberg, 2018; El Haj et al., 2020; Moore et al., 2008; Shepherd & Wild, 2014), and the accessibility of memories (Newman & Lindsay, 2009; Wisco & Nolen-Hoeksema, 2010), which is also a form of temporal distance (Friedman, 1993, 2004). Whether emotion regulation could also explain or influence the relations between depression and trauma and psychological distance, and how it may vary according to the valence and objective age of memories has not been explored.

Based on the review of the literature, the five research questions that we aim to answer in our study are:

1. Are there differences in psychological distance between individuals with subclinical levels of depression and psychologically healthy individuals?
2. Are there differences in psychological distance between individuals with subclinical levels of PTSD and psychologically healthy individuals?
3. Do valence and objective age of memory have an effect on the relations of depression and trauma with psychological distance?

4. Will recollective experience, vantage perspective, emotional intensity, and centrality of events mediate or moderate the relations of depression and trauma with psychological distance?
5. Will emotion regulation strategies mediate or moderate the relations of depression and trauma with psychological distance?

Based on previous findings, we hypothesized for our current study that:

1. Individuals with subclinical depression symptoms will demonstrate lower psychological distance (i.e., feel further away) towards recent positive events than psychologically healthy individuals. Psychological distance of recent negative events and older events will be similar for those with subclinical depression and those who are psychologically healthy.
2. Individuals with subclinical PTSD symptoms will demonstrate higher psychological distance (i.e., feel closer) towards recent negative events than psychologically healthy individuals. Psychological distance of recent positive events and older events will be similar for those with subclinical PTSD and those who are psychologically healthy.
3. Valence and age of the memory will have an interaction effect on the relations between depression groups and psychological distance and between trauma groups and psychological distance.
4. Recollective experience, field perspective, observer perspective, and emotional intensity, and centrality of events will mediate or moderate the relations of depression with the psychological distance of recent positive memories and the relations of trauma with the psychological distance of recent negative memories.

5. Cognitive reappraisal will mediate or moderate the relations of depression with the psychological distance of recent positive memories. Expressive suppression will mediate or moderate the relations of trauma with the psychological distance of recent negative memories.

To test these hypotheses, participants were asked to describe their most positive and negative memories that were recent and remote. For each memory described, participants then completed the Autobiographical Memory Questionnaire, Psychological Distance Scale, and Centrality of Event Scale. Last, they answered the Center for Epidemiologic Studies Depression Scale, PTSD Checklist for DSM-5, and Emotion Regulation Questionnaire.

Method

Participants

Power analysis with a medium effect size of .50, an alpha of .05, and a beta of .20 (to give a power of .80) indicated that 102 participants would be needed to reach statistical significance in an independent-samples t-test. For this study, 126 students from the University of Nottingham Malaysia were recruited. There were no errors in answering the memory task or the questionnaires, therefore, no participants were excluded. The participants had a mean age of 21.35 (*SD* = 2.56, range = 18-34), and consisted of 59 males and 67 females. Most participants were Malaysians (*N* = 89) and the remaining 37 were non-Malaysians (25 British, 2 German, 1 Irish, 1 Danish, 1 Polish, 1 Lithuanian, 1 South African, 1 Vietnamese, 1 Sri Lankan, 1 Indian, 1 Pakistani, and 1 Iranian). Similar to the studies in the previous chapters, the data in the current study is conceptualized as both categorical groups and as existing on a continuum.

Materials

Most positive and negative memory task. Similar to methodology used from Janssen et al. (2015), the memory task aimed to elicit the most positive and the most negative memories. This instruction was given to control for importance of the memory, which is a variable that could also affect psychological distance (Demiray & Janssen, 2015). To obtain recent events, participants were asked to provide short descriptions of their most positive memory that had occurred within the past 3 years (i.e., recent positive memory) and their most negative memory that had occurred within the past 3 years (i.e., recent negative memory). To obtain older events, participants were similarly asked to briefly describe their most positive memory that had occurred more than 3 years ago (i.e., remote positive memory) and their most negative memory that had occurred more than 3 years ago (i.e., remote negative memory).

A cut-off of 3 years was used to distuingush between recent and remote memories in the current study. Recency effects of memory can span up to 10 years when looking at memory over a lifespan (Rubin et al., 1986). However, taking into account the young age of the sample (i.e., 18-34 years old), it was not possible to use that cut-off (e.g., an 18-year-old participant would only be able to include events that occurred at the age of 8 and below for remote events if a cut-off of 10 years is used). Events older than 3 years for this sample would already fall into a different lifetime period (i.e., before entering university). Hence, we decided to reduce the cut-off to 3 years to mirror the original recency cut-off but in a shorter lifespan.

Later, the short memory descriptions were returned to the participants. For each memory, participants were prompted to provide the date of the event and longer descriptions

of the memories (in no less than 40 words) with as much details and phenomenological information (e.g., place, people, emotions, thoughts, atmosphere, and clothing) as possible. There was no time limit given to complete each memory description.

Autobiographical Memory Questionnaire (AMQ). For each memory, the participants answered the AMQ. The AMQ is an 18-item instrument designed to measure characteristics and phenomenological aspects of autobiographical memory (refer to Appendix P). Fifteen items that measured areas of sensory, narrative, properties, and metacognition were taken from Rubin et al. (2003), whereas 3 items that measured emotional intensity, field perspective, and observer perspective were added for the current study. It consists of a 7-point Likert scale (ranging from 1 to 7) for 18 of the items, whereas 1 item had 3 multiple choice options and 1 item was a short answer.

Psychological Distance Scale. For each memory, the participants also answered the the Psychological Distance Scale (adapted from Ross & Wilson, 2002), which is a 3-item instrument developed to measure the psychological distance of events and memories (refer to Appendix Q). The three items measure how recent the event feels, how close the event feels, and how close the past self feels, and the scale consists of a 11-point Likert scale (ranging from 1 to 11). Psychological distance score is obtained by summing all the items together, with total scores ranging between 3 and 33. Although having more psychological distance may suggest that there is greater distance from the events, in actuality, higher psychological distance score reflects that the event feels psychologically closer. This scale has Cronbach's alphas ranging between .82 and .89 (Demiray & Freund, 2017; Demiray & Janssen, 2015; Janssen et al., 2015).

Centrality of Event Scale – short form (CES). The participants also answered the CES for each memory. The CES (Berntsen & Rubin, 2006) is a 7-item instrument developed

to measure the centrality of an event to the individual's current self and life narrative, in terms of meaning-making and future expectations (refer to Appendix R). It consists of a 5-point Likert scale (ranging from 1 to 5), and centrality scores for the event are obtained by summing all the items together. Total scores range from 5 to 35, and higher total score reflects higher centrality towards the event. This scale has Cronbach's alphas ranging between .87 and .92.

CES-D and PCL-5. Similar to the studies in the previous chapters, the Center for Epidemiologic Studies Depression Scale (CES-D) (Radloff, 1977) was used to measure depression symptomology in the general population (refer to Appendix D). Also similar to the previous chapters, the PTSD Checklist for DSM-5 (PCL-5) (Weathers et al., 2013) was used to measure PTSD or trauma symptoms (refer to Appendix B).

Emotion Regulation Questionnaire (ERQ). The ERQ (Gross & John, 2003) is a 10-item instrument developed to measure two types of emotion regulation strategies, which are cognitive reappraisal and expressive suppression (refer to Appendix S). It consists of a 7-point Likert scale (ranging from 1 to 7), with higher scores reflecting a higher magnitude of the respective coping style. Cognitive reappraisal score was obtained by adding items from the cognitive reappraisal domain, whereas expressive suppression score was obtained by adding items from the expressive suppression domain. Total score of cognitive reappraisal ranges from 6 to 42, whereas total score of expressive suppression ranges from 4 to 28. This scale has a three-month test–retest reliability of .69 for both domains and Cronbach's alphas ranging between .75 and .82 for cognitive reappraisal and between .68 and .76 for expressive suppression.

Procedure

This study was approved by the Science and Engineering Research Ethics Committee of the University of Nottingham Malaysia (SJ110118). The study was conducted using a desktop computer in a controlled space in the University. Participants were first given an information sheet to read and a consent form and demographic sheet to answer. After they had given their informed consent, participants answered the memory task. The retrieval of positive and negative memories in the memory task was counterbalanced, but there was a fixed order of recent memories followed by remote memories. Subsequently, they were given the events back one-by-one. For each event, participants were asked to provide the longer descriptions and to answer the AMQ, the Psychological Distance scale, and the CES. Last, participants answered the CES-D, PCL-5, and ERQ. The order of the tasks was fixed, as listed above. The session took approximately 30-45 minutes to complete. At the end of the session, the participants were thanked for their contribution, for which they received a small financial reward (RM10).

Scoring

From the items in the AMQ, Item 1 was used as the recollective experience score, Item 8 was used as the field perspective score, and Item 9 was used as the observer perspective score. For the emotional intensity score, Item 18 was used, but the negative scores were converted to positive scores (e.g., -3 was converted to 3), whereas the positive scores were retained as it was. The reason the negative scores were converted is because Item 18 incorporates both measurements of emotional valence (i.e., positive, negative, and neutral) and intensity (i.e., ranging between 0 and 3). Scores related to memory phenomenology (i.e., psychological distance, recollective experience, field perspective, observer perspective,

emotional intensity, and centrality of event) were calculated for each of the four memories recorded (i.e., recent positive, recent negative, remote positive, and remote negative).

Results

Phenomenology of Autobiographical Memories *[Descriptives]*

The mean and standard deviations of the memory phenomenology are listed in Table 4.1. To test for effects of valence and objective age of memory on the phenomenological traits of memory, a within-subjects multivariate analysis of variances was conducted. There was a significant main effect for the objective age of the memory on memory phenomenology. Recent memories were recalled with higher ratings of closeness ($F(1, 125) = 91.46$, $p < .001$, $d = .42$; recent: $M = 20.57$, $SD = 0.52$; remote: $M = 14.36$, $SD = 0.62$), recollective experience ($F(1, 124) = 41.58$, $p < .001$, $d = .25$; recent: $M = 4.86$, $SD = 0.10$; remote: $M = 3.99$, $SD = 0.12$), field perspective ($F(1, 125) = 66.69$, $p < .001$, $d = .35$; recent: $M = 5.29$, $SD = 0.10$; remote: $M = 4.33$, $SD = 0.13$), emotional intensity ($F(1, 125) = 21.18$, $p < .001$, $d = .15$; recent: $M = 2.37$, $SD = 0.05$; remote: $M = 2.08$, $SD = 0.06$), and centrality ($F(1, 125) = 8.42$, $p = .004$, $d = .06$; recent: $M = 23.76$, $SD = 0.47$; remote: $M = 22.06$, $SD = 0.59$), and lower ratings of observer perspective ($F(1, 125) = 9.04$, $p = .003$, $d = .07$; recent: $M = 3.18$, $SD = 0.14$; remote: $M = 3.62$, $SD = 0.14$) than remote memories. There were no main effects of valence and no interactions between the valence and age of the memories on the phenomenologies of memories (ps > .05) .

Depression, Trauma, and Autobiographical Memory Phenomenology *[Hypotheses 1 and 2]*

Scoring of subclinical and psychologically healthy groups. To analyse the data from a categorical approach, participants who scored a total of 20 and above in the CES-D (Vilagut et al., 2016) were categorized as subclinical depression (n = 53; males = 21, females = 32), whereas those who scored a total of 19 and below were categorized as non-depressed (n = 73; males = 38, females = 35). The depression scores varied significantly from the cut-off score (M = 17.86, SD = 10.56, $t(125) = -2.28$, $p = .025$), indicating that the scores were distributed away from the cut-off.

For the PCL-5 (Weathers et al., 2013), individuals that scored a total of 33 and above were categorized as subclinical PTSD (n = 41; males = 20, females = 21), whereas those who scored a total of 32 and below were categorized as non-PTSD (n = 85; males = 39, females = 46). The trauma scores varied significantly from the cut-off score (M = 26.19, SD = 16.65, $t(125) = -4.59$, $p < .001$), indicating that the scores were distributed away from the cut-off.

Subclinical depression and non-depressed group differences for recent memories. To examine differences in memory phenomenology between subclinical depression and non-depressed groups and between subclinical PTSD and non-PTSD groups, independent-samples t-tests were conducted (see Table 4.2, Figure 4.1, and Figure 4.2). For recent positive memories, there were no differences between subclinical depression and non-depressed groups in psychological distance ($t(124) = -1.72$, $p = .088$), recollective experience ($t(124) = -0.28$, $p = .784$), field perspective ($t(124) = 0.56$, $p = .578$), observer perspective ($t(124) = 0.77$, $p = .441$), emotional intensity ($t(124) = -0.99$, $p = .326$), and centrality ($t(124) = -0.52$, $p = .606$).

For recent negative memories, subclinical depression and non-depressed groups retrieved memories with similar field perspective ($t(124) = 1.44$, $p = .152$) and observer perspective ($t(124) = -0.49$, $p = .624$). Although the subclinical depression group felt closer to

the memory ($t(124) = 1.98$, $p = .050$), had more recollective experience ($t(124) = 2.14$, $p = .034$), and had higher centrality ($t(124) = 2.17$, $p = .032$) than the non-depressed group, these differences were no longer significant after applying Bonferroni corrections ($p \leq .008$). However, the subclinical depression group did experience higher emotional intensity ($t(124) = 2.85$, $p = .005$, $d = .52$) for the recent negative memories than the non-depressed group, even after Bonferroni corrections ($p \leq .008$).

Subclinical depression and non-depressed group differences for remote memories. For remote positive memories, the subclinical depression and non-depressed groups had similar psychological distance ($t(124) = -0.15$, $p = .879$), recollective experience ($t(124) = 0.28$, $p = .777$), field perspective ($t(124) = 0.89$, $p = .375$), observer perspective ($t(124) = -0.92$, $p = .359$), emotional intensity ($t(124) = -1.04$, $p = .300$), and centrality ($t(124) = -0.67$, $p = .502$). For remote negative memories, there were also no differences in psychological distance ($t(124) = 1.25$, $p = .214$), recollective experience ($t(124) = 0.67$, $p = .506$), field perspective ($t(124) = 1.81$, $p = .074$), observer perspective ($t(124) = 0.35$, $p = .724$), emotional intensity ($t(124) = 1.44$, $p = .153$), and centrality ($t(124) = 1.55$, $p = .125$) between subclinical depression and non-depressed groups.

Subclinical PTSD and non-PTSD group differences for recent memories. Similar to depression, for recent positive memories, there were no differences between subclinical PTSD and non-PTSD groups in psychological distance ($t(124) = -1.24$, $p = .216$), recollective experience ($t(124) = -0.81$, $p = .419$), field perspective ($t(124) = 0.36$, $p = .720$), observer perspective ($t(124) = -0.61$, $p = .546$), emotional intensity ($t(124) = 0.44$, $p = .658$), and centrality ($t(124) = 1.45$, $p = .150$). For recent negative memories, those with subclinical PTSD and non-PTSD groups retrieved memories with similar psychological distance ($t(124) = 1.75$, $p = .082$), recollective experience ($t(124) = 1.64$, $p = .103$), observer perspective

($t(124) = -1.78$, $p = .077$), and emotional intensity ($t(124) = 1.81$, $p = .072$). Although the subclinical PTSD group also recalled more field perspective ($t(124) = 2.10$, $p = .038$) than the non-PTSD group, this difference was no longer significant after Bonferroni corrections ($p \leq .008$) were applied. However, the subclinical PTSD group did recall recent negative memories with higher centrality ($t(124) = 2.84$, $p = .005$, $d = .54$) than the non-PTSD group, even after correcting with Bonferroni ($p \leq .008$).

Subclinical PTSD and non-PTSD group differences for remote memories. For remote positive memories, there were no differences between subclinical PTSD and non-PTSD groups in psychological distance ($t(124) = -0.74$, $p = .459$), recollective experience ($t(124) = -1.44$, $p = .153$), field perspective ($t(124) = 0.14$, $p = .892$), observer perspective ($t(124) = -0.53$, $p = .596$), emotional intensity ($t(124) = -0.92$, $p = .357$), and centrality ($t(95.25) = 0.67$, $p = .502$). For remote negative memories, subclinical PTSD and non-PTSD groups retrieved memories with similar psychological distance ($t(124) = 1.47$, $p = .145$), recollective experience ($t(124) = -0.12$, $p = .909$), field perspective ($t(124) = 0.38$, $p = .703$), and observer perspective ($t(124) = 0.62$, $p = .535$). Although the subclinical PTSD group also recalled memories with higher emotional intensity ($t(124) = 2.00$, $p = .047$) than the non-PTSD group, this difference was no longer significant after Bonferroni corrections ($p \leq .008$) were applied. The subclinical PTSD group had higher centrality ($t(91.80) = 2.86$, $p = .005$, $d = .53$) than the non-PTSD group towards their remote negative memories, and this difference was still significant after Bonferroni corrections ($p \leq .008$).

Subclinical and psychologically healthy group differences for emotion regulation components. Independent-samples t-tests were conducted to test differences in emotion regulation components between subclinical depression and non-depressed groups and between subclinical PTSD and non-PTSD groups. The subclinical depression group had

lower cognitive reappraisal than the non-depressed group ($t(124) = -3.82$, $p < .001$, $d = .69$; sub dep: $M = 28.28$, $SD = 6.54$; non-dep: $M = 32.55$, $SD = 5.91$), even after Bonferroni corrections ($p \leq .025$). There were no differences in expressive suppression between the subclinical depression and non-depressed groups ($t(124) = 1.71$, $p = .090$).

The subclinical PTSD and non-PTSD groups had similar levels of cognitive reappraisal ($t(124) = -1.92$, $p = .058$). However, the subclinical PTSD group had higher expressive suppression than the non-PTSD group ($t(124) = 3.43$, $p = .001$, $d = .66$; sub PTSD: $M = 18.54$, $SD = 4.76$; non-PTSD: $M = 15.33$, $SD = 4.99$). This difference was still significant after applying Bonferroni corrections ($p \leq .025$).

Valence and Objective Age of Memory *[Hypothesis 3]*

Mixed-design multivariate analyses of variances were used to examine the effects of emotional valence and objective age of memory on psychological distance between subclinical depression and non-depressed groups and between subclinical PTSD and non-PTSD groups. There was an interaction effect between valence and depression groups on psychological distance (see Figure 4.3) ($F(1, 124) = 6.64$, $p = .011$, Cohen's $d = .05$). The subclinical depression group felt closer to negative memories ($M = 18.32$, $SE = 0.90$) than positive memories ($M = 17.23$, $SE = 0.93$), whereas the non-depressed group felt closer to positive memories ($M = 18.54$, $SE = 0.79$) than negative memories ($M = 15.93$, $SE = 0.76$). There was no interaction between objective age of memory and depression groups on psychological distance ($F(1, 124) = 0.17$, $p = .686$).

Similar to depression groups, there was an interaction effect between valence and PTSD groups on psychological distance (see Figure 4.4) ($F(1, 124) = 7.12$, $p = .009$, Cohen's $d = .05$). The subclinical PTSD group felt closer to negative memories ($M = 18.63$, $SE =$

1.02) than positive memories (M = 16.98, SE = 1.05), whereas the non-PTSD group felt closer to positive memories (M = 18.48, SE = 0.73) than negative memories (M = 16.12, SE = 0.71). There was no interaction between objective age of memory and PTSD groups on psychological distance ($F(1, 124) = 0.00$, $p = .949$).

Depression, Trauma, and Psychological Distance

Exploratory linear regression analyses were conducted to test the predictive effects of depression and trauma severity on psychological distance, to examine the data from a continuous approach. Depression severity significantly explained 6.2% of the variance in the psychological distance of recent negative memories ($F(1, 124) = 8.17$, $p = .005$) even after Bonferroni corrections ($p \leq .013$), whereby higher depression predicted higher feelings of closeness towards recent negative memories (*beta* = .25, $p = .005$). Although depression severity explained 4.3% of the variance in the psychological distance of recent positive memories ($F(1, 124) = 5.54$, $p = .020$, *beta* = -.21), it no longer predicted psychological distance of recent positive memories after applying Bonferroni corrections ($p \leq .013$). Depression severity also did not predict the psychological distance of remote positive and negative memories (ps > .05).

Although trauma severity significantly explained 3.9% of the variance in the psychological distance of recent negative memories ($F(1, 124) = 5.02$, $p = .027$, *beta* = .20), it was no longer a predictor of the psychological distance of recent negative memories after applying Bonferroni corrections ($p \leq .013$). Trauma severity also did not predict psychological distance of recent positive memories and remote positive and negative memories (ps > .05).

Mediators of Depression, Trauma, and Psychological Distance *[Hypotheses 4 and 5]*

Correlations with mediating variables. To investigate the associations between recollective experience, field perspective, observer perspective, emotional intensity, and centrality with depression, trauma, and psychological distance to determine potential mediators (see Table 4.3), Pearson correlation coefficients were calculated. As depression levels only related to psychological distance of recent positive and recent negative memories and trauma levels only related to psychological distance of recent negative memories, prior to Bonferroni corrections, only these psychological distances will be discussed here.

For recent positive memories, psychological distance was associated with recollective experience ($r(124) = .66$, $p < .001$), field perspective ($r(124) = .39$, $p < .001$), emotional intensity ($r(124) = .23$, $p = .011$), centrality ($r(124) = .18$, $p = .049$). However, there were no linear relations between depression with recollective experience ($r(124) = -.04$, $p = .676$), field perspective ($r(124) = .01$, $p = .902$), emotional intensity ($r(124) = -.08$, $p = .350$), and centrality ($r(124) = -.01$, $p = .892$). Depression ($r(124) = .03$, $p = .704$) and psychological distance ($r(124) = -.11$, $p = .204$) were also not related to observer perspective. Due to the lack of relations to both variables in the relation, no phenomenological characteristics could be tested as mediators for the relations of depression and psychological distance of recent positive memories.

Because depression predicted psychological distance of recent negative memories although it was not hypothesized to do so, exploratory mediation analyses would be conducted on this relation. The potential mediators were selected based on any memory phenomenology that related to both of the variables in the relation. For recent negative memories, psychological distance was associated with recollective experience ($r(124) = .60$, $p < .001$), field perspective ($r(124) = .19$, $p = .034$), and centrality ($r(124) = .21$, $p = .020$).

Depression was associated with recollective experience ($r(124) = .20$, $p = .023$) and centrality ($r(124) = .18$, $p = .045$) but not field perspective ($r(124) = .12$, $p = .174$), whereas trauma was associated with recollective experience ($r(124) = .20$, $p = .025$), field perspective ($r(124) = .18$, $p = .044$), and centrality ($r(124) = .29$, $p = .001$). Although depression ($r(124) = .21$, $p = .016$) and trauma ($r(124) = .24$, $p = .008$) related to emotional intensity, psychological distance ($r(124) = .03$, $p = .760$) did not. Depression ($r(124) = -.05$, $p = .597$), trauma ($r(124) = -.12$, $p = .188$), and psychological distance ($r(124) = -.06$, $p = .523$) were also not related to observer perspective. Hence, recollective experience and centrality could be tested as mediators for the relations between depression and psychological distance of recent negative memories. Field perspective, in addition to recollective experience and centrality, could be tested as mediators for trauma and psychological distance of recent negative memories.

Associations between the emotion regulation strategy of cognitive reappraisal was also tested with depression and psychological distances of recent positive and negative memories, and expressive suppression with depression, trauma, and psychological distances of recent negative memories. Cognitive reappraisal related negatively to depression ($r(124) = -.34$, $p < .001$) but not to psychological distance of recent positive ($r(124) = .09$, $p = .304$) and recent negative ($r(124) = -.08$, $p = .385$) memories. Expressive suppression related positively to depression ($r(124) = .27$, $p = .002$) and trauma ($r(124) = .36$, $p < .001$) but not to psychological distance of recent negative memories ($r(124) = .02$, $p = .862$). Therefore, the emotion regulation strategies could not be tested as a mediator for the relations between depression and trauma and psychological distance.

Mediation analyses for depression and psychological distance of recent negative memories. To examine recollective experience as a mediator of depression and psychological distance of recent negative memories, a hierarchical regression was conducted with

recollective experience (entered in the first step) and depression (entered in the second step) as the independent variables and psychological distance of recent negative memories as the dependent variable. Recollective experience fully mediated the relation between depression and psychological distance, whereby adding depression did not lead to a significant increase in the explained variance (ΔR^2 = .017, p = .069; Z = 2.11, p = .035).

Similar steps were repeated to test whether centrality of event mediated depression and psychological distance of recent negative memories, by entering centrality into the first step of the hierarchical regression analysis instead. Centrality of event did not mediate the relation between depression and psychological distance. Adding depression led to a significant increase in the explained variance (ΔR^2 = .046, p = .014), and its influence was independent from the influence of centrality (Z = 1.31, p = .190).

Mediation analyses for trauma and psychological distance of recent negative memories. To examine recollective experience as a mediator of trauma and psychological distance of recent negative memories, a hierarchical regression was conducted with recollective experience (entered in the first step) and trauma (entered in the second step) as the independent variables and psychological distance of recent negative memories as the dependent variable. Recollective experience fully mediated the relation between trauma and psychological distance, whereby adding trauma did not lead to a significant increase in the explained variance (ΔR^2 = .006, p = .268; Z = 2.12, p = .034).

Next, whether field perspective served as a mediator for trauma and psychological distance of recent negative memories was tested. All steps in the hierarchical regressions were similar as the previous analysis, except field perspective was entered into the first step of the hierarchical regression analysis instead. Field perspective did not mediate the relation between trauma and psychological distance. Adding trauma did not lead to a significant

increase in the explained variance (ΔR^2 = .027, p = .060), but the Sobel test was not significant (Z = 1.22, p = .224).

Finally, similar steps were repeated to test the role of centrality of event as a mediator of trauma and psychological distance of recent negative memories, by entering centrality into the first step of the hierarchical regression analysis instead. Centrality of event did not mediate the relation between trauma and psychological distance. Adding trauma did not lead to a significant increase in the explained variance (ΔR^2 = .020, p = .104) but the Sobel test was not significant (Z = 1.51, p = .126).

Moderators of Depression, Trauma, and Psychological Distance *[Hypotheses 4 and 5]*

To investigate the effects of memory phenomenology and emotion regulation on the relations of depression and trauma and psychological distance, moderation analyses were conducted. Similar to the exploratory mediation analyses in the previous chapter, exploratory moderation analyses were also conducted for the relations of depression and trauma with psychological distance that were not included in the hypotheses or did not have significant relations, to test whether these relations could become significant with the addition of the moderator. All memory phenomenology and emotion regulation were tested as moderators for the exploratory moderation analyses, due to its exploratory nature.

Moderation analyses for depression and psychological distance of recent memories. Moderation analyses showed that recollective experience (ΔR^2 = .00, p = .329), field perspective (ΔR^2 = .01, p = .330), observer perspective (ΔR^2 = .00, p = .512), emotional intensity (ΔR^2 = .01, p = .460), centrality (ΔR^2 = .01, p = .239), and cognitive reappraisal (ΔR^2 = .01, p = .365) did not moderate the relation between depression and psychological distance of recent positive memories. For the relation between depression and psychological distance

of recent negative memories, field perspective (ΔR^2 = .00, p = .780), observer perspective (ΔR^2 = .00, p = .498), emotional intensity (ΔR^2 = .00, p = .900), centrality (ΔR^2 = .01, p = .178), cognitive reappraisal (ΔR^2 = .00, p = .541), and expressive suppression (ΔR^2 = .00, p = .707) did not serve as moderators. Because recollective experience was found to function as a mediator for the relation of depression and psychological distance of recent negative memories, it was excluded from the moderation analysis for this relation.

Moderation analyses for depression and psychological distance of remote memories. Only emotional intensity served as a moderator for the association between depression and psychological distance of remote positive memories (ΔR^2 = .04, B = -.18, SE = .08, p = .028). Higher depression predicted feeling further from remote positive memories as the emotional intensity level increased. However, this moderating effect was only observed at high levels of emotional intensity. Recollective experience (ΔR^2 = .01, p = .301), field perspective (ΔR^2 = .00, p = .945), observer perspective (ΔR^2 = .02, p = .088), centrality (ΔR^2 = .00, p = .609), cognitive reappraisal (ΔR^2 = .00, p = .884), and expressive suppression (ΔR^2 = .01, p = .187) did not moderate this relation.

For remote negative memories, field perspective was found to moderate the relation between depression and psychological distance (ΔR^2 = .03, B = .07, SE = .03, p = .037). Higher depression predicted feeling closer to remote negative memories more strongly as field perspective increased. However, this moderating effect was only observed at high levels of field perspective. Recollective experience (ΔR^2 = .01, p = .106), observer perspective (ΔR^2 = .01, p = .386), emotional intensity (ΔR^2 = .02, p = .125), centrality (ΔR^2 = .01, p = .233), cognitive reappraisal (ΔR^2 = .00, p = .947), and expressive suppression (ΔR^2 = .02, p = .180) did not moderate this relation.

Moderation analyses for trauma and psychological distance of recent memories. There were no significant moderating effects of recollective experience (ΔR^2 = .00, p = .401), field perspective (ΔR^2 = .00, p = .476), observer perspective (ΔR^2 = .00, p = .779), emotional intensity (ΔR^2 = .00, p = .924), centrality (ΔR^2 = .00, p = .744), cognitive reappraisal (ΔR^2 = .02, p = .090), and expressive suppression (ΔR^2 = .00, p = .665) on the relation between trauma and psychological distance of recent positive memories. For the relation between trauma and psychological distance of recent negative memories, field perspective (ΔR^2 = .00, p = .826), observer perspective (ΔR^2 = .00, p = .958), emotional intensity (ΔR^2 = .00, p = .996), centrality (ΔR^2 = .03, p = .056), and expressive suppression (ΔR^2 = .00, p = .920) were not significant moderators. Recollective experience was excluded from the moderation analysis on the relation between trauma and psychological distance of recent negative memories because it functioned as a mediator for the relation.

Moderation analyses for trauma and psychological distance of remote memories. For remote positive memories, recollective experience (ΔR^2 = .00, p = .964), field perspective (ΔR^2 = .00, p = .964), observer perspective (ΔR^2 = .03, p = .071), emotional intensity (ΔR^2 = .03, p = .070), centrality (ΔR^2 = .00, p = .857), cognitive reappraisal (ΔR^2 = .00, p = .977), and expressive suppression (ΔR^2 = .00, p = .676) did not moderate the trauma and psychological distance relation. Field perspective served as a moderator for the relation between trauma and psychological distance of remote negative memories (ΔR^2 = .05, B = .06, SE = .02, p = .005). Higher trauma predicted feeling closer to remote negative memories more strongly as field perspective increased, but this moderating effect was only observed at high levels of field perspective. However, recollective experience (ΔR^2 = .02, p = .062), observer perspective (ΔR^2 = .00, p = .880), emotional intensity (ΔR^2 = .00, p = .586), centrality (ΔR^2 = .01, p =

.325), cognitive reappraisal (ΔR^2 = .00, p = .968), and expressive suppression (ΔR^2 = .00, p = .750) did not moderate this relation.

Discussion

The present study investigated the relation of depression and trauma with psychological distance for memories of different valence (i.e., positive and negative) and different objective ages (i.e., recent and remote). Memory phenomenology (i.e., recollective experience, vantage perspective, emotional intensity, and centrality) and emotion regulation strategies (i.e., cognitive reappraisal and expressive suppression) as underlying mechanisms of these relations were also tested. To investigate these aims, participants retrieved positive and negative memories that were recent and remote, and completed the psychological distance scale, AMQ and CES for every event, as well as the CES-D, PCL-5, and ERQ. Overall findings indicate that:

1. Individuals with subclinical depression and psychologically healthy individuals attached similar psychological distances to recent positive events (part of Hypothesis 1 was not accepted), recent negative events, and remote events (part of Hypothesis 1 was accepted). However, depression severity predicted feeling closer to recent negative memories.
2. Individuals with subclinical PTSD and psychologically healthy individuals attached similar psychological distances to recent negative events (part of Hypothesis 2 was not accepted), recent positive events, and remote events (part of Hypothesis 2 was accepted).
3. In general, subclinical depression and PTSD groups felt closer to negative events whereas psychological healthy groups felt closer to positive events (part of

Hypothesis 3 was accepted). There was no effect of objective age on the relations between depression and trauma groups and psychological distance (part of Hypothesis 3 was not accepted).

4. Recollective experience fully mediated the relations of depression and trauma with psychological distance for recent negative events (part of Hypothesis 4 was accepted). Recollective experience did not mediate the other relations (part of Hypothesis 4 was not accepted).
5. Emotional intensity moderated the relation between depression and psychological distance of remote positive events, whereas field perspective moderated the relations of depression and trauma with psychological distance of remote negative events. Higher emotional intensity strengthened the relation between higher depression and feeling further from remote positive events. Higher field perspective strengthened relations of higher depression and trauma and feeling closer to remote negative events. Emotional intensity and field perspective did not mediate or moderate the other relations (part of Hypothesis 4 was not accepted).
6. Observer perspective, centrality of event, cognitive reappraisal, and expressive suppression did not mediate or moderate the relations of depression and trauma with psychological distance for all types of memories (part of Hypotheses 4 and 5 were not accepted).

Depression and Psychological Distance

Individuals with subclinical depression and psychologically healthy individuals did not feel any differently towards the psychological distance of memories. Unlike the group difference findings, higher depression severity predicted increased feelings of closeness

towards recent negative memories, but not feelings of closeness towards the other types of memories. This finding suggests that there is no observable difference in psychological distance upon crossing the subclinical threshold, but higher amount of depression symptoms could be one of the many predictors that contributes towards changes in psychological distance of negative memories that occurred in recent times. The current results are different from those of Janssen et al. (2015), who found that people with higher depression felt further from positive events, but did not feel closer to negative memories.

The results showed that the relation between depression and psychological distance is affected by the valence of memories. When memories were negative, the subclinical depression group exhibit more feelings of closeness than the psychologically healthy group, whereas the opposite was observed when the memories were positive. Individuals with higher levels of depression have been known to have more negative attentional biases (Baert et al., 2010; Dalgleish et al., 2011; Everaert et al., 2014), which cause feelings of closeness towards negative memories. Furthermore, those with higher depression symptoms include more negative memories than positive memories in their life narratives (Bohn, 2010; Dalgleish et al., 2011; Fromholt et al., 2003; Habermas et al., 2008; Jobson et al., 2018; Jørgensen et al., 2012; Rubin et al., 2009), which means they think and talk about important negative memories more often. Rehearsal of memories, in terms of thinking and talking, have been shown to influence psychological distance (Demiray & Janssen, 2015). Hence, the tendency to narrate and think more about negative important memories may also be a reason for those with more depression symptoms to feel closer towards those memories. Besides the role of attentional biases and rehearsal, individuals with higher depression scores typically have higher rumination tendencies, particularly brooding (Schoofs et al., 2010; Treynor et al., 2003; Xavier, Cunha, & Pinto-Gouveia, 2016). Higher brooding has been shown to make

negative events feel closer (Öner & Gülgöz, 2018), and thus, may also explain the reason higher levels of depression predicts feeling closer to negative events.

Although depression severity predicted changes in psychological distance of negative events, it did so only for recent events but not remote events. Psychological distance has been noted to reduce or weaken over time, independent of the levels of depression (Janssen et al., 2015; Ross & Wilson, 2002). Hence, it may be possible that the depression severity only predicts feeling closer to negative events in the beginning when the events have just occurred, and similarly loses its association over time.

Trauma and Psychological Distance

The present study also did not find any differences in psychological distance for those with subclinical PTSD and psychological healthy individuals. In line with the lack of group differences, trauma severity also did not explain psychological distance. Individuals with trauma have been noted to have more attentional biases towards threatening memories rather than negative memories (Bryant & Harvey, 1997; Pineles et al., 2009; Schönfeld & Ehlers, 2017). The current results about the negative events are different from Janssen et al. (2015), who showed that people with higher levels of trauma felt closer to negative events, but the current results about the positive events are similar to Janssen et al. (2015), who found no associations for positive memories. It is possible that the negative memories retrieved for the present study may not have been threatening in nature or related to their traumatic experience, which may be a reason that the participants with subclinical PTSD symptoms did not feel any closer or further from the negative memories.

Similar to depression, the relation between trauma and psychological distance appeared to be affected by the valence of memories. The subclinical PTSD group experienced

more feelings of closeness than the psychologically healthy group when the memories were negative, whereas the opposite was experienced when the memories were positive. Although individuals with trauma symptoms primarily have attentional biases towards traumatic and threatening memories (Bryant & Harvey, 1997; Pineles et al., 2009), they may still experience a small amount of attentional bias towards negative memories (El Khoury-Malhame et al., 2011; Vythilingam et al., 2007).

Another potential factor that may explain the lack of group differences in psychological distance for the subclinical PSTD group, as well as the subclinical depression group, is the language of narration. Van Boven and Caruso (2015) theorized that language during narration of the memory has the ability to form or change psychological distance towards an event. Past studies have shown that people tend to have less access to memories when the language during encoding and narration do not match, and people have more difficulty retrieving and narrating memories in their second language if it is not as fluent or preferred as their first language (Marian & Neisser, 2000; Matsumoto & Stanny, 2006). These effects are known as language-dependent memories. The current study required participants to narrate their memories in English, but the sample consisted of participants from a mixture of nationalities that may not have had English as a first language despite having sufficient proficiency to complete the task. Thus, psychological distance could have been affected during narration of the memory for participants who did not have English as a first language. Additionally, language has also been shown to affect memory phenomenology, such as emotional intensity. When describing emotional memories or events, emotional intensity was shown to increase when first language was used and decrease when second language was used (Pizzaro, 1994).

Recollective Experience

The current study found that recollective experience was the underlying mechanism of the relation of depression and trauma with psychological distance of recent negative events. Individuals with more depression and trauma symptoms felt closer to recent negative events, because they are able to travel back in time to that event and relive or re-experience it as intensely as if it were occurring at the present. However, the current study did not find any differences in the amount of recollective experience for the negative events engaged by those with subclinical depression and PTSD as compared to those who are psychologically healthy, similar to past studies using clinical samples (Söderlund et al., 2014). This finding suggests that those with subclinical levels of depression and PTSD do not engage in more recollective experience towards recent negative events than the average person, but they do appear to be more strongly impacted by it. The enhanced effect that reliving of recent negative events has may be due to the negative attentional biases experienced by people with depression and trauma symptoms that makes the recall of these events easier and more intense (Baert et al., 2010; Dalgleish et al., 2011; El Khoury-Malhame et al., 2011; Everaert et al., 2014; Vythilingam et al., 2007), causing an increase in the closeness felt towards the event.

Vantage Perspective

Field and observer perspective did not underlie the relations of depression and trauma with psychological distance. However, manipulating vantage perspective from field to observer perspective has been used as a tool to create distance from memories, emotions, and thoughts, especially in clinical populations (e.g., Gu & Tse, 2016; Kross et al., 2012). One reason for the difference in results from the literature is that past studies viewed field and observer perspective as opposite ends of one variable, and did not take into account the

interaction between objective age and valence of the memory. Subclinical depression and PTSD groups in the current study did not have significant differences in field and observer perspective, similar to previous studies (Rubin et al., 2008), which suggests that those with subclinical depression and PTSD did not view the recalled memory any differently. Hence, although changing vantage perspective has the ability to change psychological distance, it is not able to directly account for the influence of depression and trauma on psychological distance.

Instead, field perspective was found to strengthen the associations of depression and trauma with psychological distance of remote negative memories but only at high levels of field perspective. This moderation means when an individual has more symptoms of depression or trauma and high field perspective during recall of a remote negative memory, the likelihood that the individual feels closer to the memory increases. There was no prior association between trauma and psychological distance of remote negative memories but adding high field perspective resulted in findings that match Janssen et al. (2015), whereby higher trauma predicted feeling closer towards negative memories.

Seeing negative memories from a field perspective is likely to make the memory appear as if the person is experiencing the event first-hand in the present, which could reflect an increase in recollective experience. Marcotti and St. Jacques (2018) found that changes in vantage perspective and psychological distance could be attributed to changes in recollective experience. As the current results have shown that recollective experience underlies those with higher depression and trauma levels feeling closer to recent negative memories, it may be possible that the high field perspective is indirectly increasing the recollective experience, which then alters the psychological distance of remote negative memories.

Emotional Intensity

Emotional intensity also did not underlie the relations of depression and trauma with psychological distance. Changing the emotional intensity at recall has been shown to cause changes in psychological distance (Mei et al., 2008; Van Boven et al., 2010). In the current study, emotional intensity was not associated to measures of psychological distance, and was not any different between the subclinical depression and PTSD groups and the psychologically healthy groups for all except recent negative memories, results of which were different from past studies (Knyazev et al., 2017; Rottenberg et al., 2005; Rubin et la., 2008, 2011; Werner-Seidler & Moulds, 2011). The subclinical depression group retrieved recent negative memories with higher intensity than the psychologically healthy groups.

The higher emotional intensity for negative but not positive memories could be attributed to people with depression symptoms having an impairment in their fading affect bias (Gibbons & Lee, 2019; Marsh, Hammond, & Crawford, 2019). Fading affect bias refers to the emotional intensity of negative memories typically fading faster than positive memories, and usually starts taking an effect between one day to three months after the event occurred (Gibbons & Lee, 2019; Walker & Skowronski, 2009). The mean objective age of memories recorded in the recent negative category for the subclinical depression group was 12.5 months, which means a fading affect bias should have taken place on the memories. The high emotional intensity for recent but not remote negative events suggests that individuals with subclinical depression do not completely lack the fading affect bias, but instead may experience delays or weakening in automatically reducing the negative emotions of recent memories, similar to findings of Hitchcock et al. (2020).

Gu and Tse (2016) found that psychological distance and vividness mediated and caused changes in emotional intensity. One possibility that arises from the lack of

associations between depression and trauma and psychological distance for the other memory conditions in the current study is that other phenomenological factors, such as vividness or recollective experience, could have an influence and may need to be taken into account. Another factor that explains the lack of associations is narrating memories using one's second or less-preferred language, which can increase or decrease the emotional intensity of the memory as compared to narrating it in the first or preferred language (Marian & Kaushanskaya, 2008; Pavlenko, 2012). Hence, it is possible that the emotional intensity recorded at narration may not reflect the actual emotional intensity experienced during recall for some bilingual participants.

However, higher emotional intensity strengthened the association between depression and psychological distance of remote positive memories but only at high levels of emotional intensity. It means when an individual has more symptoms of depression and high emotional intensity during recall of a remote positive memory, the likelihood that the individual feels further from the memory increases. Although there was initially no association between depression and psychological distance of remote positive memories, the addition of high emotional intensity resulted in a relation similar to the results of Janssen et al. (2015), whereby higher depression predicted feeling further away from positive memories.

Feeling further when positive memories have a higher intensity may be a form of avoidance by those with depression symptoms. People with depression have been observed to demonstrate fear and avoidance towards emotions that are positive in nature (e.g., Hayes, 2015; Vanderlind, Stanton, Weinbrecht, Velkoff, & Joormann, 2016; Werner-Seidler, Banks, Dunn, & Moulds, 2013). Therefore, remote memories that are accompanied by higher positive emotional intensity are likely to increase this fear and avoidance in individuals with

depression symptoms towards the memory, resulting in feelings of distance from the memory.

Event Centrality

In addition, centrality of the event was not the underlying mechanism for the depression, trauma, and psychological distance relations either. Although the current study looked at the most important positive and negative personal events, these memories were not necessarily central to the person's identity and outlook in life. Importance and centrality are characteristics of memory that are highly related but separate constructs (Gehrt, Berntsen, Hoyle, & Rubin, 2018; Janssen et al., 2015). In line with past studies (Berntsen & Rubin, 2006; Boals, 2014; da Silva et al., 2016; Wamser-Nanney et al., 2018; Zaragoza Scherman et al., 2015), those with subclinical PTSD symptoms did perceive negative events as being more central to them regardless of the objective age of memory, but the centrality of those events did not account for trauma's influence on psychological distance of those events.

Emotion Regulation

Finally, although those with subclinical depression symptoms had lower cognitive reappraisal and those with subclinical PTSD symptoms had higher expressive suppression, cognitive reappraisal and expressive suppression did not explain associations between depression and trauma with psychological distance. This finding indicates that the inability of those with higher depression symptoms to feel closer to positive events and those with higher trauma to distance themselves from negative events is not related to poor emotion regulation strategies. However, the current study only tested two types of emotion regulation strategies and it is still possible that other types of emotion regulation strategies, such as task- or

problem-focused, emotional-focused, and avoidant-focused (Carver et al., 1989; Endler, 1997; Sahler & Carr, 2009), may be related to the associations instead. Task- or problem-focused coping involves planning, strategizing, and taking action in trying to solve the experienced problems. Emotional-focused coping primarily aims to manage and reduce emotional distress that arises from problems, by venting emotions and relying on social support. Avoidant focused coping are forms of aversions and dissociations towards the problem, by denying that the problem is real or forgetting that the problem exists. These three emotion regulation strategies cover a wider coping area than cognitive reappraisal and expressive suppression, and hence, may be able to better explain the associations between depression and trauma and psychological distance.

Implications

The findings suggest that depression symptoms do contribute to feeling psychologically closer towards recent negative events, which has been shown to relate to negative mood and thoughts (Kross et al., 2012). Hence, managing or reducing individuals' symptoms of depression via psychotherapy could help them to distance themselves from negative events that occurred in recent times. Being able to successfully distance themselves from negative events will further allow those with depression symptoms to reduce the likelihood of the escalation of depression symptoms to clinical levels (e.g., Barbosa, Silva, Pinto-Guiveia, & Salgado, 2019; Kross & Ayduk, 2009; Kross et al., 2012).

The current findings further suggest that an effective way to increase the distance from recent negative events for individuals with higher depression and trauma is by manipulating the recollective experience of these events. The amount of reliving experienced when recalling an event can be altered by asking these individuals to recall these memories

with fewer episodic details, which will help reduce the vividness and enable them to relive the memories less intensely. Memory specificity training is employed as a form of cognitive training to increase the episodic details recalled in positive autobiographical memories in populations with depression and PTSD (e.g., Erten & Brown, 2018; Hamlat & Alloy, 2018; Raes, Williams, & Hermans, 2009). This memory specificity training could be modified to help people with higher depression and trauma symptoms reduce the amount of episodic details of the recent negative memories they recall instead, therefore reducing the recollective experience of those memories and hence, increasing the distance from those memories. By targeting only certain types of memories to decrease its episodic details (e.g., only recent negative memories instead of all negative memories or positive memories), the risk of the individuals developing OGM tendencies from the training is low. However, future application research is needed to study how effective this adapted memory specificity training would be.

Besides these two implications, the results from this study also indicate that the centrality that individuals with subclinical PTSD symptoms place on negative events does not change over time. This result means that the centrality of negative events will not automatically reduce over time and that active intervention needs to be undertaken to reduce the centrality of negative events. Changing the meaning and perceptions associated with negative events, or learning to accept and normalize the event, could reduce the centrality attached to the event by the individual, which could further help reduce their symptoms of trauma from escalating (e.g., Boals & Murrell, 2016; Boals & Schuettler, 2011; Greenhoot, Sun, Bunnell, & Lindboe, 2013).

Last, the current results showed that individuals with subclinical depression symptoms had stronger emotional intensity for their recent negative memories. As the

emotional intensity of negative events does not appear to fade automatically or as quickly in people with many depression symptoms, active intervention needs to be used to alleviate the heightened emotional intensity. Reframing perceptions of the event or increasing the acceptance towards recent negative memories could be used to reduce the emotional intensity of the negative events (e.g., Clabby, 2006; Qu, Sas, & Doherty, 2019). Besides reframing memories, mindfulness-based intervention can also be utilized to manage the emotional intensity attached to negative memories (e.g., Jimines, Niles, & Park, 2010; Wu et al., 2019). Using both types of techniques could reduce the emotional intensity and hence, prevent their depression symptoms from escalating.

Limitations

One limitation of the present study is that the memory retrieval task used in the current study may not have reflected naturalistic retrieval and narration of memories. The memory task required participants to describe their memory in more than 40 words. Therefore, individuals who may not typically recall their memories with that much phenomenological characteristics were forced to do so, which may have elevated the ratings obtained in the current study beyond their typical recall patterns. Furthermore, it also raises the possibility that some participants may not have been able to recall sufficient details about the memory, leading them to describe memory details that they have less confidence in and are less accurate, to meet the minimum word limit.

One more limitation is that the current study only examined the relations of depression and trauma with phenomenological traits of most important memories. Everyday memories or memories of varying importance were not studied, and hence, whether the current results can also be generalized to those memories is uncertain. The current study

tested the recall phenomenology that was related to each specific event as possible underlying mechanisms but did not take into account existing individual differences in recall phenomenology tendencies that may be present in general, regardless of the event that is being recalled. Future studies could address this limitation by comparing the individual differences in overall recollective experience tendencies, vantage perspectives typically used for memory recall, and intensity of emotions typically experienced during recall, with phenomenological traits attached to specific events, to explain differences in psychological distance.

Another limitation of the current study is that although the study was conducted in English, language ability was not taken into account. The current sample consisted of participants of many different nationalities, some of whom may be bilinguals or trilinguals, who did not have English as their first language. Having different first languages could affect memory recall and phenomenology during narration, but aspects of language were not measured or recorded in the current study. Future studies could record first and second languages of participants and employ measurements of language proficiency to test for effects of language on relations of depression and trauma on psychological distance.

Conclusions

There were no differences in the psychological distance attached by individuals with subclinical depression and PTSD as compared to psychologically healthy individuals, regardless of the valence or objective age of the memories. However, subclinical depression and PTSD groups had stronger tendencies to feel closer to negative memories than psychologically heathy groups, and the opposite for positive memories. Higher depression severity was predicted increased feelings of closeness towards recent negative events but not

remote negative events. The findings suggest that although having more depressive symptoms contributes to feeling closer towards negative events that occurred recently, it loses its significance over time.

Recollective experience mediated the relation of depression and trauma with the psychological distance of recent negative events but not with the psychological distance of other events, despite the lack of difference in recollective experience between subclinical depression and PTSD groups and psychologically healthy groups. Individuals with higher levels of depression and trauma had difficulties distancing themselves from recent negative events due to their inability to stop reliving the event intensely, which appears to impact them greatly although they don't relive the memory more. Higher emotional intensity strengthened associations between higher depression and feeling further from remote positive memories, whereas higher field perspective strengthened associations between higher depression and trauma and feeling closer to remote negative memories. Observer perspective, centrality, and emotion regulation did not mediate or moderate the relations of depression and trauma with psychological distance.

Chapter 5: General Discussion

Summary

Aims of current thesis. The literature has shown that those with clinical depression and PTSD have impairments in aspects of their autobiographical memory recall as compared to those who are psychologically healthy. However, whether there are differences in autobiographical memory recall for individuals with subclinical levels of depression and PTSD and psychologically healthy individuals and for which aspects of autobiographical memory (i.e., semantic and episodic components, types of memories, and subjective feelings) have not been clearly established yet. Underlying mechanisms that explain those relations and factors that influence those relations were also tested.

Findings from Chapter 2. Chapter 2 (i.e., Study 1 and Study 2) examined differences in characteristics and typicality of CLS and ILS for individuals with subclinical levels of depression and PTSD. The chapter further examined differences in societal pressures and perceived ability associated with the CLS and ILS and the role of societal identification. The results showed that there were no differences in characteristics (i.e., importance, emotional valence, pressure, and perceived ability) of the CLS across the depression and trauma groups, but there was a difference in typicality of the CLS for the depression groups. Individuals with subclinical depression symptoms generated less typical CLS events than psychologically healthy individuals, but higher depression symptoms did not predict changes in CLS typicality. Further exploration suggested that a difference in the knowledge of the CLS, rather than the selection process of typical events, may underlie the differences in CLS typicality observed for those with subclinical depression symptoms. The changes in CLS knowledge was predicted by levels of depression. Although people with

subclinical PTSD levels also had some differences in their CLS knowledge, it did not appear to have an impact on the type of events they included in the CLS.

Meanwhile, there were no differences in the typicality and characteristics of the ILS across the depression and trauma groups, except for the emotional valence and pressure to achieve the ILS for the trauma groups. Individuals with subclinical PTSD symptoms retrieved less positive ILS events than the psychologically healthy individuals, despite no differences in ILS typicality between the groups. This result, along with them rating individual typical ILS events as more negative, indicates that they attach more negative emotions to positive events. Those with subclinical PTSD symptoms also perceived there was higher pressure to achieve the ILS events than those who are psychologically healthy. Higher trauma symptoms predicted changes in ILS valence and pressure.

Finally, collectivism was found to moderate the associations between depression and CLS typicality and between depression and trauma and ILS pressure. Having lower collectivism strengthened the associations between higher depression and lower CLS typicality, whereas having higher collectivism strengthened the associations between higher depression and trauma and higher pressure to achieve ILS events.

Findings from Chapter 3. Chapter 3 (i.e., Study 3 and Study 4) looked at differences in memory specificity for individuals with subclinical levels of depression and PTSD. The chapter also tested whether the CaR-FA-X model underlies or influences the observed associations. The results showed that there were no differences in memory specificity (i.e., specific memory, OGM, categorical memory, extended memory, semantic associations, and omissions) between individuals with subclinical depression and PTSD symptoms and psychologically healthy individuals, regardless of the retrieval instructions, emotional valence of the cues, and emotional intensity of the cues. Despite a lack of group differences,

higher trauma predicted the retrieval of more semantic associations when minimal retrieval instructions were provided and the retrieval of more OGM when specific instructions were provided. These results indicate that trauma levels contribute to the development of overgeneral styles of memory retrieval.

The CaR-FA-X model (i.e., rumination, avoidant coping, inhibition, and verbal working memory) did not mediate the relations of depression and trauma with memory specificity. However, rumination and inhibition moderated the relations between depression and trauma and semantic associations when minimal retrieval instructions were provided. Having higher rumination and having more impairments in inhibition strengthened the relations of higher depression and trauma with the retrieval of semantic associations. These findings indicate that the CaR-FA-X model does not explain the relations of depression, trauma, and memory specificity, but its CaR and X components are still able to impair memory specificity for those with more depression and trauma symptoms.

Findings from Chapter 4. Chapter 4 (i.e., Study 5) investigated the differences in psychological distance for individuals with subclinical levels of depression and PTSD. The chapter also tested whether emotion regulation strategies and memory phenomenology underlies, or influences, the observed associations. The results showed that that there were no differences in psychological distance between individuals with subclinical levels of depression and PTSD and psychologically healthy individuals, regardless of the emotional valence or objective age of the memory. However, there was an interaction effect for the valence of the events, whereby the subclinical depression and PTSD groups felt closer to negative events than the psychologically healthy group, whereas the psychologically healthy groups felt closer to positive events than the subclinical depression and PTSD groups. Despite a lack of group difference, higher depression predicted feeling closer to recent

negative events but not remote negative memories. The results further suggested that depressive symptoms do contribute to the psychological distance of negative events that occurred recently, but its contribution may diminish over time.

Memory phenomenology (i.e., vantage perspective, emotional intensity, and centrality) and emotion regulation (i.e., cognitive reappraisal and expressive suppression) did not mediate the relations of depression and trauma with psychological distance, except for recollective experience, which mediated the relations of depression and trauma with the psychological distance of recent negative events. People with higher depression and trauma levels had more difficulties in distancing themselves from recent negative events due to them reliving the event more intensely. However, there was a lack of group differences in the recollective experience of recent negative events, which suggests that although people with higher depression and trauma levels do not relive or reexperience recent negative events more often than people with lower depression and trauma levels, they appear to be more strongly impacted by them. Emotional intensity moderated the relations of depression with the psychological distance of remote positive events, and field perspective moderated the relations of depression and trauma with the psychological distance of remote negative events. Higher emotional intensity strengthened the relations of higher depression with feeling further from remote positive memories, whereas higher field perspective strengthened the relations of higher depression and trauma with feeling closer to remote negative memories.

Autobiographical Memory as Multidimensional Components

The findings from this thesis corroborate that autobiographical memories are indeed multidimensional. This finding is supported from the different results obtained for the various facets of autobiographical memory tested here, despite all of them being a part of

autobiographical memory. The results suggest that an individual with subclinical depression and PTSD may be able to recall some facets of a memory with no difficulties, but they may also have difficulties in other facets of the very same memory. Considering various different facets and dimensions come together to form a coherent recollection of memory (Rubin, 2005), difficulties in any one facet could result in impairments for the recall of the specified memory. The current findings highlight the importance of studying memory recall in a holistic manner not only for subclinical populations but also for other populations.

Autobiographical Memory Recall for Depression

Overall memory profile. The current studies show that there are small differences in autobiographical memory recall between individuals with subclinical depression and psychologically healthy individuals. Individuals with subclinical depression symptoms differed in the semantic aspects (i.e., generated less typical CLS events) and phenomenology of their memories (i.e., recalled recent negative memories with higher emotional intensity) as compared to psychologically healthy individuals. However, there were no differences in the recall of the episodic components of their memories, in the type of memories they recalled, and in how they felt towards their memories. Despite the lack of group differences, depression severity did predict feelings towards the memory (i.e., higher depression severity predicted feeling closer towards recent negative events).

These findings indicate that in normal populations, many aspects of recalled autobiographical memories are stable and do not appear to change for individuals with subclinical symptoms of depression. The characteristics of their most important and significant memories did not change, nor did they have more difficulties recalling the details of their memories, and there were no unusual distancing effects towards their memories, as

compared to those who are psychologically healthy. Hence, the findings suggest that the recall of memories does not change greatly upon crossing the subclinical depression threshold and is not influenced much by, or much dependent on, the presence or severity of depression symptoms. However, the results do suggest that for individuals with a higher range of depression severity, a distancing effect may be seen.

In the larger context of the Self Memory System (SMS) model (Conway & Pleydell-Pearce, 2000; Conway et al., 2004), the findings from this thesis show that the long-term self is mostly stable for people with subclinical depression symptoms. This suggestion is evidenced by the lack of differences in the episodic components, types of memories recalled, and their feelings towards the memories; areas which are represented at or involve the conceptual self and autobiographical knowledge base that make up the long-term self (Conway & Jobson, 2012; Conway & Pleydell-Pearce, 2000; Conway et al., 2004; Williams et al., 2007). The difference in semantic aspects of memory and some memory phenomenology, however, suggests that there may still be small differences at the event-specific knowledge level within the autobiographical knowledge base, the conceptual self, and the working self for those with subclinical depression symptoms (Conway & Jobson, 2012).

Attentional biases. The individuals with subclinical depressive symptoms in this thesis did not appear to attach negative biases to their recalled memories, although depression is typically associated with increased attention to negative materials (Baert et al., 2010; Beck, 1995; Dalgleish et al., 2011; Feng et al., 2015). They did not generate more negative culturally shared semantic knowledge or recall more negative events in their life narrative. They also did not have greater ease in recalling details of negative memories or feel closer to negative memories. Similarly, they did not exhibit aversions towards positive memories, as

demonstrated by not recalling fewer positive events for culturally shared semantic knowledge or the life narratives. They also did not have more difficulty in recalling details of positive memories or feel further from positive memories.

The biases that those with depressive symptoms typically possess towards negative memories (or against positive memories) may depend on the age of the memories. Those with subclinical depression symptoms experienced the emotions associated with negative memories more intensely than those who are psychologically healthy and depression symptoms contributed to feeling closer to negative memories, but only for recent memories and not for older memories. Hence, the negative biases typically accompanying depression may only exist for newer memories, with this bias dissipating as the memory ages. This age dependency may also explain why no negative bias was observed for the life narratives and cue-elicited memories, which consists of a wider age range and include many older memories.

Besides age, another factor that may affect the presence of a negative bias is the severity of depressive symptoms. Depression symptoms contributed to psychological distance of recent negative events, which may indicate the presence of a negative bias. However, there was an absence of group differences, and hence, a distance effect towards those events was suggested to be observed only at higher depression levels, further suggesting that negative biases may exist more strongly at higher depression severity. These suggestions are in line with the literature that showed depression severity was related to negative biases in thinking, storage, and interpretation of information from the past and future (Korn, Sharot, Walter, Heekeren, & Dolan, 2014; Orchard & Reynolds, 2018). Furthermore, the relation between depression severity and feeling distant from remote positive events becoming stronger when

the memory had a higher emotional intensity also suggests that an aversion from positive memories may have a bigger effect at higher depression severity.

In addition to severity, the type and combination of symptoms may also be a factor that relates to attentional biases. Krings, Heeren, Fontaine, and Blairy (2020) similarly found a lack of attentional biases toward negative stimuli and away from positive stimuli for their subclinical depression group as well as their clinically depressed group. They attributed the absence of the typically observed attentional biases to the diversity and heterogeneity of depression symptoms that individuals experience, and argued that a specific combination or profile of symptoms may be needed before these attentional biases are triggered.

Fading affect bias. Only one of the episodic aspects of autobiographical memory recall was shown to vary with depression, whereby those with subclinical levels of depression recalled recent negative memories with higher emotional intensity but recent positive memories in the same manner as those who are psychologically healthy. Although the emotional intensity of negative memories typically fades faster than the emotional intensity of positive memories (Walker & Skowronski, 2009), individuals with subclincal depression in the current thesis demonstrated an absence of this fading effect bias. Fading affect bias has been shown to occur between one day to three months after the event took place (Gibbons, Lee, & Walker, 2011), which means that recent negative events in the current studies that encompassed memories within the past three years should similarly demonstrate a fading affect bias, but it did not for those with subclinical depression symptoms. However, there were no differences in emotional intensity of negative remote memories which encompassed memories older than three years, indicating that the intensity of negative memories did dissipate but over a longer span of time. This finding raises the possibility that those with subclinical depression symptoms may have a delay in their fading affect bias instead of a

complete absence of the effect. This delay indicates that they also experience their negative memories at a higher intensity for a longer span of time, which could further excarbate their depression symptoms (Davis & Burns, 1999).

This inability or delay to automatically reduce the intensity of negative memories among those with depression matches the results of past studies (e.g., Marsh et al., 2019; Gibbons & Lee, 2019; Walker, Skowronski, Gibbons, Vogl, & Thompson, 2003) but also raises the possibility of another variable playing a role in this mechanism. These past studies found that thinking or ruminating about the memory and rehearsing the memory (cognitively or verbally) mediated the association between depression and the fading affect bias and may similarly serve as underlying mechanisms for the relations between depression and memory intensity observed in the current thesis. Individuals with subclinical depression symptoms tend to have higher rumination levels, as seen in the current thesis and the literature (e.g., Moulds, Kandris, Starr, & Wong, 2007) and tend to rehearse negative memories more often (e.g., Kuyken & Howell, 2006), and these tendencies are likely to cause the difficulties observed in reducing negative memory intensity.

Updating societal information. Although most episodic aspects of autobiographical memory do not vary, the findings do suggest that the semantic aspects related to autobiographical memory changes for individuals with subclinical symptoms of depression. Semantic knowledge in general is typically stable and constant (Tulving, 1972), even among individuals with depression (Söderlund et al., 2014), but the type of semantic knowledge examined in the current thesis revolved around societal norms and expectations. What is defined as normal or expected by society (e.g., the age at which people are expected to marry or have children) is constantly changing and being reconstructed (Freud, 1999), which means

an inability to keep up and update oneselves with those changes is likely to result in the differences in culturally shared semantic knowledge as found in this thesis.

Individuals with depression have been found to be self-absorbed in their own symptoms and problems and suffer from social isolation as a result (Matthews et al., 2016; Taylor & Vaughan, 1967). After being in this state for a prolonged period of time, they may become less aware and more disinterested and disconnected from society and its expectations, occurances, and changes (Cruwys Alexander Haslam, Dingle, Haslam, et al., 2014; Matthews et al., 2016; Söderlund et al., 2014; Taylor & Vaughan, 1967). This lower interest and ability in keeping up with updated information could cause differences in their existing semantic knowledge as compared to others and likely leads to differences in the CLS seen in this thesis.

Individuals with depression symptoms have been shown to have difficulties and differences in their decision-making model (Bishop & Gagne, 2018; Paulus & Ju, 2012). The results of the current thesis indicated that there were no impairments in the decision-making process itself for both semantic and episodic components of memory of those with subclinical depression symptoms. However, the underlying semantic knowlege or information needed to make decisions regarding the CLS for these individuals were different, and this difference is what results in the differences in decisions of CLS events to select and generate. Furthermore, individuals with higher depression are likely to use minimal information and resources to make decisions (Leykin, Roberts, & DeRubeis, 2011), indicating that when asked about typical CLS events, they may have just selected any event that came to the forefront of their mind without evaluating the validity of their semantic knowledge. Individuals with higher depression have also been found to have difficulties making immediate decisions (Lawlor et al., 2019). Having the participants with subclinical depression in the current thesis make

immediate decisions about the events typically experienced by people in society may have caused them to be less accurate in the retrieval of their semantic knowledge.

Autobiographical Memory Recall for Trauma

Overall memory profile. Similar to the findings on depression, the current studies showed small differences in memory recall between individuals with subclinical PTSD symptoms and psychologically healthy individuals. Individuals with subclinical PTSD symptoms had differences in the episodic aspects of their memory (i.e., recalled ILS events that were more negative and had higher societal pressure to achieve their ILS events) and phenomenology of recalled memory (i.e., higher centrality towards negative important events) as compared to individuals who are psychologically healthy. However, there were no differences in the recall of the semantic aspects of their memory, in the type of memories they recalled, and in how they felt towards their memories. Changes in trauma severity predicted changes in the episodic components of memory (i.e., higher trauma severity predicted ILS that were more negative and had higher pressure), in line with the group differences, and in the types of memory they recall (i.e., higher trauma severity predicted more overgeneral styles of retrieval), despite the lack of observable group differences.

These findings indicate that in normal populations, some aspects of autobiographical memories recalled are still stable and do not change for individuals with subclinical symptoms of PTSD. Their culturally shared semantic knowledge did not change, they did not have any difficulties recalling the details of their autobiographical memories, and there were no unusual distancing effects towards their memories as compared to those who are psychologically healthy. The findings suggest that these aspects of semantic and episodic autobiographical memory recall do not changes upon crossing the subclinical PTSD threshold

and are not influenced much by, or much dependent on, the presence or severity of trauma symptoms. However, the results do suggest that individuals with a much higher trauma severity may develop difficulties in recalling details of their memories and have tendencies to recall negative narratives.

In terms of the SMS (Conway & Pleydell-Pearce, 2000; Conway et al., 2004), the results of this thesis suggest that the working self and parts of the long-term self are stable for those with subclinical PTSD symptoms. The semantic components, types of memories recalled, and their feelings towards the memories which are represented in these areas of the model did not differ between the groups (Conway & Jobson, 2012; Conway & Pleydell-Pearce, 2000; Conway et al., 2004; Williams et al., 2007). However, the ILS is also represented within the conceptual self and at higher levels of the autobiographical knowledge base, and therefore, differences in the ILS may reflect some differences in these two parts of the memory model.

Attentional biases. The individuals with subclinical PTSD symptoms in this thesis did not appear to attach negative biases to most of their recalled memories, despite past research showing that those with PTSD do demonstrate negative biases (El Khoury-Malhame et al., 2011; Vythilingam et al., 2007). They did not feel closer to negative memories, have greater ease in recalling details of negative memories, or retrieve more negative culturally shared semantic knowledge. Those with trauma have been noted to have stronger biases towards threatening stimuli, thoughts, and memories (Bryant & Harvey, 1997; Constans, McCloskey, Vasterling, & Brailey, 2004; Pineles et al., 2009). However, the stimuli presented and memories retrieved by the subclinical PTSD group in the current thesis may not have been sufficiently threatening to trigger those biases. Similarly, they also did not show aversions towards positive memories, as demonstrated by not feeling further from

positive memories, not having more difficulty in recalling details of positive memories, and not recalling fewer positive culturally shared semantic knowledge.

Trauma symptoms contributed to the development of difficulties in recalling the specific details of their memories, independent of valence. However, there were no differences upon crossing the subclinical threshold, indicating that impairments in recalling specific memory details were only observed at higher trauma symptom severity. The literature has shown trauma severity was related to threat biases towards thoughts, cues, memories, and expectations from the past and future, as a form of global self-protection from feelings of anxiety (El Khoury-Malhame et al., 2011; Naim et al., 2015; Wald et al., 2011). The lack of difference in recall between positively cued and negatively cued memories indicates that negative biases may not underlie the relations, but it does not exclude the possible underlying role of threat biases. The past findings suggest that threat biases may exist more strongly at higher trauma severity and, hence, may be the underlying mechanism for the relation between severity of trauma and difficulties in recalling memory details found in the current results.

Significant memories. Meanwhile, there were other aspects of the recalled memories that changed for those with subclinical symptoms of PTSD. Their most important and significant memories were more negative, more central to their identity, and had higher pressure to achieve, as compared to those who are psychologically healthy. People with lower levels of distress have been shown to associate positive personally significant events as more central to their identities and narratives, whereas people with higher levels of distress associate negative personally significant events as more central (Zaragoza Scherman et al., 2015), matching the findings of the current thesis. Associating higher centrality to significant negative memories may be a function of the negative bias that has been observed in these

populations (El Khoury-Malhame et al., 2011; Vythilingam et al., 2007), suggesting that a small negative bias may be present among those with subclinical PTSD in the current thesis, but only for significant events.

Besides significant memories, traumatic events have been shown to be more central towards the life narrative of people with higher trauma (Berntsen et al., 2011; da Silva et al., 2016; Lloyd & Lishman, 1975). Replacing these existing central traumatic events with future events which are important, positive, and socially expected could be perceived as an effective coping strategy by the society to bring back perceptions of normality to those with trauma symptoms. This expectation from society, especially from the people with whom they have close relations and whose opinions are highly valued, can induce a large amount of pressure to meet those expectations and achieve the important expected events.

Attribution style. The lack of difference in the types of events listed in the life narratives but not the emotional valence indicates that those with subclinical levels of PTSD attached negative emotions to typically positive events, and thus demonstrating a difference in their attribution of emotions. Individuals with PTSD have been shown to have more negative or depressive attribution tendencies (de Kliene et al., 2019; Gonzalo, Kleim, Donaldson, Moorey, & Ehlers, 2012) and tend to view their past experiences in a negative light (Beck et al., 1979; Substance Abuse and Mental Health Services Administration, 2014). This attribution bias may then cause them to override the original positive nature of the event and recall the event as being more negative.

One possible reason for this difference in attribution styles is the emotional valence of central memories. Individuals with subclinical symptoms of PTSD symptoms viewed negative events that they have experienced as being more central to their narrative and identity. Events that are considered as central serve as reference points and affect how a

person perceives and makes attributions about themselves and the world around them (Berntsen & Rubin, 2006). Having positive events as references will more likely result in positive perceptions and attributions towards their past and current experiences, whereas having negative events as references will more likely result in negative perceptions and attributions towards those experiences. Therefore, those with subclinical levels of PTSD having more negative events that are central could increase the likelihood of negative attributions being extended to their other experiences and memories that may not be inherently negative to begin with.

Comparisons of Depression and Trauma

Memory differences. Due to their co-morbidity and overlap in symptoms, no statistical comparisons were conducted between the subclinical depression and PTSD groups throughout the thesis, but surface-level or descriptive comparisons can be made on the overall findings for the groups. Although depression and trauma are different psychopathologies, both subclinical depression and PTSD groups did not have differences in the type of memories they recalled and in how they felt towards their memories, and both depression and trauma severity were unrelated to semantic aspects of memory. However, there were also differences in memory recall across the groups. There were differences in the semantic aspects of memory for the subclinical depression group but not the subclinical PTSD group, whereas there were differences in the episodic aspects of memory for the subclinical PTSD group but not the subclinical depression group, when compared to the psychologically healthy groups. Higher depression severity predicted changes in feelings towards the memory, whereas higher trauma severity predicted the type of memories recalled and changes in the episodic aspects of memory. The differences in memory, and the relations with

memory components, did not overlap greatly for those with subclinical depression and PTSD symptoms, suggesting that there may be slight differences in the memory retrieval processes involved, which may relate back to differences in symptoms and aetiologies for the two psychopathologies (American Psychiatric Association, 2013).

Shared mechanisms and moderators. Although the components of autobiographical memory recall that differed from psychologically healthy individuals were not the same for those with subclinical depression and those with subclinical PTSD, the findings showed that some similar mechanisms were involved in the relations of depression and trauma with autobiographical memory. Only one mechanism was found to underlie the relations, for both depression and trauma, which was recollective experience. Those with higher depression and trauma symptoms were impacted greatly by the typical amount of reliving and reexperiencing of recent negative memories. This greater impact may relate back to the increased attention and sensitivity towards negative information that are observed in people with depression and trauma symptoms (Baert et al., 2010; Beck, 1995; Dalgleish et al., 2011; El Khoury-Malhame et al., 2011; Feng et al., 2015; Vythilingam et al., 2007).

The CaR-FA-X model was not supported as a suitable explaination for memory specifity differences for both depression and trauma. Rumination, executive functioning, and memory phenomenology did not serve as underlying mechanisms for both depression and trauma, but instead, were found to influence the relations of both depression and autobiographical memory recall, and trauma and autobiographical memory recall, along with another mechanism, societal identification.

The effects of rumination and inhibition may reflect the involvement of another cognitive component, attention. Problems with allocating attention to the needed areas or activities is a symptom that is typically seen in both depression and PTSD (American

Psychiatric Association, 2013). Rumination has been shown to be caused by more attention being captured by ruminative and negative thoughts, emotions, and memories that were unable to be inhibited for people with depression and PTSD symptoms (e.g., Buchholz et al., 2016; Zetsche, D'Avanzato, & Joormann, 2011). Therefore, problems or differences in attention allocation may be the reason that rumination and inhibition results in more impairments in memory recall for those with depression and trauma symptoms.

Emotion regulation similarly did not serve as the underlying mechanism for the relations between depression and trauma and memory recall differences. Functional avoidance, cognitive reappraisal, and expressive suppression are all emotion regulation strategies (Carver et al., 1989; Endler, 1997; Gross & John, 2003; Sahler & Carr, 2009), and despite those with subclinical depression and PTSD symptoms in the current thesis exhibiting differences in these strategies, it did not appear to have an affect on the relations with memory recall. Although depression and PTSD are psychopathologies that are characterized with experiencing negative mood as a symptom (American Psychiatric Association, 2013), the findings from this thesis suggest that the differences or difficulties in memory recall are not due attempts or inabilities of these individuals to manage this negative mood. The current findings of overlapping mechanisms suggest that there are some similar mechanisms that are involved in the way those with subclinical depression and PTSD symptoms recall memory, despite MDD and PTSD being two distinct psychopathologies.

Memory Differences Compared to Clinical Samples

Memory in depressed populations. The current thesis did not show any differences in the life narrative and types of memory retrieved by the subclinical depression and psychologically healthy groups, but clinical samples were shown to have differences in their

life narratives (Dalgleish et al., 2011; Fromholt et al., 2003; Habermas et al., 2008; Jobson et al., 2018) and the types of memory recalled (Dritschel et al., 2011; Hitchcock et al., 2019; Liu et al., 2016; Park et al., 2002; Ridout et al., 2016). The phenomenology of memories recalled in the current thesis also did not mimic those seen in clinical samples (Bergouignan et al., 2008; Kuyken & Moulds, 2009; Rottenberg et al., 2005; Werner-Seidler & Moulds, 2011). Furthermore, clinically depressed studies have shown effects of cue valence (Champagne et al., 2016; Park et al., 2002; Ricarte et al., 2011) and depression severity (Kleim & Ehlers, 2008) on the types of memory recalled, which was not observed in the current results. There have not been studies that have examined the recall of culturally shared semantic knowledge and feelings towards memories using clinical samples, and hence, comparisons with the current findings are not able to be made.

Memory in PTSD populations. Similarly, the current thesis did not show any differences in the types and phenomenology of memory recalled by the subclinical PTSD and psychologically healthy groups, but clinical samples had differences in the types of memory (Nixon et al., 2013; Schönfeld & Ehlers, 2006, 2017; Schönfeld et al., 2007) and the phenomenology of memory recalled (Rubin et al., 2004, 2011). Valence of cues did not affect the types of memory recalled, unlike observed in clinical samples (Ono et al., 2016; Schönfeld & Ehlers, 2006).

However, there was one similarity in memory recall between the current thesis and clinical samples. Trauma severity was shown to predict the higher retrieval of more overgeneral types of memory, which was similar to clinical samples (Kleim & Ehlers, 2008). Previous studies have not yet examined the recall of life narratives (using the same characteristics as the current thesis), culturally shared semantic knowledge, and feelings

towards memories using clinical samples, which means comparisons with the current findings cannot be made at the present.

Depression and PTSD symptoms. There were hardly any similarities in memory recall between the subclinical depression and PTSD groups in the present thesis and clinical samples from the literature. One possible explanation for memory differences being observed in clinical samples but not the current subclinical groups is the severity of the symptoms. The results of the current thesis showed that depression and trauma contributed to some differences in memory recall, but the lack of group differences suggested that those memory differences may only be observed at a state of higher symptoms severity. Clinical groups in past research tend to experience higher symptom severity and more prolonged distress from those symptoms, as compared to the subclinical depression and PTSD groups in the current thesis. Thus, the severity of symptoms experienced by the subclinical groups may not have been sufficiently high or prolonged to replicate the same autobiographical memory recall as those observed in clinical populations.

Besides the severity, the way depression and trauma are measured could also be a possible explaination for the difference in results. The studies that used clinical samples measured or identified clinical-level symptoms using clinician-administered assessments or self-report questionnaires with clinical norms, or they used samples that had already been previously diagnosed in psychiatry settings. The studies in this thesis, meanwhile, did not use the same self-report questionnaires as the studies with clinical samples, as measurements that were more suitable for normal samples were used instead. These differences in measurement tools used could cause variations in the measurements of symptom severity and allocation of people into groups, which may result in the different relations between depression and trauma and memory recall in the current thesis as compared to the clinical samples.

Variability of memory across the spectrum. Although some differences in memory recall were observed in the current thesis, these differences were not the same as the ones typically seen with clinical samples, which may relate to symptoms of depression and trauma existing on a spectrum. In addition to increases in memory difficulties, either at different stages of the spectrum or as symptoms increase progressively, there is also a possibility that components of memory recall change non-linearly as symptoms become more severe.

Individuals with a subclinical range of symptoms may, for example, experience autobiographical memories differently than psychologically healthy individuals (e.g., experience negative memories with more emotional intensity), but once reaching the clinical range, they may no longer have differences in the same areas and develop differences in other areas of memory recall (e.g., individuals with clinical depression do not differ from psychologically healthy individuals in emotional intensity but in recollective experience of negative memories). This non-linear variability across the spectrum may explain why there is hardly any overlap in the type of memory differences when comparing psychologically healthy samples with subclinical samples and when comparing psychologically healthy samples with clinical samples.

This non-linear variability also highlights the need to incorporate both categorical and continuum approaches when conceptualizing memory recall for depression and trauma symptoms. Memory recall of psychologically healthy, subclinical, and clinical groups (i.e., categorical) need to be viewed in the context of their place along the spectrum (i.e., continuum), to fully be able to see the evolution and change in memory recall across the different groups and different severity of symptoms.

Cultural and language influences. Besides symptom-specific explainations, there may also be more general reasons for the results of the current thesis not replicating those

from the literature. The effect of culture may be a factor to consider in explaining the differences in results. Most of the differences in memory seen the literature were stable across cultures, but there were still small variations in naturalistic memory retrieval and narration styles between Western and Asian samples (e.g., Dritschel et al., 2011; Wang, 2009). Cultural differences in emotional processing, viewpoints of the self and the world, and social behaviours also have the ability to affect the recall of memory (Ross & Wang, 2010). A large amount of the past studies with clinical samples used Western samples, as compared to the current thesis that used samples consisting of a variety of nationalties and cultural backgrounds. This difference in cultures between the samples could be a reason that the findings from the past clinical samples were not replicated in the current thesis.

Besides culture, language is another factor that could explain the differences. The language that memories are recalled and narrated in, and whether it matches the language the memories were encoded in could either enhance or impair memory recall and feelings towards those memories (Van Boven & Caruso, 2015). In addition to the congruence of language, proficiency and comfort in using the language, especially for languages that are not the first language can also affect the ease or difficulty in retrieving and narrating memories (Marian & Neisser, 2000; Matsumoto & Stanny, 2006). Contradictory to some clinical samples that asked participants to recall and narrate their memories in their first language, the studies in the current thesis required participants to recall and narrate their memories in English, regardless of whether English was their first language or not. Despite the participants having sufficient profiency to complete the memory tasks, those who did not have English as their first language may have had difficulties in recalling or narrating certain memories, which could have caused the results obtained to differ from those seen in past clinical samples.

Statistical analyses. Another possible explanation for the lack of replication of the results from clinical samples are family-wise errors. Past studies using clinical studies did not appear to perform any correction for family-wise errors despite conducting many statistical analyses. The current thesis, on the other hand, corrected for family-wise errors using Bonferroni correction for all studies. Applying this correction changed a number of significant findings that would have matched the results from previous clinical studies into insignificant results, encompassed as a lack of memory differences between subclinical and psychologically healthy groups. Therefore, it is possible that after correcting for family-wise errors in those past studies, there may not be as robust of a memory difference with clinical samples.

Methodological and Theoratical Considerations

Effect size. Although there were some significant group differences and relations with memory recall in this thesis, the effect sizes were small. Hence, there is a high likelihood that the results obtained from the studies here will not be replicable. The small effect sizes also suggest that memory differences within subclinical populations may not be a robust phenomenon and investigating memory differences in subclinical samples will not have the same level of implications as studying it in clinical samples.

Validity of tools and cut-offs. One important methodological issue to take into account is the validity of measurement tools and cut-off scores used in the current thesis. To measure depression and trauma levels, the studies in this thesis used self-report questionnaires which either had norms and cut-offs for normal samples (i.e., CES-D), only clinical norms and cut-offs (i.e., PCL-5), or multiple cut-offs which were unclear to be used for clinical or normal samples (i.e., DASS-21). Using measurement tools and cut-off scores

that are not validated for normal or subclinical samples to measure symptom severity and allocate people into subclinical groups could cause inaccurate measurements and group allocations, and variability in expected results and relations. Besides a lack of validity of the measurements for normal samples, the absence of validity and norms of the measurement for cultures from which the samples are recruited could similarly have resulted in inaccurate measurements.

Although many studies investigate similar variables and relations, more often each study uses different measurements and tasks. For example, there are many self-report questionnaires that measure depression and trauma symptoms and various experimental task that measure specific executive functioning components to choose from. Each task uses different types of stimuli, different number of questions, has different completion times, and may induce different mental states during participation. Hence, these variabilities in the measures could influence the final outcomes and increases difficulties in comparing the results between current and past studies. Standardizing the methods of diagnosing individuals as clinical and subclinical populations and the tools used to measure cognitive functioning could improve the comparibility and reliability of findings in this area.

Complexity of autobiographical memories. A theoratical issue that warrants discussion is the complexities of autobiographical memory. Autobiographical memories are multidimensional recollections and consists of various components that are interrelated and integrated to form the recollection (Rubin, 2005). Although autobiographical memories can be broken down into individual components, recollection typically involves many components at once (e.g., describing a life story event with specific details of the event and how it relates to the current self, incorporates semantic and episodic components, specific types of memories, and feelings of distance). In the current thesis, specific components or

aspects of these memories were studied seperately, but it may not reflect the actual recollection process which involves many components at a time.

Heterogeneity of symptoms. Similar to autobiographical memories, depression and PTSD are also complex structures. Depression and PTSD are psychopathologies that exist on a spectrum, which means that individuals can experience a different number and combination of symptoms at different severities with different levels of impairments. It is possible that at subclinical levels where not all symptoms are experienced and not at severe levels yet, only a certain profile or combination of symptoms may trigger differences in memories or cognitive processing (e.g., Krings et al., 2020). This variability in the depression and trauma symptoms could further cause variability in relations with memory recall, increasing the difficulty in obtaining consistent results of the memory differences.

Besides the variability of symptoms, the state and trait properties of the depression and trauma symptoms are another area to take into consideration. Trait properties are constant and stable symptoms or markers that are present regardless of situation or levels of distress experienced, whereas state properties reflect symptoms or markers tied to the current mood and state of mind of the person (American Psychological Association, 2013; Lu et al., 2012). In the current thesis, depression and trauma were conceptualized as being trait symptoms, but the presence of state symptoms and the mood of the participants were not assessed. When the current mood or emotional state matches the mood or state of the memory, memories are more accessible and easier to recall, and vice versa (American Psychological Association, 2013). Therefore, distinguishing between trait and state symptoms may be necessary to obtain more accurate results of the consistency and pervasiveness of differences in memory recall observed.

Implications

Theorocatical. The results obtained from this thesis highlight the importance of studying autobiographical memories in a holistic manner, to better capture the nuances in memory recall across the different facets and dimensions. The results from this thesis also suggest that theoratical models such as the CaR-FA-X model may not be suitable in explaining memory specificity differences for subclinical populations. However, more research using experimental and longitudinal designs are needed before this conclusion can be made with more certainty and alternative models can be suggested.

The findings from this thesis also improves our understanding into autobiographical memory recall in subclinical depression and PTSD populations. The results show that individuals with subclinical levels of depression do not necessarily have impairments or difficulties in recalling episodic aspects and details of autobiographical memories. As autobiographical memory functions to assists in problem solving, creating self-concepts, enhancing socialization, and improve emotion regulation (Bluck et al., 2005; Fivush, 2011; Pasupathi, 2003), being able to recall memories without many difficulties indicates that those with subclinical depression should be fully able to use memories for those aforementioned functions. Individuals with subclinical PTSD, on the other hand, appear to have some difficulties in recalling the episodic elements of memory, and therefore, may experience difficulties tapping into the memory functions mentioned above.

The findings from this thesis indicate that there is some value in studying autobiographical memory in subclinical populations. By doing so, the changes in memory across the spectrum of symptoms can be established more clearly, along with factors and mechanisms that may exacerbate and limit those changes. However, the results obtained from subclinical samples are likely to be less consistent and robust as compared to clinical

samples, and hence, may produce findings that are less informative and have less implications.

Diagnostics. The differences in memory recall observed in the subclinical depression and PTSD populations in this thesis, although small, could be used for early screening of the associated psychopathologies. For example, experiencing difficulties in recalling the semantic aspects of memory could be indicative of a risk of developing MDD, whereas difficulties in recalling the episodic aspects of memory could imply a risk of developing PTSD. By using the memory differences to identify those at risk, they can seek early intervention to prevent the subclinical symptoms they have from escalating to become psychological disorders (e.g., Leaman et al., 2013; Muñoz et al., 2012).

Interventions. Although the subclinical populations in this thesis constitute of those individuals from normal samples with above average symptoms who are at risk for developing disorders, it is also possible that those with remitted depression or PTSD have residual symptoms that are presented at subclinical levels (Ji, 2012). Therefore, findings and insights regarding interventions from this thesis may not only reduce the likelihood of subclinical symptoms escalating to clinical levels and developing into psychological disorders, but they could possibly also prevent relapse in symptoms and disorders for those in the remitted category.

These results of this thesis indicate that those with subclinical symptoms will not have difficulties engaging in psychotherapy interventions that employ techniques involving recalling the specific details of everyday activities or important past memories (e.g., cognitive behavioural therapy, narrative therapy, psychodynamic therapy) to increase understanding into presenting concerns and distress and to find evidence to contradict inaccurate negative beliefs and thoughts (Beck, 1995; Corey, 2013). Therefore, these types of interventions have

a likelihood of being effective when used in subclinical populations to manage their symptoms and prevent relapses for remitted populations.

However, those with subclinical depression do recall recent negative memories with stronger emotions, which may cause them to experience more distress when asked to retrieve those memories. Hence, improving emotion regulation strategies, as well as focusing on reducing the emotional intensity towards those events during psychotherapy may help alleviate the distress they experience. Depression symptoms contributed to feeling psychologically closer to negative memories, which similarly has the potential to lead to experiencing more distress during recall, indicating that it is also important to work on managing depression symptoms to be able to change the retrieval styles of negative events.

The current thesis also shows that individuals with subclinical PTSD have differences in their recall of life narratives, which tends to be more negative and have higher levels of centrality. Reframing negative experiences, changing attributions associated with memory to become more realistic, and reducing centrality of traumatizing and other negative memories can be done in psychotherapy of those with subclinical PTSD symptoms, to modify the cognitive processes to become more adaptive, reduce the negative emotions attached to their life narratives, and create a life narrative that is more functional (Beck, 1995; Corey, 2013).

Trauma symptoms contributed to difficulties retrieving specific memories and details of memories, which may suggest that individuals with higher levels of trauma may not be able to fully use the benefits that autobiographical memory recall has, and could further deteriorate their already poor daily functioning levels (Bluck et al., 2005; Fivush, 2011; Pasupathi, 2003). Therefore, to maintain access to those memory benefits and improve overall functionality, it is crucial for them to work on managing trauma symptoms through psychotherapy. In addition, those with higher trauma symptoms have vulnerabilities toward

developing overgeneral styles of memory retrieval, and hence may benefit from cognitive training such as Memory Specificity Training (Raes et al., 2009) to practice recalling the details of memories, which will reduce difficulties in retrieving specific memories.

The mechanisms tested in the current thesis help shed light into ways to change the relations of depression and trauma with memory recall. Practicing recalling negative memories that occurred recently with less details, and that occurred remotely from an observer perspective, could be implemented as a form of cognitive training for those with subclinical depression and PTSD symptoms. This cognitive training could increase the distance felt towards negative memories and in turn, reduce any distress experienced from the difficulties in distancing away from these memories.

Using mindfulness and cognitive behavioural techniques to challenge rumination tendencies (e.g., Deyo, Wilson, Ong, & Koopman, 2009; Querstret & Cropley, 2013) could help to improve the recall of memory details that people with depression and trauma previously had difficulties recalling. Similarly, tasks or mental exercises that improve executive functioning related to inhibition (e.g., Maraver et al., 2016) can also be implemented to increase the amount of cognitive resources available to recall more details of memories. For those with depression and trauma who are too attuned to meeting societal norms and expectations, reducing the values and importance attached to these expectations can help reduce feelings of pressure (e.g., Cruwys, Alexander Haslam, Dingle, Jetten, et al., 2014; Muldoon et al., 2019). Meanwhile, for those with depression who are less attuned to what the societal norms are, improving their connection to society will not only increase social support but will also increase awareness of what are considered societal norms, and hence, update their semantic knowledge of society.

Limitations

As discussed in previous sections, current mood states, along with their congruence with depressive and trauma symptoms, were not measured, which may have confounded the recalled memories and interacted with the cues of varying valences and intensities. Cultural and language backgrounds, which could have confounded the recall of memories, were also not measured and controlled in the current thesis.

Another limitation was that clinical groups were not recruited in addition to the subclinical and psychologically healthy groups. Hence, no direct comparison between clinical and subclinical groups using the same tasks and measurements could be conducted. Instead, comparison of the current results was made with studies from the literature that used clinical samples, but differences in conditions and measures used may have affected the accuracy of the comparisons.

Besides not using a clinical sample, participants were also not screened as to whether they have been formally diagnosed with depression or PTSD in the past, or whether they were in a remitted state. Individuals with remitted depression or PTSD may still experience residual symptoms at subclinical levels, similar to never-diagnosed individuals with subclincal symptoms (Paykel, 2008). However, those at a remitted stage have typically undergone interventions, such as psychotherapy or medication, which could confound the recall of memories, automatic thoughts, and emotion regulation abilities. Furthermore, participants were not screened for pre-existing psychological disorders, and hence, the effect of comorbidity of other psychological disorders on the symptoms of depression and trauma was not taken into account.

The studies in the current thesis used correlational designs, and hence, causation between the variables could not be determined. Although we suggested possible directions

between depression, trauma, and memory recall in this study, this directionality was inferred from the literature. Previous studies indicated bidirectional relations exist between the variables, and we selected one of the two possible directions to test the mediation and moderation models. Future research could use either experimental manipulation or longitudinal designs to obtain more accurate directions of these variables, to then be able to test these mediation and moderations models.

Future Directions

The current research projects have looked into the differences and underlying mechanisms of recalling episodic and semantic aspects of memory, types of memory recalled, and feelings towards those memories for people with subclinical symptoms of depression and PTSD. Future studies could investigate these components using three groups: clinical group, subclinical group, and psychologically healthy group. By studying all three groups together, more accurate comparisons can be made, as all groups will be administered the same measures and tasks under similar conditions. This will enable the variation of memory recall across the depression and trauma spectrum to be better established. As there is no clinical literature for the recall of culturally shared semantic knowledge and subjective feelings towards memories, these two components could also be studied using only clinical samples, to better understand memory differences in clinical samples.

It would be interesting if future studies would examine whether there would be differences in the functions of recalling autobiographical memories between those with subclinical depression and PTSD symptoms and those who are psychologically healthy. Autobiographical memories have been shown to have functions in the areas of problem solving, self-concept development, socialization, and emotion regulation (Bluck et al., 2005;

Fivush, 2011; Pasupathi, 2003), and utalizing certain functions over others could have an effect on memory recall. Whether they are differences in the purpose of recalling memories, or the existence of other functions that have not been taken into account in these populations, are not known. Identifying similarities and differences in these functions may explain the memory recall observed in the current thesis.

Besides functions of autobiographical memory, it may be valuable for future studies to examine the stability of the memory recall observed in this thesis across mood. Congruence between current mood and mood of the memory have been identified as a factor that affects the type of memory recalled and its characteristics (e.g., Rutherford, 2009; Werner-Seidler & Moulds, 2011). Whether mood congruence in individuals with subclinical depression (i.e., sad) and PTSD (i.e., anxious) symptoms will affect autobiographical memory recall and whether mood induction procedures in these samples will affect the stability of memory recall has not been investigated. Establishing the role of mood could provide further insight into the memory recall tendencies and the selective attentional biases observed in the current thesis. In a similar manner, the affect of culture and language on memory recall of those with subclinical depression and PTSD symptoms could also be studied.

Conclusions

The results of this thesis indicate that in normal populations, individuals with subclinical depression symptoms differed in culturally shared semantic knowledge and the emotional intensity of recent negative memories, whereas other aspects of autobiographical memory did not differ from individuals who are psychologically healthy. Individuals with subclinical PTSD symptoms from normal populations, on the other hand, differed in their life

narrative, whereas other aspects of autobiographical memory did not differ from individuals who are psychologically healthy. In addition, depression severity predicted the psychological distance towards recent negative memories, whereas trauma severity predicted overgeneral memory retrieval and the valence and pressure associated with life narratives.

In terms of underlying mechanisms, recollective experience was found to underlie the association of depression and trauma with psychological distance but only for recent negative memories. Vantage perspective, emotional intensity, centrality, emotion regulation, rumination, functional avoidance, and executive function did not serve as underlying mechanisms for the associations of depression and trauma with psychological distance and memory specificity. However, rumination and executive functions (i.e., inhibition) strengthened associations between depression and trauma and the retrieval of semantic associations. Societal identification was also shown to strengthen associations between depression and CLS typicality, and between depression and trauma and the pressure of achieving ILS events. Emotional intensity, meanwhile, strengthened associations between depression and feeling further from remote positive memories, whereas field perspective strengthened associations between depression and trauma and feeling closer to remote negative memories.

Those with subclinical symptoms of depression were observed to have different deficits in memory recall from those with subclinical symptoms of PTSD, but both groups had similar underlying mechanisms for their associations with autobiographical memory recall. When comparing the current findings with past clinical studies, individuals with subclinical depression and PTSD symptoms were found to have different deficits in memory recall as compared to clinical samples with MDD and PTSD.

Hence, there is a need for psychotherapeutic interventions to focus on modifying negative cognitive processes and attribution of emotions to become more adaptive, which in turn should improve memory recall. Reducing details of negative memories, reducing rumination, improving executive functioning, managing vantage perspective of negative memories, and managing societal expectations could also improve memory recall. Improving the memory recall of those with subclinical depression and PTSD symptoms will in turn improve their overall functioning.

References

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes, 50*(2), 179–211. https://doi.org/10.1016/0749-5978(91)90020-t

Alea, N., Ali, S., & Marcano, B. (2014). The bumps in Trinidadian life: Reminiscence bumps for positive and negative life events. *Applied Cognitive Psychology, 28*(2), 174–184. https://doi.org/10.1002/acp.2975

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders (5th ed.)*. Arlington: American Psychiatric Association.

American Psychological Association. (2013). *APA dictionary of clinical psychology*. Washington: American Psychological Association.

Anderson, R. J., & Evans, G. L. (2015). Mental time travel in dysphoria: Differences in the content and subjective experience of past and future episodes. *Consciousness and Cognition, 37*, 237–248. https://doi.org/10.1016/j.concog.2014.05.006

Antony, M. M., Bieling, P. J., Cox, B. J., Enns, M. W., & Swinson, R. P. (1998). Psychometric properties of the 42-item and 21-item versions of the Depression Anxiety Stress Scales in clinical groups and a community sample. *Psychological Assessment, 10*(2), 176–181. https://doi.org/10.1037/1040-3590.10.2.176

Ayçiçeği Dinn, A., & Caldwell-Harris, C. L. (2016). How collectivism and family control influence depressive symptoms in Asian American and European American college students. *Elektronik Sosyal Bilimler Dergisi, 15*(57), 579–599. https://doi.org/10.17755/esosder.44308

Baert, S., de Raedt, R., & Koster, E. H. W. (2010). Depression-related attentional bias: The influence of symptom severity and symptom specificity. *Cognition and Emotion, 24*(6), 1044–1052. https://doi.org/10.1080/02699930903043461

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, *84*(2), 191–215. https://doi.org/10.1037/0033-295X.84.2.191

Barbosa, E., Silva, S., Pinto-Gouveia, J., & Salgado, J. (2019). How and when immersion and distancing are useful in emotion focused therapy for depression. *Psychotherapy Research*, *29*(6), 737–751, https://doi.org/10.1080/10503307.2017.1411626

Beck, A. T., Rush, A., Shaw, B., & Emery, G. (1979). *Cognitive therapy of depression*. New York: The Guilford Press.

Beck, J. S. (1995). *Cognitive therapy: Basics and beyond*. New York: The Guilford Press.

Bergouignan, L., Lemogne, C., Foucher, A., Longin, E., Vistoli, D., Allilaire J.-F., & Fossati, P. (2008). Field perspective deficit for positive memories characterizes autobiographical memory in euthymic depressed patients. *Behaviour Research and Therapy*, *46*(3), 322–333. https://doi.org/10.1016/j.brat.2007.12.007

Berntsen, D., Hoyle, R. H., & Rubin, D. C. (2019). The autobiographical recollection test (ART): A measure of individual differences in autobiographical memory. *Journal of Applied Research in Memory and Cognition*, *8*(3), 305–318. https://doi.org/10.1016/j.jarmac.2019.06.005

Berntsen, D., & Jacobsen, A. S. (2008). Involuntary (spontaneous) mental time travel into the past and future. *Consciousness and Cognition*, *17*(4), 1093–1104. https://doi.org/10.1016/j.concog.2008.03.001

Berntsen, D., & Rubin, D. C. (2002). Emotionally charged autobiographical memories across the life span: The recall of happy, sad, traumatic and involuntary memories. *Psychology and Aging*, *17*(4), 636–652. https://doi.org/10.1037/0882-7974.17.4.636

Berntsen, D., & Rubin, D. C. (2004). Cultural life scripts structure recall from autobiographical memory. *Memory & Cognition*, *32*(3), 427–442. https://doi.org/10.3758/BF03195836

Berntsen, D., & Rubin, D. C. (2006). The centrality of event scale: A measure of integrating a trauma into one's identity and its relation to post-traumatic stress disorder symptoms. *Behaviour Research and Therapy, 44*(2), 219–231. https://doi.org/10.1016/j.brat.2005.01.009

Berntsen, D., Rubin, D. C., & Siegler, I. C. (2011). Two versions of life: Emotionally negative and positive life events have different roles in the organization of life story and identity. *Emotion, 11*(5), 1190–1201. https://doi.org/10.1037/a0024940

Berntsen, D., Willert, M., & Rubin, D. C. (2003). Splintered memories or vivid landmarks? Qualities and organization of traumatic memories with and without PTSD. *Applied Cognitive Psychology, 17*(6), 675–693. https://doi.org/10.1002/acp.894

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

Biedermann, S. V., Demirakca, T., Sartorius, A., Auer, M. K., Ende, G., & Berna, F. (2017). Autobiographical memory deficits in patients with depression follow a temporal distribution. *Psychiatry Research, 257*, 193–196. https://doi.org/10.1016/j.psychres.2017.07.046

Binder, J. R., & Desai, R. H. (2011). The neurobiology of semantic memory. *Trends in Cognitive Sciences*, *15*(11), 527–536. https://doi.org/10.1016/j.tics.2011.10.001

Bishop, S. J., & Gagne, C. (2018). Anxiety, depression, and decision making: A

computational perspective. *Annual Review of Neuroscience*, *41*(1), 371–388. https://doi.org/10.1146/annurev-neuro-080317-062007

Blevins, C. A., Weathers, F. W., Davis, M. T., Witte, T. K., & Domino, J. L. (2015). The Posttraumatic Stress Disorder Checklist for DSM-5 (PCL-5): Development and initial psychometric evaluation. *Journal of Traumatic Stress*, *28*(6), 489–498. https://doi.org/10.1002/jts.22059

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

Boals, A. (2014). Using event centrality to predict depressive symptoms after a romantic conflict: A prospective design. *Applied Cognitive Psychology*, *28*(2), 259–265. https://doi.org/10.1002/acp.2996

Boals, A., Contractor, A. A., & Blumenthal, H. (2020). The utility of college student samples in research on trauma and posttraumatic stress disorder: A critical review. *Journal of Anxiety Disorders*, *73*, 102235. https://doi.org/10.1016/j.janxdis.2020.102235

Boals, A., & Murrell, A. R. (2016). I am > trauma: Experimentally reducing event centrality and PTSD symptoms in a clinical trial. *Journal of Loss and Trauma*, *21*(6), 471–483. https://doi.org/10.1080/15325024.2015.1117930

Boals, A., & Schuettler, D. (2011). A double-edged sword: Event centrality, PTSD and posttraumatic growth. *Applied Cognitive Psychology*, *25*(5), 817–822. https://doi.org/10.1002/acp.1753

Boden, M. T., Westermann, S., Mcrae, K., Kuo, J., Alvarez, J., Kulkarni, M. R., … Bonn-Miller, M. O. (2013). Emotion regulation and posttraumatic stress disorder: A

prospective investigation. *Journal of Social and Clinical Psychology*, *32*(3), 296–314. https://doi.org/10.1521/jscp.2013.32.3.296

Bohn, A. (2010). Generational differences in cultural life scripts and life story memories of younger and older adults. *Applied Cognitive Psychology*, *24*(9), 1324–1345. https://doi.org/10.1002/acp.1641

Bohn, A., & Berntsen, D. (2013). The future is bright and predictable: The development of prospective life stories across childhood and adolescence. *Developmental Psychology*, *49*(7), 1232–1241. https://doi.org/10.1037/a0030212

Brewer, W. F. (1986). What is autobiographical memory? In D. C. Rubin (Ed.), *Autobiographical memory* (pp. 25–49). New York: Cambridge University Press.

Brewin, C. R. (2001). Memory processes in post-traumatic stress disorder. *International Review of Psychiatry*, *13*(3), 159–163. https://doi.org/10.1080/09540260120074019

Brosch, T., Pourtois, G., & Sander, D. (2010). The perception and categorisation of emotional stimuli: A review. *Cognition and Emotion*, *24*(3), 377–400. https://doi.org/10.1080/02699930902975754

Bryant, R. A., & Harvey, A. G. (1997). Attentional bias in posttraumatic stress disorder. *Journal of Traumatic Stress*, *10*(4), 635–644. https://doi.org/10.1002/jts.2490100409

Buchholz, K. R., Bruce, S. E., Koucky, E. M., Artime, T. M., Wojtalik, J. A., Brown, W. J., & Sheline, Y. I. (2016). Neural correlates of trait rumination during an emotion interference task in women with PTSD. *Journal of Traumatic Stress*, *29*(4), 317–324. https://doi.org/10.1002/jts.22112

Bunnell, S. L., & Greenhoot, A. F. (2012). When and why does abuse predict reduced autobiographical memory specificity? *Memory*, *20*(2), 121–137. https://doi.org/10.1080/09658211.2011.648197

Burns, D. (2014). *Depression and overgeneral memory in older adults: The role of executive functioning* (Unpublished doctoral dissertation). University of Glasgow, Scotland.

Butler, A. C., Rice, H. J., Wooldridge, C. L., & Rubin, D. C. (2016). Visual imagery in autobiographical memory: The role of repeated retrieval in shifting perspective. *Consciousness and Cognition*, *42*, 237–253. https://doi.org/10.1016/j.concog.2016.03.018

Carver, C. S., Scheier, M. F., & Weintraub, J. K. (1989). Assessing coping strategies: A theoretically based approach. *Journal of Personality and Social Psychology*, *56*(2), 267–283. https://doi.org/10.1037/0022-3514.56.2.267

Champagne, K., Burkhouse, K. L., Woody, M. L., Feurer, C., Sosoo, E., & Gibb, B. E. (2016). Overgeneral autobiographical memory in adolescent major depressive disorder. *Journal of Adolescence*, *52*, 72–75. https://doi.org/10.1016/j.adolescence.2016.07.008

Chu, C., Buchman–Schmitt, J. M., & Joiner, T. E. (2015). Autobiographical memory perspectives in task and suicide attempt recall: A study of young adults with and without symptoms of suicidality. *Cognitive Therapy and Research*, *39*(6), 766–775. https://doi.org/10.1007/s10608-015-9704-6

Clabby, J. F. (2006). Helping depressed adolescents: A menu of cognitive-behavioral procedures for primary care. *Primary Care Companion to the Journal of Clinical Psychiatry*, *8*(3), 131–141. https://doi.org/10.4088/pcc.v08n0302

Coleman, J. T. (2014). Examining the life script of African-Americans: A test of the cultural life script. *Applied Cognitive Psychology*, *28*(3), 419–426. https://doi.org/10.1002/acp.3000

Constans, J. I., McCloskey, M. S., Vasterling, J. J., Brailey, K., & Mathews, A. (2004). Suppression of attentional bias in PTSD. *Journal of Abnormal Psychology*, *113*(2), 315–323. https://doi.org/10.1037/0021-843X.113.2.315

Conway, M. A. (1987). Verifying autobiographical facts. *Cognition*, *26*(1), 39–58. https://doi.org/10.1016/0010-0277(87)90013-8

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

Conway, M. A., & Jobson, L. (2012). On the nature of autobiographical memory. In D. Berntsen & D. C. Rubin (Eds.), *Understanding autobiographical memories: Theories and approaches* (pp. 54–69). Cambridge: Cambridge University Press.

Conway, M. A., & Loveday, C. (2015). Remembering, imagining, false memories & personal meanings. *Consciousness and Cognition*, *33*, 574–581. https://doi.org/10.1016/j.concog.2014.12.002

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

Conway, M. A., Singer, J. A., & Tagini, A. (2004). The self and autobiographical memory: Correspondence and coherence. *Social Cognition*, *22*(5), 491–529. https://doi.org/10.1521/soco.22.5.491.50768

Corey, G. (2013). *Theory and practice of counselling and psychotherapy (9th ed.)*. Canada: Cengage Learning.

Crane, C., Barnhofer, T., Visser, C., Nightingale, H., & Williams, J. M. G. (2007). The effects of analytical and experiential rumination on autobiographical memory

specificity in individuals with a history of major depression. *Behaviour Research and Therapy*, *45*(12), 3077–3087. https://doi.org/10.1016/j.brat.2007.05.009

Crawley, R. A. (2010). Closure of autobiographical memories: The effects of written recounting from first- or third-person visual perspective, *Memory*, *18*(8), 900–917. https://doi.org/10.1080/09658211.2010.524650

Cruwys, T., Alexander Haslam, S., Dingle, G. A., Haslam, C., & Jetten, J. (2014). Depression and social identity: An integrative review. *Personality and Social Psychology Review*, *18*(3), 215–238. https://doi.org/10.1177/1088868314523839

Cruwys, T., Alexander Haslam, S., Dingle, G. A., Jetten, J., Hornsey, M. J., Desdemona Chong, E. M., & Oei, T. P. S. (2014). Feeling connected again: Interventions that increase social identification reduce depression symptoms in community and clinical settings. *Journal of Affective Disorders*, *159*, 139–146. https://doi.org/10.1016/j.jad.2014.02.019

Cuijpers, P., Koole, S. L., van Dijke, A., Roca, M., Li, J., & Reynolds, C. F. (2014). Psychotherapy for subclinical depression: Meta-analysis. *The British Journal of Psychiatry*, *205*(4), 268–274. https://doi.org/10.1192/bjp.bp.113.138784

Cuijpers, P., & Smit, F. (2008). Subclinical depression: A clinically relevant condition? *Tijdschrift voor Psychiatrie*, *50*(8), 519–528.

Dalgleish, T., Hill, E., Golden, A.-M. J., Morant, N., & Dunn, B. D. (2011). The structure of past and future lives in depression. *Journal of Abnormal Psychology*, *120*(1), 1–15. https://doi.org/10.1037/a0020797

Dalgleish, T., Rolfe, J., Golden, A., Dunn, B. D., & Barnard, P. J. (2008). Reduced autobiographical memory specificity and posttraumatic stress: Exploring the contributions of impaired executive control and affect regulation. *Journal of*

Abnormal Psychology, *117*(1), 236–241. https://doi.org/10.1037/0021-843X.117.1.236

Dalgleish, T., Williams, J. M. G., Golden, A. J., Perkins, N., Barrett, L. F., Barnard, P. J., … Yeung, C. (2007). Reduced specificity of autobiographical memory and depression: The role of executive control. *Journal of Experimental Psychology: General*, *136*(1), 23–42. https://doi.org/10.1037/0096-3445.136.1.23

D'Argembeau, A., & Van der Linden, M. (2004). Phenomenal characteristics associated with projecting oneself back into the past and forward into the future: Influence of valence and temporal distance. *Consciousness and Cognition*, *13*(4), 844–858. https://doi.org/10.1016/j.concog.2004.07.007

D'Argembeau, A., Comblain, C., & Van der Linden, M. (2003). Phenomenal characteristics of autobiographical memories for positive, negative, and neutral events. *Applied Cognitive Psychology*, *17*(3), 281–294. https://doi.org/10.1002/acp.856

da Silva, T. L. G., Donat, J. C., Lorenzonni, P. L., de Souza, L. K., Gauer, G., & Kristensen, C. H. (2016). Event centrality in trauma and PTSD: Relations between event relevance and posttraumatic symptoms. *Psicologia: Reflexão E Crítica*, *29*(1), 34–40. https://doi.org/10.1186/s41155-016-0015-y

Debeer, E., Hermans, D., & Raes, F. (2009). Associations between components of rumination and autobiographical memory specificity as measured by a minimal instructions Autobiographical Memory Test. *Memory*, *17*(8), 892–903. https://doi.org/10.1080/09658210903376243

Debeer, E., Raes, F., Claes, S., Vrieze, E., Williams, J. M. G., & Hermans, D. (2012). Relationship between cognitive avoidant coping and changes in overgeneral autobiographical memory retrieval following an acute stressor. *Journal of Behavior*

Therapy and Experimental Psychiatry, *43*(1), S37–S42. https://doi.org/10.1016/j.jbtep.2011.04.002

Debeer, E., Raes, F., Williams, J. M. G., & Hermans, D. (2011). Context-dependent activation of reduced autobiographical memory specificity as an avoidant coping style. *Emotion*, *11*(6), 1500–1506. https://doi.org/10.1037/a0024535

Demiray, B., & Freund, A. M. (2017). The psychological distance of memories: Examining causal relations with mood and self-esteem in young, middle-aged and older adults. *Consciousness and Cognition, 49,* 117–131. https://doi.org/10.1016/j.concog.2017.01.004

Demiray, B., & Janssen, S. M. J. (2015). The self-enhancement function of autobiographical memory. *Applied Cognitive Psychology, 29*(1)*,* 49–60. https://doi.org/10.1002/acp.3074

de Paula, J. J., Malloy-Diniz, L. F., & Romano-Silva, M. A. (2016). Reliability of working memory assessment in neurocognitive disorders: A study of the Digit Span and Corsi Block-Tapping tasks. *Revista Brasileira de Psiquiatria*, *38*(3), 262–263. https://doi.org/10.1590/1516-4446-2015-1879

de Vries, M., & Geurts, H. M. (2014). Beyond individual differences: Are working memory and inhibition informative specifiers within ASD? *Journal of Neural Transmission*, *121*(9), 1183–1198. https://doi.org/10.1007/s00702-014-1225-z

Deyo, M., Wilson, K. A., Ong, J., & Koopman, C. (2009). Mindfulness and rumination: Does mindfulness training lead to reductions in the ruminative thinking associated with depression? *EXPLORE*, *5*(5), 265–271. https://doi.org/10.1016/j.explore.2009.06.005

Diamond, A. (2013). Executive functions. *Annual Review of Psychology*, *64*(1), 135–168. https://doi.org/10.1146/annurev-psych-113011-143750

Dickson, J. M., & Bates, G. W. (2006). Autobiographical memories and views of the future: In relation to dysphoria. *International Journal of Psychology*, *41*(2), 107–116. https://doi.org/10.1080/00207590500188025

Dickson, R. A., Pillemer, D. B., & Bruehl, E. C. (2011). The reminiscence bump for salient personal memories: Is a cultural life script required? *Memory and Cognition*, *39*(6), 977–991. https://doi.org/10.3758/s13421-011-0082-3

Diehl, A. S., & Prout, M. (2002). Effects of posttraumatic stress disorder and child sexual abuse on self-efficacy development. *American Journal of Orthopsychiatry*, *72*(2), 262–265. https://doi.org/10.1037/0002-9432.72.2.262

Dritschel, B., Kao, C., Astell, A., Neufeind, J., & Lai, T.-J. (2011). How are depression and autobiographical memory retrieval related to culture? *Journal of Abnormal Psychology*, *120*(4), 969–974. https://doi.org/10.1037/a0025293

Dryman, M. T., & Heimberg, R. G. (2018). Emotion regulation in social anxiety and depression: A systematic review of expressive suppression and cognitive reappraisal. *Clinical Psychology Review*, *65*, 17–42. https://doi.org/10.1016/j.cpr.2018.07.004

Ehrlich, P. R., & Levin, S. A. (2005). The evolution of norms. *PLoS Biology*, *3*(6), e194. https://doi.org/10.1371/journal.pbio.0030194

El Haj, M., Boudoukha, A., Moustafa, A. A., Antoine, P., Allain, P., & Gallouj, K. (2020). "La vie en rose": A positive shift of autobiographical memory in Alzheimer's Disease. *Archives of Gerontology and Geriatrics*, *86*, 103953. https://doi.org/10.1016/j.archger.2019.103953

El Haj, M., Gandolphe, M. C., Gallouj, K., Kapogiannis, D., & Antoine, P. (2018). From nose to memory: The involuntary nature of odor-evoked autobiographical memories

in Alzheimer's disease. *Chemical Senses, 43*(1), 27–34. https://doi.org/10.1093/chemse/bjx064

El Khoury-Malhame, M., Lanteaume, L., Beetz, E. M., Roques, J., Reynaud, E., Samuelian, J.-C., … Khalifa, S. (2011). Attentional bias in post-traumatic stress disorder diminishes after symptom amelioration. *Behaviour Research and Therapy, 49*(11), 796–801. https://doi.org/10.1016/j.brat.2011.08.006

Endler, N. S. (1997). Stress, anxiety and coping: The multidimensional interaction model. *Canadian Psychology/Psychologie Canadienne, 38*(3), 136–153. https://doi.org/10.1037/0708-5591.38.3.136

Erdoğan, A., Baran, B., Avlar, B., Taş, A. Ç., & Tekcan, A. İ. (2008). On the persistence of positive events in life scripts. *Applied Cognitive Psychology, 22*(1), 95–111. https://doi.org/10.1002/acp.1363

Eriksen, B. A., & Eriksen, C. W. (1974). Effects of noise letters upon the identification of a target letter in a nonsearch task. *Perception & Psychophysics, 16*(1), 143–149. https://doi.org/10.3758/BF03203267

Erten, M. N., & Brown, A. D. (2018). Memory specificity training for depression and posttraumatic stress disorder: A promising therapeutic intervention. *Frontiers in Psychology, 9,* 419. https://doi.org/10.3389/fpsyg.2018.00419

Everaert, J., Duyck, W., & Koster, E. H. W. (2014). Attention, interpretation, and memory biases in subclinical depression: A proof-of-principle test of the combined cognitive biases hypothesis. *Emotion, 14*(2), 331–340. https://doi.org/10.1037/a0035250

Feng, Z., Wang, X., Liu, K., Liu, X., Wang, L., Chen, X., & Dai, Q. (2015). The neural mechanism of negative cognitive bias in major depression: Theoretical and empirical issues. In Y. Kim (Ed.), *Major Depressive Disorder: Cognitive and neurobiological*

mechanisms (pp. 107-132). Croatia: InTech.

Ferrell, O. C., & Gresham, L. G. (1985). A contingency framework for understanding ethical decision making in marketing. *Journal of Marketing*, *49*(3), 87–96. https://doi.org/10.2307/1251618

Field, A. (2009). *Discovering statistics using SPSS (3rd ed.)*. London: SAGE Publications.

Fisk, J., Ellis, J. A., & Reynolds, S. A. (2019) A test of the CaR-FA-X mechanisms and depression in adolescents. *Memory*, *27*(4), 455–464, https://doi.org/10.1080/09658211.2018.1518457

Fivush, R. (2011). The development of autobiographical memory. *Annual Review of Psychology*, *62*(1), 559–582. https://doi.org/10.1146/annurev.psych.121208.131702

Flory, J. D., & Yehuda, R. (2015). Comorbidity between post-traumatic stress disorder and major depressive disorder: Alternative explanations and treatment considerations. *Dialogues in Clinical Neuroscience*, *17*(2), 141–150.

Fontaine, K. R., Manstead, A. S. R., & Wagner, H. (1993). Optimism, perceived control over stress, and coping. *European Journal of Personality*, *7*(4), 267–281. https://doi.org/10.1002/per.2410070407

Freud, S. (1999). The social construction of normality. *Families in Society: The Journal of Contemporary Social Services*, *80*(4), 333–339. https://doi.org/10.1606/1044-3894.1213

Friedman, W. J. (1993). Memory for the time of past events. *Psychological Bulletin, 113*(1), 44–66. https://doi.org/10.1037/0033-2909.113.1.44

Friedman, W. J. (2004). Time in autobiographical memory. *Social Cognition*, *22*(5), 591–605. https://doi.org/10.1521/soco.22.5.591.50766

Fromholt, P., Mortensen, D., Torpdahl, P., Bender, L., Larsen, P., & Rubin, D. (2003). Life-

narrative and word-cued autobiographical memories in centenarians: Comparisons with 80-year-old control, depressed, and dementia groups. *Memory*, *11*(1), 81–88. https://doi.org/10.1080/741938171

Fukushima, M., Sharp, S. F., & Kobayashi, E. (2009). Bond to society, collectivism, and conformity: A comparative study of Japanese and American college students. *Deviant Behavior*, *30*(5), 434–466. https://doi.org/10.1080/01639620802296212

Gehrt, T. B., Berntsen, D., Hoyle, R. H., & Rubin, D. C. (2018). Psychological and clinical correlates of the Centrality of Event Scale: A systematic review. *Clinical Psychology Review*, *65*, 57–80. https://doi.org/10.1016/j.cpr.2018.07.006

Gibbons, J. A., & Lee, S. A. (2019). Rehearsal partially mediates the negative relations of the fading affect bias with depression, anxiety, and stress. *Applied Cognitive Psychology*, *33*(4), 693–701. https://doi.org/10.1002/acp.3538

Gibbons, J. A., Lee, S. A., & Walker, W. R. (2011). The fading affect bias begins within 12 hours and persists for 3 months. *Applied Cognitive Psychology*, *25*(4), 663–672. https://doi.org/10.1002/acp.1738

Gignac, G. E., Reynolds, M. R., & Kovacs, K. (2019). Digit Span subscale scores may be insufficiently reliable for clinical interpretation: Distinguishing between stratified coefficient alpha and omega hierarchical. *Assessment, 26*(8), 1554–1563. https://doi.org/10.1177/1073191117748396

Glück, J., & Bluck, S. (2007). Looking back across the life span: A life story account of the reminiscence bump. *Memory & Cognition*, *35*(8), 1928–1939. https://doi.org/10.3758/BF03192926

Gonzalo, D., Kleim, B., Donaldson, C., Moorey, S., & Ehlers, A. (2012). How disorder-specific are depressive attributions? A comparison of individuals with depression,

post-traumatic stress disorder and healthy controls. *Cognitive Therapy and Research, 36*(6), 731–739. https://doi.org/10.1007/s10608-011-9429-0

Greenberg, D. L., Ogar, J. M., Viskontas, I. V., Tempini, M. L. G., Miller, B., & Knowlton, B. J. (2011). Multimodal cuing of autobiographical memory in semantic dementia. *Neuropsychology, 25*(1), 98–104. https://doi.org/10.1037/a0021005

Greenhoot, A. F., Sun, S., Bunnell, S. L., & Lindboe, K. (2013). Making sense of traumatic memories: Memory qualities and psychological symptoms in emerging adults with and without abuse histories. *Memory, 21*(1), 125–142. https://doi.org/10.1080/09658211.2012.712975

Griffith, J. W., Sumner, J. A., Raes, F., Barnhofer, T., Debeer, E., & Hermans, D. (2012). Current psychometric and methodological issues in the measurement of overgeneral autobiographical memory. *Journal of Behavior Therapy and Experimental Psychiatry, 43*(1), 21–31. https://doi.org/10.1016/j.jbtep.2011.05.008

Gross, J. J., & John, O. P. (2003). Individual differences in two emotion regulation processes: Implications for affect, relationships, and well-being. *Journal of Personality and Social Psychology, 85*(2), 348–362. https://doi.org/10.1037/0022-3514.85.2.348

Grysman, A., & Dimakis, S. (2018). Later adults' cultural life scripts of middle and later adulthood. *Aging, Neuropsychology, and Cognition, 25*(3), 406–426. https://doi.org/10.1080/13825585.2017.1319458

Gu, X., & Tse, C.-S. (2016). Narrative perspective shift at retrieval: The psychological-distance-mediated-effect on emotional intensity of positive and negative autobiographical memory. *Consciousness and Cognition, 45*, 159–173. https://doi.org/10.1016/j.concog.2016.09.001

Habermas, T. (2007). How to tell a life: The development of the cultural concept of biography. *Journal of Cognition and Development*, *8*(1), 1–31. https://doi.org/10.1080/15248370709336991

Habermas, T. (2012). Identity, emotion, and the social matrix of autobiographical memory: A psychoanalytic narrative view. In D. Berntsen & D. C. Rubin (Eds.), *Understanding autobiographical memories: Theories and approaches* (pp. 33–53). Cambridge: Cambridge University Press.

Habermas, T., Ott, L.-M., Schubert, M., Schneider, B. S., & Pate, A. (2008). Stuck in the past: Negative bias, explanatory style, temporal order, and evaluative perspectives in life narratives of clinically depressed individuals. *Depression and Anxiety*, *25*(11), E121–E132. https://doi.org/10.1002/da.20389

Haddad, A. D. M., Harmer, C. J., & Williams, J. M. G. (2014). Executive dysfunction and autobiographical memory retrieval in recovered depressed women. *Journal of Behavior Therapy and Experimental Psychiatry*, *45*(2), 260–266. https://doi.org/10.1016/j.jbtep.2013.12.001

Hamlat, E., & Alloy, L. (2018). Autobiographical memory as a target of intervention: Increasing specificity for therapeutic gain. *Practice Innovations*, *3*(4), 227–241. https://doi.org/10.1037/pri0000075

Haque, S., & Conway, M. A. (2001). Sampling the process of autobiographical memory construction. *European Journal of Cognitive Psychology*, *13*(4), 529–547. https://doi.org/10.1080/09541440125757

Haque, S., Juliana, E., Khan, R., & Hasking, P. (2014). Autobiographical memory and hierarchical search strategies in depressed and non-depressed participants. *BMC Psychiatry*, *14*(1), 310–318. https://doi.org/10.1186/s12888-014-0310-z

Hatiboğlu, N., & Habermas, T. (2016). The normativity of life scripts and its relation with life story events across cultures and subcultures. *Memory*, *24*(10), 1369–1381. https://doi.org/10.1080/09658211.2015.1111389

Haxby, J. V., Grady, C. L., Horwitz, B., Ungerleider, L. G., Mishkin, M., Carson, R. E., … Rapoport, S. I. (1991). Dissociation of object and spatial visual processing pathways in human extrastriate cortex. *Proceedings of the National Academy of Sciences*, *88*(5), 1621–1625. https://doi.org/10.1073/pnas.88.5.1621

Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. New York: The Guilford Press.

Hayes, A. M. (2015). Facilitating emotional processing in depression: The application of exposure principles. *Current Opinion in Psychology*, *4*, 61–66. https://doi.org/10.1016/j.copsyc.2015.03.032

Hedge, C., Powell, G., & Sumner, P. (2018). The reliability paradox: Why robust cognitive tasks do not produce reliable individual differences. *Behavior Research Methods*, *50*(3), 1166–1186. https://doi.org/10.3758/s13428-017-0935-1

Heitz, R. P. (2014). The speed-accuracy tradeoff: History, physiology, methodology, and behavior. *Frontiers in Neuroscience*, *8*, 150. https://doi.org/10.3389/fnins.2014.00150

Hermans, D., Van Den Broeck, K., Belis, G., Raes, F., Pieters, G., & Eelen, P. (2004). Trauma and autobiographical memory specificity in depressed inpatients. *Behaviour Research and Therapy*, *42*(7), 775–789. https://doi.org/10.1016/S0005-7967(03)00197-9

Herz, R. S., (2004). A naturalistic analysis of autobiographical memories triggered by olfactory visual and auditory stimuli. *Chemical Senses*, *29*(3), 217–224. https://doi.org/10.1093/chemse/bjh025

Hitchcock, C., Newby, J., Timm, E., Howard, R. M., Golden, A.-M., Kuyken, W., & Dalgleish, T. (2020). Memory category fluency, memory specificity, and the fading affect bias for positive and negative autobiographical events: Performance on a good day–bad day task in healthy and depressed individuals. *Journal of Experimental Psychology, 149*(1), 198–206. https://doi.org/10.1037/xge0000617

Hitchcock, C., Nixon, R. D. V., & Weber, N. (2014). A longitudinal examination of overgeneral memory and psychopathology in children following recent trauma exposure. *Applied Cognitive Psychology*, *28*(4), 531–538. https://doi.org/10.1002/acp.3027

Hitchcock, C., Rodrigues, E., Rees, C., Gormley, S., Dritschel, B., & Dalgleish, T. (2019). Misremembrance of things past: Depression is associated with difficulties in the recollection of both specific and categoric autobiographical memories. *Clinical Psychological Science*, *7*(4), 693–700. https://doi.org/10.1177/2167702619826967

Hoekstra, S. J., Harris, R. J., & Helmick, A. L. (1999). Autobiographical memories about the experience of seeing frightening movies in childhood. *Media Psychology*, *1*(2), 117–140. https://doi.org/10.1207/s1532785xmep0102_2

Holland, A. C., & Kensinger, E. A. (2010). Emotion and autobiographical memory. *Physics of Life Reviews*, *7*(1), 88–131. https://doi.org/10.1016/j.plrev.2010.01.006

Huber, J., Salatsch, C., Ingenerf, K., Schmid, C., Maatouk, I., Weisbrod, M., … Nikendei, C. (2015). Characteristics of disorder-related autobiographical memory in acute anorexia nervosa patients. *European Eating Disorders Review*, *23*(5), 379–389. https://doi.org/10.1002/erv.2379

Humphries, C., & Jobson, L. (2012). Short report: Influence of culture and trauma history on autobiographical memory specificity. *Memory*, *20*(8), 915–922.

https://doi.org/10.1080/09658211.2012.710432

James, S. L., Abate, D., Abate, K. H., Abay, S. M., Abbafati, C., Abbasi, N., … Murray, C. J. L. (2018). Global, regional, and national incidence, prevalence, and years lived with disability for 354 diseases and injuries for 195 countries and territories, 1990–2017: A systematic analysis for the Global Burden of Disease Study 2017. *The Lancet, 392*(10159), 1789–1858. https://doi.org/10.1016/S0140-6736(18)32279-7

Janssen, S. M. J. (2015). Is there a cultural life script for public events? *Applied Cognitive Psychology, 29*(1), 61–68. https://doi.org/10.1002/acp.3022

Janssen, S. M. J., & Haque, S. (2018). The transmission and stability of cultural life scripts: A cross-cultural study. *Memory, 26*(1), 131–143. https://doi.org/10.1080/09658211.2017.1335327

Janssen, S. M. J., Hearne, T. L., & Takarangi, M. K. T. (2015). The relation between self-reported PTSD and depression symptoms and the psychological distance of positive and negative events. *Journal of Behavior Therapy and Experimental Psychiatry, 48*, 177–184. https://doi.org/10.1016/j.jbtep.2015.04.002

Janssen, S. M. J., & Rubin, D. C. (2011). Age effects in cultural life scripts. *Applied Cognitive Psychology, 25*(2), 291–298. https://doi.org/10.1002/acp.1690

Janssen, S. M. J., Uemiya, A., & Naka, M. (2014). Age and gender effects in the cultural life script of Japanese adults. *Journal of Cognitive Psychology, 26*(3), 307–321. https://doi.org/10.1080/20445911.2014.892493

Javanovski, D. (2011). *Investigating executive functioning in everyday life using an ecologically oriented virtual reality task* (Unpublished doctoral dissertation). University of Toronto, Canada.

Ji, J. (2012). Distinguishing subclinical (subthreshold) depression from the residual

symptoms of major depression. *Shanghai Archives of Psychiatry*, *24*(5), 288–289. https://doi.org/10.3969/j.issn.1002-0829.2012.05.007

Jobson, L., Miskon, N., Dalgleish, T., Hitchcock, C., Hill, E., Golden, A.-M., … Muktar, F. (2018). Impact of culture on autobiographical life structure in depression. *British Journal of Clinical Psychology*, *57*(3), 382–396. https://doi.org/10.1111/bjc.12181

Jørgensen, C. R., Berntsen, D., Bech, M., Kjølbye, M., Bennedsen, B. E., & Ramsgaard, S. B. (2012). Identity-related autobiographical memories and cultural life scripts in patients with borderline personality disorder. *Consciousness and Cognition*, *21*(2), 788–798. https://doi.org/10.1016/j.concog.2012.01.010

Jose, P. E. (2013). *Doing statistical mediation and moderation.* New York: Guilford Press.

Kane, M. J., Conway, A. R. A., Miura, T. K., & Colflesh, G. J. H. (2007). Working memory, attention control, and the n-back task: A question of construct validity. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, *33*(3), 615–622. https://doi.org/10.1037/0278-7393.33.3.615

Kanfer, R., & Zeiss, A. M. (1983). Depression, interpersonal standard setting, and judgments of self-efficacy. *Journal of Abnormal Psychology*, *92*(3), 319–329. https://doi.org/10.1037/0021-843X.92.3.319

Kar, N. (2011). Cognitive behavioral therapy for the treatment of post-traumatic stress disorder: A review. *Neuropsychiatric Disease and Treatment*, *7*(1), 167–181. https://doi.org/10.2147/NDT.S10389

Kawasaki, A., & Uehara, I. (2020). Cultural life scripts of Japanese adolescents. *Applied Cognitive Psychology*, *34*(2), 357–371. https://doi.org/10.1002/acp.3621

Kaya, G. I. (2018). Construction of academic success and failure in school memories. *Educational Research and Reviews*, *13*(1), 12–20.

https://doi.org/10.5897/ERR2017.3422

Kelemen, W. L., Weinberg, W. B., Alford, H. S., Mulvey, E. K., & Kaeochinda, K. F. (2006). Improving the reliability of event-based laboratory tests of prospective memory. *Psychonomic Bulletin & Review*, *13*(6), 1028–1032. https://doi.org/10.3758/BF03213920

Kenny, L. M., Bryant, R. A., Silove, D., Creamer, M., O'Donnell, M., & McFarlane, A. C. (2009). Distant memories: A prospective study of vantage point for traumatic memories. *Psychological Science, 20*(9), 1049–1052. https://doi.org/10.1111/j.1467-9280.2009.02393.x

Kessler, R. C., Aguilar-Gaxiola, S., Alonso, J., Benjet, C., Bromet, E. J., Cardoso, G., … Koenen, K. C. (2017). Trauma and PTSD in the WHO world mental health surveys. *European Journal of Psychotraumatology*, *8*(5), 1–16. https://doi.org/10.1080/20008198.2017.1353383

King, M. J., MacDougall, A. G., Ferris, S. M., Levine, B., MacQueen, G. M., & McKinnon, M. C. (2010). A review of factors that moderate autobiographical memory performance in patients with major depressive disorder. *Journal of Clinical and Experimental Neuropsychology, 32*(10), 1122–1144. https://doi.org/10.1080/13803391003781874

Kleim, B., & Ehlers, A. (2008). Reduced autobiographical memory specificity predicts depression and posttraumatic stress disorder after recent trauma. *International Journal of Emergency Mental Health, 10*(2), 158–160. https://doi.org/10.1037/0022-006X.76.2.231

Knyazev, G. G., Savostyanov, A. N., Bocharov, A. V., & Kuznetsova, V. B. (2017). Depressive symptoms and autobiographical memory: A pilot electroencephalography

(EEG) study. *Journal of Clinical and Experimental Neuropsychology, 39*(3), 242–256. https://doi.org/10.1080/13803395.2016.1219318

Koppel, J., & Berntsen, D. (2015). The peaks of life: The differential temporal locations of the reminiscence bump across disparate cueing methods. *Journal of Applied Research in Memory and Cognition, 4*(1), 66–80. https://doi.org/10.1016/j.jarmac.2014.11.004

Koppel, J., & Berntsen, D. (2016). The reminiscence bump without memories: The distribution of imagined word-cued and important autobiographical memories in a hypothetical 70-year-old. *Consciousness and Cognition, 44*, 89–102. https://doi.org/10.1016/j.concog.2016.06.010

Korn, C. W., Sharot, T., Walter, H., Heekeren, H. R., & Dolan, R. J. (2014). Depression is related to an absence of optimistically biased belief updating about future life events. *Psychological Medicine, 44*(3), 579–592. https://doi.org/10.1017/S0033291713001074

Krings, A., Heeren, A., Fontaine, P., & Blairy, S. (2020). Attentional biases in depression: Relation to disorder severity, rumination, and anhedonia. *Comprehensive Psychiatry, 100*, 152173. https://doi.org/10.1016/j.comppsych.2020.152173

Kross, E., & Ayduk, O. (2009). Boundary conditions and buffering effects: Does depressive symptomology moderate the effectiveness of self-distancing for facilitating adaptive emotional analysis? *Journal of Research in Personality, 43*(5), 923–927. https://doi.org/10.1016/j.jrp.2009.04.004

Kross, E., Gard, D., Deldin, P., Clifton, J., & Ayduk, O. (2012). "Asking why" from a distance: Its cognitive and emotional consequences for people with major depressive disorder. *Journal of Abnormal Psychology, 121*(3), 559–569. https://doi.org/10.1037/a0028808

Krueger, R. F., & Markon, K. E. (2006). Understanding psychopathology: Melding behavior genetics, personality, and quantitative psychology to develop an empirical based model. *Current Directions in Psychological Science*, *15*(3), 113–117. https://doi.org/10.1111/j.0963-7214.2006.00418.x

Kuyken, W., & Howell, R. (2006). Facets of autobiographical memory in adolescents with major depressive disorder and never-depressed controls. *Cognition and Emotion*, *20*(3-4), 466–487. https://doi.org/10.1080/02699930500342639

Kuyken, W., & Moulds, M. L. (2009). Remembering as an observer: How is autobiographical memory retrieval vantage perspective linked to depression? *Memory*, *17*(6), 624–634. https://doi.org/10.1080/09658210902984526

Lawlor, V. M., Webb, C. A., Wiecki, T. V., Frank, M. J., Trivedi, M., Pizzagalli, D. A., & Dillon, D. G. (2019). Dissecting the impact of depression on decision-making. *Psychological Medicine*, 1–10. https://doi.org/10.1017/S0033291719001570

Leaman, S. C., Kearns, M. C., & Rothbaum, B. O. (2013). Prevention and early intervention: PTSD following traumatic events. *FOCUS*, *11*(3), 321–327. https://doi.org/10.1176/appi.focus.11.3.321

Lely, J. C. G., Smid, G. E., Jongedijk, R. A., Knipscheer, J. W., & Kleber, R. J. (2019). The effectiveness of narrative exposure therapy: A review, meta-analysis and meta-regression analysis. *European Journal of Psychotraumatolgy*, *10*(1), 1550344. https://doi.org/10.1080/20008198.2018.1550344

Levine, B., Svoboda, E., Hay, J. F., Winocur, G., & Moscovitch, M. M. (2002). Aging and autobiographical memory: Dissociating episodic from semantic retrieval. *Psychology and Aging*, *17*(4), 677–689. https://doi.org/10.1037//0882-7974.17.4.677

Leykin, Y., Roberts, C. S., & DeRubeis, R. J. (2011). Decision-making and depressive symptomatology. *Cognitive Therapy and Research*, *35*, 333–341. https://doi.org/10.1007/s10608-010-9308-0

Libby, L. K., & Eibach, R. P. (2002). Looking back in time: Self-concept change affects visual perspective in autobiographical memory. *Journal of Personality and Social Psychology*, *82*(2), 167–179. https://doi.org/10.1037/0022-3514.82.2.167

Libby, L. K., & Eibach, R. P. (2011). Self-enhancement or self-coherence? Why people shift visual perspective in mental images of the personal past and future. *Personality and Social Psychology Bulletin*, *37*(5), 714–726. https://doi.org/10.1177/0146167211400207

Lievaart, M., van der Heiden, C., & Geraerts, E. (2013). Associations between depressive symptoms, rumination, overgeneral autobiographical memory and interpretation bias within a clinically depressed sample. *Journal of Psychology and Psychotherapy*, *7*, 1–6. https://doi.org/10.4172/2161-0487.S7-004

Litman, J. A. (2006). The COPE inventory: Dimensionality and relationships with approach- and avoidance-motives and positive and negative traits. *Personality and Individual Differences*, *41*(2), 273–284. https://doi.org/10.1016/j.paid.2005.11.032

Liu, Y., Zhang, F., Wang, Z., Cao, L., Wang, J., Na, A., … Zhao, X. (2016). Overgeneral autobiographical memory at baseline predicts depressive symptoms at follow-up in patients with first-episode depression. *Psychiatry Research*, *243*, 123–127. https://doi.org/10.1016/j.psychres.2016.06.029

Lloyd, G. G., & Lishman, W. A. (1975). Effect of depression on the speed of recall of pleasant and unpleasant experiences. *Psychological Medicine*, *5*(2), 173–180. https://doi.org/10.1017/S0033291700056440

Lobo, D. M., & Agius, M. (2012). The mental illness spectrum. *Psychiatria Danubina*, *24*(1), S157–S160.

Lovibond, S. H., & Lovibond, P. F. (1993). *Manual for the depression anxiety stress scales (DASS)*. Retrieved from http://www2.psy.unsw.edu.au/dass/

Lu, X., Chen, Z., Cui, X., Uji, M., Miyazaki, W., Oda, M., … Katoh, T. (2012). Effects of temperament and character profiles on state and trait depression and anxiety: A prospective study of a Japanese youth population. *Depression Research and Treatment*, 12, 604684. https://doi.org/10.1155/2012/604684

Maraver, M. J., Bajo, M. T., & Gomez-Ariza, C. J. (2016). Training on working memory and inhibitory control in young adults. *Frontiers in Human Neuroscience*, *10,* 588. https://doi.org/10.3389/fnhum.2016.00588

Marcotti, P., & St. Jacques, P. L. (2018). Shifting visual perspective during memory retrieval reduces the accuracy of subsequent memories. *Memory*, *26*(3), 330–341. https://doi.org/10.1080/09658211.2017.1329441

Marian, V., & Kaushanskaya, M. (2008). Words, feelings, and bilingualism: Cross-linguistic differences in emotionality of autobiographical memories. *The Mental Lexicon*, *3*(1), 72–90. https://doi.org/10.1075/ml.3.1.06mar

Marian, V., & Neisser, U. (2000). Language-dependent recall of autobiographical memories. *Journal of Experimental Psychology*, *129*(3), 361–368. https://doi.org/10.1371/10.1037//0096-3445.129.3.361

Marsh, C., Hammond, M. D., & Crawford, M. T. (2019). Thinking about negative life events as a mediator between depression and fading affect bias. *PLoS ONE*, *14*(1), e0211147. https://doi.org/10.1371/journal.pone.0211147

Matsumoto, A., & Stanny, C. (2006). Language-dependent access to autobiographical memory in Japanese-English bilinguals and US monolinguals. *Memory*, *14*(3), 378–390. https://doi.org/10.1080/09658210500365763

Matsumoto, N., Takahashi, Y., & Kawaguchi, J. (2020). Increased direct retrieval of overgeneral categoric memory in individuals with dysphoria and a history of major depression. *Cognitive Therapy and Research*, *44*, 483–498. https://doi.org/10.1007/s10608-020-10079-3

Matthews, T., Danese, A., Wertz, J., Odgers, C. L., Ambler, A., Moffitt, T. E., & Arseneault, L. (2016). Social isolation, loneliness and depression in young adulthood: A behavioural genetic analysis. *Social Psychiatry and Psychiatric Epidemiology*, *51*(5), 339–348 https://doi.org/10.1007/s00127-016-1178-7

McCubbin, J. A., Zinzow, H. M., Hibdon, M. A., Nathan, A. W., Morrison, A. V., Hayden, G. W., ... Switzer, F. S. (2016). Subclinical posttraumatic stress disorder symptoms: Relationships with blood pressure, hostility, and sleep. *Cardiovascular Psychiatry and Neurology*, *2016*, 4720941. https://doi.org/10.1155/2016/4720941

Mei, D., Li, L. M. W., & Wang, Y. (2018). Influence of emotional valence on perceived psychological distance depends on emotional intensity. *European Journal of Social Psychology*, *48*(5), 687–700. https://doi.org/10.1002/ejsp.2361

Mitchell, A. E. P. (2016). Phenomenological characteristics of autobiographical memories: Responsiveness to an induced negative mood state in those with and without a previous history of depression. *Advances in Cognitive Psychology*, *12*(2), 105–114. https://doi.org/10.5709/acp-0190-8

Moore, S. A., Zoellner, L. A., & Mollenholt, N. (2008). Are expressive suppression and cognitive reappraisal associated with stress-related symptoms? *Behaviour Research*

and Therapy, *46*(9), 993–1000. https://doi.org/10.1016/j.brat.2008.05.001

Moradi, A. R., Herlihy, J., Yasseri, G., Shahraray, M., Turner, S., & Dalgleish, T. (2008). Specificity of episodic and semantic aspects of autobiographical memory in relation to symptoms of Posttraumatic Stress Disorder (PTSD). *Acta Psychologica*, *127*(3), 645–653. https://doi.org/10.1016/j.actpsy.2007.11.001

Moulds, M. L., Kandris, E., Starr, S., & Wong, A. C. M. (2007). The relationship between rumination, avoidance and depression in a non-clinical sample. *Behaviour Research and Therapy*, *45*(2), 251–261. https://doi.org/10.1016/j.brat.2006.03.003

Muldoon, O. T., Alexander Haslam, S., Haslam, C., Cruwys, T., Kearns, M., & Jetten, J. (2019). The social psychology of responses to trauma: Social identity pathways associated with divergent traumatic responses. *European Review of Social Psychology*, *30*(1), 311–348. https://doi.org/10.1080/10463283.2020.1711628

Muñoz, R. F., Beardslee, W. R., & Leykin, Y. (2012). Major depression can be prevented. *The American Psychologist*, *67*(4), 285–295. https://doi.org/10.1037/a0027666

Naim, R., Abend, R., Wald, I., Eldar, S., Levi, O., Fruchter, E., … Bar-Haim, Y. (2015). Threat-related attention bias variability and posttraumatic stress. *The American Journal of Psychiatry*, *172*(12), 1242–1250. https://doi.org/10.1176/appi.ajp.2015.14121579

Nelis, S., Debeer, E., Holmes, E. A., & Raes, F. (2013). Dysphoric students show higher use of the observer perspective in their retrieval of positive versus negative autobiographical memories. *Memory*, *21*(4), 423–430. https://doi.org/10.1080/09658211.2012.730530

Neshat-Doost, H. T., Dalgleish, T., & Golden, A. J. (2008). Reduced specificity of emotional autobiographical memories following self-regulation depletion. *Emotion*, *8*(5), 731–

736. https://doi.org/10.1037/a0013507

Newman, E. J., & Lindsay, D. S. (2009). False memories: What the hell are they for? *Applied Cognitive Psychology, 23*(8), 1105–1121. https://doi.org/10.1002/acp.1613

Ng, C. G. (2014). A review of depression research in Malaysia. *The Medical Journal of Malaysia, 69*, 42–45.

Nigro, G., & Neisser, U. (1983). Point of view in personal memories. *Cognitive Psychology, 15*(4), 467–482. https://doi.org/10.1016/0010-0285(83)90016-6

Nixon, R. D. V., Ball, S., Sterk, J., Best, T., & Beatty, L. (2013). Autobiographical memory in children and adolescents with acute stress and chronic posttraumatic stress disorder. *Behaviour Change, 30*(3), 180–198. https://doi.org/10.1017/bec.2013.17

Niziurski, J. A., Johannessen, K. B., & Berntsen, D. (2018). Emotional distress and positive and negative memories from military deployment: The influence of PTSD symptoms and time. *Memory, 26*(8), 1093–1104. https://doi.org/10.1080/09658211.2017.1418380

Nolen-Hoeksema, S. (1991). Responses to depression and their effects on the duration of depressive episodes. *Journal of Abnormal Psychology, 100*(4), 569–582. https://doi.org/10.1037/0021-843x.100.4.569

Öner, S., & Gülgöz, S. (2018). Remembering successes and failures: Rehearsal characteristics influence recollection and distancing. *Journal of Cognitive Psychology, 30*(2), 207–221. https://doi.org/10.1080/20445911.2017.1406489

Ono, M., Devilly, G. J., & Shum, D. H. K. (2016). A meta-analytic review of overgeneral memory: The role of trauma history, mood, and the presence of posttraumatic stress disorder. *Psychological Trauma, 8*(2), 157–164. https://doi.org/10.1037/tra0000027

Orchard, F., & Reynolds, S. (2018). The combined influence of cognitions in adolescent depression: Biases of interpretation, self-evaluation, and memory. *British Journal of Clinical Psychology*, *57*(4), 420–435. https://doi.org/10.1111/bjc.12184

Ottsen, C. L., & Berntsen, D. (2014). The cultural life script of Qatar and across cultures: Effects of gender and religion. *Memory*, *22*(4), 390–407. https://doi.org/10.1080/09658211.2013.795598

Packwood, S., Hodgetts, H. M., & Tremblay, S. (2011). A multiperspective approach to the conceptualization of executive functions. *Journal of Clinical and Experimental Neuropsychology*, *33*(4), 456–470. https://doi.org/10.1080/13803395.2010.533157

Paquet, S. L., & Kline, T. J. B. (2009). Uncovering the psychometric properties of scales measuring individualist and collectivist orientations. *International Journal of Testing*, *9*(3), 260–270. https://doi.org/10.1080/15305050903106859

Park, R. J., Goodyer, I. M., & Teasdale, J. D. (2002). Categoric overgeneral autobiographical memory in adolescents with major depressive disorder. *Psychological Medicine*, *32*(2), 267–276. https://doi.org/10.1017/S0033291701005189

Pascuzzi, D., & Smorti, A. (2017). Emotion regulation, autobiographical memories and life narratives. *New Ideas in Psychology*, *45*, 28–37. https://doi.org/10.1016/j.newideapsych.2016.12.001

Pasupathi, M. (2003). Emotion regulation during social remembering: Differences between emotions elicited during an event and emotions elicited when talking about it. *Memory*, *11*(2), 151–163. https://doi.org/10.1080/741938212

Paulus, M. P., & Ju, A. J. (2012). Emotion and decision-making: Affect-driven belief systems in anxiety and depression. *Trends in Cognitive Sciences*, *16*(9), 476–483. https://doi.org/10.1016/j.tics.2012.07.009

Pavlenko, A. (2012). Affective processing in bilingual speakers: Disembodied cognition? *International Journal of Psychology*, *47*(6), 405–428. https://doi.org/10.1080/00207594.2012.743665

Paykel E. S. (2008). Partial remission, residual symptoms, and relapse in depression. *Dialogues in Clinical Neuroscience*, *10*(4), 431–437.

Peters, F., Wessel, I., Merckelbach, H., & Boon-Vermeeren, M. (2002). Autobiographical memory specificity and the course of major depressive disorder. *Comprehensive Psychiatry*, *43*(5), 344–350. https://doi.org/10.1053/comp.2002.34635

Pineles, S. L., Shipherd, J. C., Mostoufi, S. M., Abramovitz, S. M., & Yovel, I. (2009). Attentional biases in PTSD: More evidence for interference. *Behaviour Research and Therapy*, *47*(12), 1050–1057. https://doi.org/10.1016/j.brat.2009.08.001

Pizzaro, C. J. (1994). Emotional Intensity in A Second Language: A Study on Fluent Spanish-English Bilingual Individuals When Discussing Emotional Topics. (Doctoral dissertation). Retrieved from https://www.elibrary.ru/item.asp?id=5700866

Porter, S., & Birt, A. R. (2001). Is traumatic memories special? A comparison of traumatic memory characteristics with memory for other emotional life experiences. *Applied Cognitive Psychology*, *15*(7), S101–S117. https://doi.org/10.1002/acp.766

Qu, C., Sas, C., & Doherty, G. (2019). Exploring and designing for memory impairments in depression. *Proceedings of the CHI Conference on Human Factors in Computing Systems*, *510*, 1–15. https://doi.org/10.1145/3290605.3300740

Querstret, D., & Cropley, M. (2013). Assessing treatments used to reduce rumination and/or worry: A systematic review. *Clinical Psychology Review*, *33*(8), 996–1009. https://doi.org/10.1016/j.cpr.2013.08.004

Radloff, L. S. (1977). The CES-D Scale: A self-report depression scale for research in the

general population. *Applied Psychological Measurement, 1*(3), 385–401. https://doi.org/10.1177/014662167700100306

Raes, F., Hermans, D., Williams, J. M. G., Beyers, W., Eelen, P., & Brunfaut, E. (2006). Reduced autobiographical memory specificity and rumination in predicting the course of depression. *Journal of Abnormal Psychology, 115*(4), 699–704. https://doi.org/10.1037/0021-843X.115.4.699

Raes, F., Hermans, D., Williams, J. M. G., Demyttenaere, K., Sabbe, B., Pieters, G., & Eelen, P. (2006). Is overgeneral autobiographical memory an isolated memory phenomenon in major depression? *Memory*, *14*(5), 584–594. https://doi.org/10.1080/09658210600624614

Raes, F., Hermans, D., Williams, J. M. G., & Eelen, P. (2006). Reduced autobiographical memory specificity and affect regulation. *Cognition and Emotion*, *20*(3–4), 402–429. https://doi.org/10.1080/02699930500341003

Raes, F., Hermans, D., Williams, J. M. G., & Eelen, P. (2007). A sentence completion procedure as an alternative to the Autobiographical Memory Test for assessing overgeneral memory in non-clinical populations. *Memory*, *15*(5), 495–507. https://doi.org/10.1080/09658210701390982

Raes, F., Verstraeten, K., Bijttebier, P., Vasey, M. W., & Dalgleish, T. (2010). Inhibitory control mediates the relationship between depressed mood and overgeneral memory recall in children. *Journal of Clinical Child and Adolescent Psychology*, *39*(2), 276–281. https://doi.org/10.1080/15374410903532684

Raes, F., Williams, J. M. G., & Hermans, D. (2009). Reducing cognitive vulnerability to depression: A preliminary investigation of Memory Specificity Training (MEST) in inpatients with depressive symptomatology. *Journal of Behavior Therapy and*

Experimental Psychiatry, *40*(1), 24–38. https://doi.org/10.1016/j.jbtep.2008.03.001

Raymaekers, L., Smeets, T., Peters, M. J. V., & Merckelbach, H. (2010). Autobiographical memory specificity among people with recovered memories of childhood sexual abuse. *Journal of Behavior Therapy and Experimental Psychiatry*, *41*(4), 338–344. https://doi.org/10.1016/j.jbtep.2010.03.004

Redick, T. S., & Lindsey, D. R. B. (2013). Complex span and n-back measures of working memory: A meta-analysis. *Psychonomic Bulletin & Review*, *20*, 1102–1113. https://doi.org/10.3758/s13423-013-0453-9

Ricarte, J. J., Latorre, J. M., Ros, L., Navarro, B., Aguilar, M. J., & Serrano, J. P. (2011). Overgeneral autobiographical memory effect in older depressed adults. *Aging and Mental Health*, *15*(8), 1028–1037. https://doi.org/10.1080/13607863.2011.573468

Rice, H. J., & Rubin, D. C. (2009). I can see it both ways: First and third-person visual perspectives at retrieval. *Consciousness and Cognition*, *18*(4), 877–890. https://doi.org/10.1016/j.concog.2009.07.004

Ridout, N., Dritschel, B., Matthews, K., & O'Carroll, R. (2016). Autobiographical memory specificity in response to verbal and pictorial cues in clinical depression. *Journal of Behavior Therapy and Experimental Psychiatry*, *51*, 109–115. https://doi.org/10.1016/j.jbtep.2016.01.002

Robinson, J. A., & Swanson, K. L. (1993). Field and observer modes of remembering. *Memory*, *1*(3), 169–184. https://doi.org/10.1080/09658219308258230

Robinson, S. R., & Jobson, L. A. (2013). The relationship between post-traumatic stress disorder symptoms and overgeneral autobiographical memory in older adults. *Clinical Psychologist*, *17*(1), 26–30. https://doi.org/10.1111/cp.12000

Romero, N., Vazquez, C., & Sanchez, A. (2014). Rumination and specificity of

autobiographical memory in dysphoria. *Memory*, *22*(6), 646–654. https://doi.org/10.1080/09658211.2013.811254

Ros, L., Latorre, J. M., Aguilar, J. M., Ricarte, J. J., Castillo, A., Catena, A., & Fuentes, L. J. (2017). Differences in brain activation between the retrieval of specific and categoric autobiographical memories: An EEG study. *Psicologica*, *38*(2), 347–363.

Ros, L., Latorre, J. M., & Serrano, J. P. (2009). Working memory capacity and overgeneral autobiographical memory in young and older adults. *Aging Neuropsychology and Cognition*, *17*(1), 89–107. https://doi.org/10.1080/13825580903042650

Ross, M., & Wang, Q. (2010). Why we remember and what we remember: Culture and autobiographical memory. *Perspectives on Psychological Science*, *5*(4), 401–409. https://doi.org/10.1177/1745691610375555

Ross, M., & Wilson, A. E. (2002). It feels like yesterday: Self-esteem, valence of personal past experiences, and judgments of subjective distance. *Journal of Personality and Social Psychology*, *82*(5), 792–803. https://doi.org/10.1037/0022-3514.82.5.792

Rössler, W. (2013). What is normal? The impact of psychiatric classification on mental health practice and research. *Frontiers in Public Health*, *1*, 68. https://doi.org/10.3389/fpubh.2013.00068

Rottenberg, J., Joormann, J., Brozovich, F., & Gotlib, I. H. (2005). Emotional intensity of idiographic sad memories in depression predicts symptom levels 1 year later. *Emotion*, *5*(2), 238–242. https://doi.org/10.1037/1528-3542.5.2.238

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. (2011). The coherence of memories for trauma: Evidence from posttraumatic stress disorder. *Consciousness and Cognition*, *20*(3), 857–865. https://doi.org/10.1016/j.concog.2010.03.018

Rubin, D. C., & Berntsen, D. (2003). Life scripts help to maintain autobiographical memories of highly positive, but not highly negative, events. *Memory & Cognition*, *31*(1), 1–14. https://doi.org/10.3758/BF03196077

Rubin, D. C., Berntsen, D., Deffler, S., & Brodar, K. (2019). Self-narrative focus in autobiographical events: The effect of time, emotion and individual differences. *Memory & Cognition*, *47*(1), 63–75. https://doi.org/10.3758/s13421-018-0850-4

Rubin, D. C., Berntsen, D., & Hutson, M. (2009). The normative and the personal life: Individual differences in life scripts and life story events among U.S.A and Danish undergraduates. *Memory*, *17*(1), 54–68. https://doi.org/10.1080/09658210802541442

Rubin, D. C., Boals, A., & Berntsen, D. (2008). Memory in posttraumatic stress disorder: Properties of voluntary and involuntary, traumatic and nontraumatic autobiographical memories in people with and without posttraumatic stress disorder symptoms. *Journal of Experimental Psychology: General*, *137*(4), 591–614. https://doi.org/10.1037/a0013165

Rubin, D. C., Dennis, M. F., & Beckham, J. C. (2011). Autobiographical memory for stressful events: The role of autobiographical memory in posttraumatic stress disorder. *Consciousness and Cognition*, *20*(3), 840–856. https://doi.org/10.1016/j.concog.2011.03.015

Rubin, D. C., Feldman, M. E., & Beckham, J. C. (2004). Reliving, emotions, and fragmentation in the autobiographical memories of veterans diagnosed with PTSD. *Applied Cognitive Psychology*, *18*(1), 17–35. https://doi.org/10.1002/acp.950

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

Rubin, D. C., & Schulkind, M. D. (1997a). Distribution of important and word-cued autobiographical memories in 20-, 35-, and 70-year-old adults. *Psychology and Aging, 12*(3), 524–535. https://doi.org/10.1037/0882-7974.12.3.524

Rubin, D. C., & Schulkind, M. D. (1997b). The distribution of autobiographical memories across the lifespan. *Memory & Cognition, 25*(6), 859–866. https://doi.org/10.3758/BF03211330

Rubin, D. C., Wetzler, S. E., & Nebes, R. D. (1986). Autobiographical memory across the adult life span. In D. C. Rubin (Ed.), *Autobiographical memory* (pp. 202–221). Cambridge: Cambridge University Press.

Russell, J. A. (1980). A circumplex model of affect. *Journal of Personality and Social Psychology*, *39*(6), 1161–1178. https://doi.org/10.1037/h0077714

Rutherford, B. J. (2009). Autobiographical memory specificity, negative mood state, and executive control: Implications for clinical depression. *Dissertation Abstracts International: Section B. The Sciences and Engineering, 70*(11-B), 7220.

Sahler, O. J. Z., & Carr, J. E. (2009). Coping strategies. In W. B. Carey, A. C. Crocker, W. L. Coleman, E. R. Elias, & H. M. Feldman (Eds.), *Developmental-behavioral pediatrics (4th ed.)* (pp. 491–496). Philadelphia: Saunders.

Saigh, P. A., Mroueh, M., Zimmerman, B. J., & Fairbank, J. A. (1995). Self-efficacy expectations among traumatized adolescents. *Behaviour Research and Therapy, 33*(6), 701–704. https://doi.org/10.1016/0005-7967(94)00092-X

Salo, A., Grimshaw, P. N., & Viitasalo, P. T. (1997). Reliability of variables in the kinematic

analysis of spring hurdle. *Medicine and Science in Sports and Exercise*, *29*(3), 383–389. https://doi.org/10.1097/00005768-199703000-00014

Schank, R. C., & Abelson, R. P. (1977). Scripts, plan, and knowledge. In P. N. Johnson-Laird & P. C. Wason (Eds.), *Thinking: Readings in cognitive science* (pp. 421–435). Cambridge: Cambridge University Press.

Schönfeld, S., & Ehlers, A. (2006). Overgeneral memory extends to pictorial retrieval cues and correlates with cognitive features in posttraumatic stress disorder. *Emotion*, *6*(4), 611–621. https://doi.org/10.1037/1528-3542.6.4.611

Schönfeld, S., & Ehlers, A. (2017). Posttraumatic stress disorder and autobiographical memories in everyday life. *Clinical Psychological Science*, *5*(2), 325–340. https://doi.org/10.1177/2167702616688878

Schönfeld, S., Ehlers, A., Böllinghaus, I., & Rief, W. (2007). Overgeneral memory and suppression of trauma memories in post-traumatic stress disorder. *Memory*, *15*(3), 339–352. https://doi.org/10.1080/09658210701256571

Schoofs, H., Hermans, D., & Raes, F. (2010). Brooding and reflection as subtypes of rumination: Evidence from confirmatory factor analysis in nonclinical samples using the Dutch ruminative response scale. *Journal of Psychopathology and Behavioral Assessment*, *32*(4), 609–617. https://doi.org/10.1007/s10862-010-9182-9

Schultz, I. Z., Sepehry, A. A., & Greer, S. C. (2018). Impact of common mental health disorders on cognition: Depression and posttraumatic stress disorder in forensic neuropsychology context. *Psychological Injury and Law*, *11*(2), 139–152. https://doi.org/10.1007/s12207-018-9322-1

Shanahan, E., & Busseri, M. A. (2016). Life gets better and better: Cultural life script theory and subjective trajectories for life satisfaction. *European Journal of Personality, 30*(6), 564–579. https://doi.org/10.1002/per.2077

Sheldon, S., & Donahue, J. (2017). More than a feeling: Emotional cues impact the access and experience of autobiographical memories. *Memory & Cognition*, *45*(5), 731–744. https://doi.org/10.3758/s13421-017-0691-6

Shepherd, L., & Wild, J. (2014). Emotion regulation, physiological arousal and PTSD symptoms in trauma-exposed individuals. *Journal of Behavior Therapy and Experimental Psychiatry*, *45*(3), 360–367. https://doi.org/10.1016/j.jbtep.2014.03.002

Skowronski, J. J., Walker, W. R., Henderson, D. X., & Bond, G. D. (2014). The fading affect bias: Its history, its implications, and its future. In J. M. Olson & M. P. Zanna (Eds.), *Advances in experimental social psychology* (pp. 163–218). San Diego: Elsevier Academic Press.

Smets, J., Griffith, J. W., Wessel, I., Walschaerts, D., & Raes, F. (2013). Depressive symptoms moderate the effects of a self-discrepancy induction on overgeneral autobiographical memory. *Memory*, *21*(6), 751–761. https://doi.org/10.1080/09658211.2012.756039

Snyder, H. R. (2013). Major depressive disorder is associated with broad impairments on neuropsychological measures of executive function: A meta-analysis and review. *Psychological Bulletin*, *139*(1), 81–132. https://doi.org/10.1037/a0028727

Söderlund, H., Moscovitch, M., Kumar, N., Daskalakis, Z. J., Flint, A., Herrmann, N., & Levine, B. (2014). Autobiographical episodic memory in major depressive disorder. *Journal of Abnormal Psychology*, *123*(1), 51–60. https://doi.org/10.1037/a0035610

Soveri, A., Lehtonen, M., Karlsson, L. C., Lukasik, K., Antfolk, J., & Laine, M. (2016). Test–

retest reliability of five frequently used executive tasks in healthy adults. *Applied Neuropsychology: Adult*, *25*(2), 155–165. https://doi.org/10.1080/23279095.2016.1263795

Substance Abuse and Mental Health Services Administration. (2014). *A treatment improved protocol: Trauma-informed care in behavioral health services.* Rockville: Substance Abuse and Mental Health Services Administration.

Substance Abuse and Mental Health Services Administration. (2019). *Key substance use and mental health indicators in the United States: Results from the 2018 National Survey on Drug Use and Health*. Rockville: Substance Abuse and Mental Health Services Administration.

Sumner, J. A. (2012). The mechanisms underlying overgeneral autobiographical memory: An evaluative review of evidence for the CaR-FA-X model. *Clinical Psychology Review*, *32*(1), 34–48. https://doi.org/10.1016/j.cpr.2011.10.003

Sumner, J. A., Griffith, J. W., & Mineka, S. (2010). Overgeneral autobiographical memory as a predictor of the course of depression: A meta-analysis. *Behaviour Research and Therapy*, *48*(7), 614–625. https://doi.org/10.1016/j.brat.2010.03.013

Sumner, J. A., Mineka, S., Adam, E. K., Craske, M. G., Vrshek-Schallhorn, S., Wolitzky-Taylor, K., & Zinbarg, R. E. (2014). Testing the CaR–FA–X model: Investigating the mechanisms underlying reduced autobiographical memory specificity in individuals with and without a history of depression. *Journal of Abnormal Psychology*, *123*(3), 471–486. https://doi.org/10.1037/a0037271

Sutherland, K., & Bryant, R. A. (2007). Autobiographical memory in posttraumatic stress disorder before and after treatment. *Behaviour Research and Therapy*, *45*(12), 2915–2923. https://doi.org/10.1016/j.brat.2007.08.009

Sutherland, K., & Bryant, R. A. (2008). Social problem solving and autobiographical memory in posttraumatic stress disorder. *Behaviour Research and Therapy*, *46*(1), 154–161. https://doi.org/10.1016/j.brat.2007.10.005

Sutin, A. R., & Robins, R. W. (2007). Phenomenology of autobiographical memories: The Memory Experiences Questionnaire. *Memory, 15*(4), 390–411. https://doi.org/10.1080/09658210701256654

Sutin, A. R., & Robins, R. W. (2010). Correlates and phenomenology of first and third person memories. *Memory*, *18*(6), 625–637. https://doi.org/10.1080/09658211.2010.497765

Sweeney, M. L. (2015). *An examination of self-defining memories, cognitive avoidance and metacognitive processes in depressed and non-depressed older adults* (Doctoral dissertation). Retrieved from http://theses.gla.ac.uk/6748/

Talarico, J. M., LaBar, K. S., & Rubin, D. C. (2004). Emotional intensity predicts autobiographical memory experience. *Memory & Cognition*, *32*(7), 1118–1132. https://doi.org/10.3758/BF03196886

Taylor, A. J. W., & Vaughan, G. M. (1967). Clinical depression and conformity. *Perceptual and Motor Skills*, *25*(1), 257–260. https://doi.org/10.2466/pms.1967.25.1.257

Tekcan, A. İ., Kaya-Kızılöz, B., & Odaman, H. (2012). Life scripts across age groups: A comparison of adolescents, young adults, and older adults. *Memory, 20*(8), 836–847. https://doi.org/10.1080/09658211.2012.710431

Timimi, S. (2014). No more psychiatric labels: Why formal psychiatric diagnostic systems should be abolished. *International Journal of Clinical and Health Psychology*, *14*(3), 208–215. https://doi.org/10.1016/j.ijchp.2014.03.004

Thomsen, D. K., & Berntsen, D. (2008) The cultural life script and life story chapters contribute to the reminiscence bump. *Memory*, *16*(4), 420–435.

https://doi.org/10.1080/09658210802010497

Treynor, W., Gonzalez, R., & Nolen-Hoeksema, S. (2003). Rumination reconsidered: A psychometric analysis. *Cognitive Therapy and Research*, *27*(3), 247–259. https://doi.org/10.1023/A:1023910315561

Triandis, H. C. (1995). *Individualism & collectivism*. Boulder: Westview Press.

Triandis, H. C. (2000). Cultural syndromes and subjective well-being. In E. Diener & E. M. Suh (Eds.), *Culture and subjective well-being* (pp. 13-36). Cambridge: The MIT Press.

Triandis, H. C., & Gelfand, M. J. (1998). Converging measurement of horizontal and vertical individualism and collectivism. *Journal of Personality and Social Psychology*, *74*(1), 118–128. https://doi.org/10.1037/0022-3514.74.1.118

Tulving, E. (1972). Episodic and semantic memory. In E. Tulving & W. Donaldson (Eds.), *Organization of memory* (pp. 382–403). Oxford: Academic Press.

Valentino, K., Bridgett, D. J., Hayden, L. C., & Nuttall, A. K. (2012). Abuse, depressive symptoms, executive functioning, and overgeneral memory among a psychiatric sample of children and adolescents. *Journal of Clinical Child and Adolescent Psychology*, *41*(4), 491–498. https://doi.org/10.1080/15374416.2012.660689

Van Boven, L., & Caruso, E. M. (2015). The tripartite foundations of temporal psychological distance: Metaphors, ecology, and teleology. *Social and Personality Psychology Compass*, *9*(11), 593–605. https://doi.org/10.1111/spc3.12207

Van Boven, L., Kane, J., McGraw, A. P., & Dale, J. (2010). Feeling close: Emotional intensity reduces perceived psychological distance. *Journal of Personality and Social Psychology*, *98*(6), 872–885. https://doi.org/10.1037/a0019262

Van Daele, T., Griffith, J. W., Van den Bergh, O., & Hermans, D. (2014). Overgeneral

autobiographical memory predicts changes in depression in a community sample. *Cognition and Emotion*, *28*(7), 1303–1312. https://doi.org/10.1080/02699931.2013.879052

Van den Broeck, K. (2014). *Specificity and vantage perspective of autobiographical memories in borderline pathology* (Unpublished doctoral dissertation). University of Leuven, Belgium.

Vanderlind, W. M., Stanton, C. H., Weinbrecht, A., Velkoff, E. A., & Joormann, J. (2016). Remembering the good ole days: Fear of positive emotion relates to affect repair using positive memories. *Cognitive Therapy and Research*, *41*(3), 362–368. https://doi.org/10.1007/s10608-016-9775-z

Vaughan, L., & Giovanello, K. (2010). Executive function in daily life: Age-related influences of executive processes on instrumental activities of daily living. *Psychology and Aging*, *25*(2), 343–355. https://doi.org/10.1037/a0017729

Vestberg, T., Reinebo, G., Maurex, L., Ingvar, M., & Petrovic, P. (2017). Core executive functions are associated with success in young elite soccer players. *PLoS One*, *12*(2), e0170845. https://doi.org/10.1371/journal.pone.0170845

Vilagut, G., Forero, C. G., Barbaglia, G., & Alonso, J. (2016). Screening for depression in the general population with the Center for Epidemiologic Studies Depression (CES-D): A systematic review with meta-analysis. *PLoS One*, *11*(5), e0155431. https://doi.org/10.1371/journal.pone.0155431

Vythilingam, M., Blair, K. S., McCaffrey, D., Scaramozza, M., Jones, M., Nakic, M., … Blair, R. J. R. (2007). Biased emotional attention in post-traumatic stress disorder: A help as well as a hindrance? *Psychological Medicine*, *37*(10), 1445–1455. https://doi.org/10.1017/S003329170700092X

Wald, I., Shechner, T., Bitton, S., Holoshitz, Y., Charney, D. S., Muller, D., … Bar-Haim, Y. (2011). Attention bias away from threat during life threatening danger predicts PTSD symptoms at one-year follow-up. *Depression and Anxiety*, *28*(5), 406–411. https://doi.org/10.1002/da.20808

Walker, W. R., & Skowronski, J. J. (2009). The fading effect bias: But what the hell is it for? *Applied Cognitive Psychology*, *23*(8), 1122–1136. https://doi.org/10.1002/acp.1614

Walker, W. R., Skowronski, J. J., Gibbons, J. A., Vogl, R. J., & Thompson, C. P. (2003). On the emotions that accompany autobiographical memories: Dysphoria disrupts the fading affect bias. *Cognition and Emotion*, *17*(5), 703–723. https://doi.org/10.1080/02699930302287

Wamser-Nanney, R., Howell, K. H., Schwartz, L. E., & Hasselle, A. J. (2018). The moderating role of trauma type on the relationship between event centrality of the traumatic experience and mental health outcomes. *Psychological Trauma: Theory, Research, Practice, and Policy*, *10*(5), 499–507. https://doi.org/10.1037/tra0000344

Wang, Q. (2009). Are Asians forgetful? Perception, retention, and recall in episodic remembering. *Cognition*, *111*(1), 123–131. https://doi.org/10.1016/j.cognition.2009.01.004

Warne, N., Caseras, X., & Rice, F. (2020). The cross-sectional and longitudinal relationship between overgeneral autobiographical memory and adolescent depression in a UK population-based cohort. *Journal of Affective Disorders*, *266*, 621–625. https://doi.org/10.1016/j.jad.2020.02.011

Warriner, A. B., Kuperman, V., & Brysbaert, M. (2013). Norms of valence, arousal, and dominance for 13,915 English lemmas. *Behavior Research Methods*, *45*, 1191–1207. https://doi.org/10.3758/s13428-012-0314-x

Waters, T. E. A., & Fivush, R. (2015). Relations between narrative coherence, identity, and psychological well-being in emerging adulthood. *Journal of Personality*, *83*(4), 441–451. https://doi.org/10.1111/jopy.12120

Watkins, E. (2004). Adaptive and maladaptive ruminative self-focus during emotional processing. *Behaviour Research and Therapy*, *42*(9), 1037–1052. https://doi.org/10.1016/j.brat.2004.01.009

Watkins, E., & Teasdale, J. D. (2001). Rumination and overgeneral memory in depression: Effects of self-focus and analytic thinking. *Journal of Abnormal Psychology*, *110*(2), 353–357. https://doi.org/10.1037/0021-843X.110.2.333

Watson, L. A., Berntsen, D., Kuyken, W., & Watkins, E. R. (2013). Involuntary and voluntary autobiographical memory specificity as a function of depression. *Journal of Behavior Therapy and Experimental Psychiatry*, *44*(1), 7–13. https://doi.org/10.1016/j.jbtep.2012.06.001

Weafer, J., Baggott, M. J., & de Wit, H. (2013). Test-retest reliability of behavioral measures of impulsive choice, impulsive action, and inattention. *Experimental and Clinical Psychopharmacology*, *21*(6), 475–481. https://doi.org/10.1037/a0033659

Weathers, F. W., Litz, B. T., Keane, T. M., Palmieri, P. A., Marx, B. P., & Schnurr, P. P. (2013). *The PTSD Checklist for DSM-5 (PCL-5)*. Retrieved from https://www.ptsd.va.gov/professional/assessment/adult-sr/ptsd-checklist.asp

Weiss, R. B., Aderka, I. M., Lee, J., Beard, C., & Björgvinsson, T. (2014). A comparison of three brief depression measures in an acute psychiatric population: CES-D-10, QIDS-SR, and DASS-21-DEP. *Journal of Psychopathology and Behavioral Assessment*, *37*(2), 217–230. https://doi.org/10.1007/s10862-014-9461-y

Wenzel, A., & Rubin, D. C. (2005). *Cognitive methods and their application to clinical*

research. Washington: American Psychological Association.

Werner-Seidler, A., Banks, R., Dunn, B. D., & Moulds, M. L. (2013). An investigation of the relationship between positive affect regulation and depression. *Behaviour Research and Therapy*, *51*(1), 46–56. https://doi.org/10.1016/j.brat.2012.11.001

Werner-Seidler, A., & Moulds, M. L. (2011). Autobiographical memory characteristics in depression vulnerability: Formerly depressed individuals recall less vivid positive memories. *Cognition and Emotion*, *25*(6), 1087–1103. https://doi.org/10.1080/02699931.2010.531007

Wessel, I., Postma, I. R., Huntjens, R. J. C., Crane, C., Smets, J., Zeeman, G. G., & Barnhofer, T. (2014). Differential correlates of autobiographical memory specificity to affective and self-discrepant cues. *Memory*, *22*(6), 655–668. https://doi.org/10.1080/09658211.2013.811255

Willander, J., Sikström, S., & Karlsson. K. (2015). Multimodal retrieval of autobiographical memories: Sensory information contributes differently to the recollection of events. *Frontiers in Psychology*, *6*, 1681. https://doi.org/10.3389/fpsyg.2015.01681

Williams, J. M. G. (2006). Capture and rumination, functional avoidance, and executive control (CaRFAX): Three processes that underlie overgeneral memory. *Cognition and Emotion*, *20*(3–4), 548–568. https://doi.org/10.1080/02699930500450465

Williams, J. M. G., Barnhofer, T., Crane, C., Herman, 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., & Broadbent, K. (1986). Autobiographical memory in suicide attempters. *Journal of Abnormal Psychology*, *95*(2), 144–149. https://doi.org/10.1037/0021-

843X.95.2.144

Williams, J. M. G., Chan, S., Crane, C., Barnhofer, T., Eade, J., & Healy, H. (2006). Retrieval of autobiographical memories: The mechanisms and consequences of truncated search. *Cognition and Emotion*, *20*(3–4), 351–382. https://doi.org/10.1080/02699930500342522

Williams, J. M. G., & Dritschel, B. (1992). Categoric and extended autobiographical memories. In M. A. Conway, D. C. Rubin, H. Spinnler, & W. A. Wagenaar (Eds.), *Theoretical perspectives on autobiographical memory* (pp. 391–410). Cumbria: Springer.

Wisco, B. E., & Nolen-Hoeksema, S. (2010). Valence of autobiographical memories: The role of mood, cognitive reappraisal, and suppression. *Behavior Research and Therapy*, *48*(4), 335–340. https://doi.org/10.1016/j.brat.2009.11.009

Woods, D. L., Kishiyama, M. M., Yund, E. W., Herron, T. J., Edwards, B., Poliva, O., … Reed, B. (2011). Improving Digit Span assessment of short-term verbal memory. *Journal of Clinical and Experimental Neuropsychology*, *33*(1), 101–111. https://doi.org/10.1080/13803395.2010.493149

World Health Organization. (2001). Mental disorders affect one in four people: Treatment available but not being used. *World Health Report.* Retrieved from https://www.who.int/whr/2001/media_centre/press_release/en/

World Health Organization. (2017). *Depression and other common mental disorders: Global health estimates*. Geneva: World Health Organization.

World Health Organization. (2018). Mental health: Strengthening our response. *Fact Sheets*. Retrieved from https://www.who.int/news-room/fact-sheets/detail/mental-health-strengthening-our-response

World Health Organization. (2019). Adolescent mental health. *Fact Sheets*. Retrieved from https://www.who.int/news-room/fact-sheets/detail/adolescent-mental-health

Wöstmann, N. M., Aichert, D. S., Costa, A., Rubia, K., Möller, H., & Ettinger, U. (2013). Reliability and plasticity of response inhibition and interference control. *Brain and Cognition, 81*(1), 82–94. https://doi.org/10.1016/j.bandc.2012.09.010

Wu, R., Liu, L.-L., Zhu, H., Su, W.-J., Cao, Z.-Y., Zhong, S.-Y., … Jiang, C.-L. (2019). Brief mindfulness meditation improves emotion processing. *Frontiers in Neuroscience, 13*, 1074. https://doi.org/10.3389/fnins.2019.01074

Xavier, A., Cunha, M., & Pinto-Gouveia, J. (2016). Rumination in adolescence: The distinctive impact of brooding and reflection on psychopathology. *The Spanish Journal of Psychology, 19*, E37. https://doi.org/10.1017/sjp.2016.41

Zaragoza Scherman, A., Salgado, S., Shao, Z., & Berntsen, D. (2015). Event centrality of positive and negative autobiographical memories to identity and life story across cultures. *Memory, 23*(8), 1152–1171. https://doi.org/10.1080/09658211.2014.962997

Zaragoza Scherman, A., Salgado, S., Shao, Z., & Berntsen, D. (2017). Life script events and autobiographical memories of important life story events in Mexico, Greenland, China, and Denmark. *Journal of Applied Research in Memory and Cognition, 6*(1), 60–73. https://doi.org/10.1016/j.jarmac.2016.11.007

Zetsche, U., D'Avanzato, C., & Joormann, J. (2011). Depression and rumination: Relation to components of inhibition. *Cognition and Emotion, 26*(4), 758–767. https://doi.org/10.1080/02699931.2011.613919

Zheng, P., & Gray, M. J. (2018). Impact of trauma type and emotion on overgeneral autobiographical memory. *Journal of Loss and Trauma, 23*(7), 559–573. https://doi.org/10.1080/15325024.2018.1524616

Tables

Table 2.1. Cultural Life Script events (including number and percentage of mentions), and mean and standard deviation of expected age at occurrence, prevalence, importance, emotional valence, and societal pressure associated with the events. Asterisk (*) denotes categories that were not considered part of the Malaysian Cultural Life Script according to Janssen and Haque (2018), whereas dashed line denotes the 4% threshold of Berntsen and Rubin (2004).

Category	Number	Percentage	Age		Prevalence		Importance		Valence		Pressure	
			M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Marriage	92	76.67	27.74	3.32	72.60	14.77	5.57	1.18	1.95	0.95	5.41	1.43
Begin childcare / kindergarten	63	52.50	4.29	2.07	87.00	13.94	5.73	1.26	1.67	1.24	4.40	1.62
Begin primary school	50	41.67	7.10	0.68	89.60	12.01	5.88	1.10	1.50	1.25	4.70	1.89
Begin university	50	41.67	17.74	2.85	64.68	19.58	5.90	0.99	1.44	1.25	5.36	1.19
Having children	45	37.50	29.89	2.94	65.42	16.15	5.44	1.20	1.93	1.03	5.20	1.55
Death (Own)	44	36.67	78.23	10.34	99.20	5.28	5.66	1.68	-0.91	1.58	1.80	1.23
First full-time job	43	35.83	23.51	1.37	82.05	15.44	5.98	1.08	0.72	1.32	6.14	0.89
University graduation	42	35.00	22.93	1.07	59.40	16.42	6.07	0.95	1.93	1.42	5.79	1.02
Birth (Own)*	35	29.17	2.83	15.18	99.71	1.69	6.29	1.07	1.80	1.47	3.17	2.28
Retirement	28	23.33	62.18	7.56	79.89	17.79	4.93	1.68	1.36	1.16	3.32	1.91
Beginning high school	27	22.50	13.22	2.14	84.04	13.59	5.89	0.89	1.04	1.22	5.19	1.47
Fall in love / first kiss	27	22.50	16.59	4.24	87.78	12.85	5.11	1.45	1.30	1.17	4.04	1.48
Adolescents / puberty	25	20.83	12.88	4.54	80.40	22.20	5.92	1.08	0.56	1.71	3.56	1.96
Settle on career	24	20.00	27.08	5.82	66.88	21.27	6.21	0.88	1.33	1.58	6.08	1.02
Peer group / friendships	20	16.67	10.65	7.52	83.70	22.86	6.20	0.89	1.50	1.79	3.30	2.05

Adulthood*	19	15.83	22.47	4.64	84.68	14.21	6.42	0.77	1.63	1.34	5.63	1.61
Death of parents	16	13.33	49.50	12.61	89.38	9.66	6.50	0.82	-2.25	1.18	2.50	2.07
Learning to walk / first steps	15	12.50	1.67	1.05	94.80	5.29	6.60	1.30	2.60	0.91	3.60	2.41
High school graduation	14	11.67	17.57	1.60	70.29	16.49	5.64	0.93	1.07	1.33	5.29	0.99
Making a long journey	14	11.67	25.07	13.18	69.79	20.34	5.07	1.07	1.71	1.44	3.57	1.95
First rejection / heartbreak	13	10.83	18.46	6.33	77.00	17.55	5.46	1.05	-1.54	1.05	3.00	1.83
Learning to talk / first words	13	10.83	2.00	1.00	94.38	7.61	6.62	0.65	2.85	0.38	4.00	2.04
Meeting future partner	13	10.83	23.69	4.71	72.85	21.31	4.85	1.46	1.38	1.45	4.69	1.44
Buying house or other property	11	9.17	31.82	7.69	58.00	16.98	5.09	1.38	1.45	1.21	6.00	0.89
Major achievement	11	9.17	25.27	8.17	62.18	24.67	6.00	1.18	1.73	1.27	5.36	1.43
First birthday	10	8.33	0.80	0.42	88.70	14.74	5.30	1.16	2.50	0.97	2.20	1.40
Twenty-first birthday*	6	5.00	21.00	0.00	82.00	21.54	5.33	1.21	1.83	0.75	2.50	1.05
Children leave house / empty nest	5	4.17	38.40	15.73	72.00	15.25	5.40	1.52	-0.20	1.30	4.00	1.00
End primary school	5	4.17	12.20	0.45	84.20	19.66	5.40	1.14	1.40	1.52	4.40	1.52
Important promotion at work	5	4.17	28.80	5.45	63.00	23.83	5.60	1.34	2.40	0.55	5.20	1.30
Serious illness	5	4.17	39.20	33.70	78.60	25.37	5.40	1.34	-2.60	0.55	1.60	0.55
Death of grandparents*	4	3.33	20.75	6.60	90.00	20.00	5.50	1.73	-1.75	1.26	2.00	1.41
First part-time job*	4	3.33	16.75	0.96	72.00	19.13	4.50	1.29	1.00	0.82	3.25	1.71
Obtaining driver’s license	4	3.33	18.50	1.29	74.00	12.94	5.75	1.26	1.00	1.15	4.75	1.71
Accident	3	2.50	15.00	13.75	68.67	28.02	5.67	1.53	-2.67	0.58	3.33	2.52
First play friend	3	2.50	4.33	0.58	79.67	33.50	5.00	1.73	2.00	1.00	2.00	1.73
Having grandchildren	3	2.50	53.33	6.11	61.67	28.43	5.67	0.58	2.67	0.58	3.33	1.15

Problems at home*	3	2.50	24.33	7.37	95.33	8.08	6.00	1.00	1.00	2.65	4.67	1.15
Moving to another house*	2	1.67	17.00	11.31	50.00	14.14	4.50	0.71	-1.00	1.41	1.50	0.71
First sexual experience	1	0.83	18.00	0.00	95.00	0.00	6.00	0.00	2.00	0.00	7.00	0.00
Learning to cycle or swim*	1	0.83	10.00	0.00	100.00	0.00	4.00	0.00	1.00	0.00	1.00	0.00
Leave home	1	0.83	20.00	0.00	75.00	0.00	7.00	0.00	-1.00	0.00	5.00	0.00
Problems at work*	1	0.83	27.00	0.00	89.00	0.00	6.00	0.00	1.00	0.00	2.00	0.00
Other*	20	16.67	15.60	8.91	77.80	24.52	6.35	1.09	0.80	1.58	3.90	1.80

Table 2.2. Perceived Individual Life Story events (including number and percentage of mentions), and mean and standard deviation of (expected) age at occurrence, prevalence, importance, valence, and societal pressure associated with the events. Asterisk (*) denotes categories that were not considered part of the Malaysian Cultural Life Script according to Janssen and Haque (2018), whereas dashed line denotes the 4% threshold of Berntsen and Rubin (2004).

Category	Number	Percentage	Age		Prevalence		Importance		Valence		Pressure	
			M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Begin university	84	70.00	18.80	2.13	57.48	21.62	6.15	1.02	1.32	1.55	4.92	1.78
Major achievement	59	49.17	23.14	9.56	39.32	20.27	6.20	0.98	2.20	1.03	4.07	1.96
Making a long journey	43	35.83	23.84	10.36	49.53	22.56	5.74	1.11	1.88	1.31	2.81	1.91
Peer groups / friendships	41	34.17	16.07	4.19	65.51	29.77	5.49	1.53	0.39	2.20	3.02	1.75
University graduation	38	31.67	22.42	1.24	60.08	18.06	6.47	0.86	1.95	1.23	5.32	1.16
Marriage	37	30.83	27.84	2.77	73.89	15.38	5.81	1.22	2.08	1.14	5.03	1.38
Beginning high school	36	30.00	13.92	1.75	65.11	28.24	6.06	0.86	0.83	2.06	4.75	1.84
Begin primary school	34	28.33	7.62	1.39	74.94	23.03	5.35	1.20	0.65	1.65	3.21	1.93
First full-time job	34	28.33	23.62	2.00	79.68	20.35	6.50	0.75	1.41	1.37	5.68	1.17
Settle on career	28	23.33	25.07	3.31	64.39	26.06	6.68	0.55	1.86	1.30	5.36	1.85
Adulthood*	26	21.67	24.50	6.54	63.92	27.57	5.77	1.27	0.42	1.70	3.73	2.13
Fall in love / first kiss	25	20.83	18.16	4.46	85.84	12.34	5.80	1.15	1.12	1.62	3.64	2.00
First rejection / heartbreak	22	18.33	17.45	2.42	77.32	24.39	5.18	1.68	-1.45	1.37	2.73	1.83
Problems at home*	22	18.33	14.05	6.40	59.68	29.77	6.09	1.19	-1.68	1.62	4.18	2.36
Having children	21	17.50	30.90	4.32	67.52	14.84	5.86	1.20	2.38	0.74	4.62	1.43
Begin childcare / kindergarten	16	13.33	4.25	0.93	75.50	23.51	5.06	1.53	1.31	1.54	2.69	1.96
Birth (Own)*	16	13.33	3.13	8.92	95.31	12.66	6.13	1.67	1.75	1.73	2.75	2.35

Accident	15	12.50	10.87	6.76	35.00	24.27	5.27	1.67	-1.40	1.64	1.67	1.11
Death of parents	15	12.50	36.93	19.64	81.20	21.24	6.53	0.92	-2.53	0.92	2.80	2.40
High school graduation	15	12.50	17.53	0.83	67.40	22.79	6.00	1.56	1.67	1.59	5.47	1.36
Leave home	15	12.50	18.87	5.94	63.47	30.67	5.53	1.13	0.87	1.19	2.93	2.05
Death (Own)	14	11.67	55.36	34.72	77.36	34.98	4.93	2.20	-0.71	1.20	2.29	1.94
Adolescents / puberty	12	10.00	12.83	5.32	61.75	29.35	5.50	1.00	0.67	1.72	3.67	1.83
First part-time job*	12	10.00	18.25	1.36	57.17	22.16	5.83	1.34	0.25	1.71	3.75	1.54
Death of grandparents*	11	9.17	15.36	4.23	91.91	9.89	6.00	0.89	-2.18	0.87	2.91	1.92
Meeting future partner	11	9.17	24.45	3.59	71.09	19.64	6.27	1.01	1.91	1.30	4.00	1.61
Retirement	10	8.33	59.50	5.99	81.90	19.65	5.40	1.51	1.70	1.06	2.50	2.07
Serious illness	9	7.50	15.00	3.61	39.56	22.87	6.11	1.05	-1.78	1.48	3.00	1.94
First sexual experience	8	6.67	18.75	2.12	75.25	22.37	5.38	1.69	-0.25	1.98	2.88	2.10
Divorce parents*	6	5.00	13.67	3.61	20.83	12.01	6.17	0.75	-1.67	1.03	3.83	2.48
Moving to another house*	6	5.00	17.50	8.98	47.00	17.15	5.83	0.98	0.33	2.34	3.33	2.42
Birth of younger sibling*	4	3.33	12.00	9.31	72.50	20.24	6.50	1.00	2.50	0.58	3.25	2.06
Buying house or other property	3	2.50	29.00	4.00	75.33	12.86	6.00	1.00	2.00	1.00	4.33	1.53
Death of sibling or friend	3	2.50	32.67	23.86	57.00	37.24	5.67	2.31	-3.00	0.00	2.67	2.89
Eighteen birthday*	3	2.50	18.33	0.58	89.00	10.15	6.00	1.00	2.67	0.58	1.00	0.00
First play friend	3	2.50	5.67	1.15	65.00	22.91	6.33	1.15	2.33	1.15	2.00	1.73
Twenty-first birthday*	3	2.50	21.00	0.00	83.33	28.87	3.00	1.73	1.33	1.53	2.33	1.53
Children leave house / empty nest	2	1.67	10.50	9.19	20.00	14.14	4.50	0.71	1.00	1.41	1.00	0.00
End primary school	2	1.67	12.00	0.00	85.00	7.07	6.50	0.71	0.00	2.83	6.50	0.71

First birthday	2	1.67	6.50	7.78	79.00	2.83	5.50	0.71	2.00	1.41	2.50	2.12
Important promotion at work	2	1.67	28.50	9.19	61.00	14.14	6.00	1.41	1.50	2.12	5.00	2.83
Learning to talk / first words	2	1.67	1.50	0.71	87.50	17.68	7.00	0.00	2.50	0.71	1.00	0.00
Obtaining driver's license	2	1.67	18.50	2.12	89.00	1.41	5.50	2.12	-1.00	2.83	4.50	0.71
Learning to cycle or swim*	1	0.83	21.00	0.00	75.00	0.00	5.00	0.00	1.00	0.00	1.00	0.00
Problems at work*	1	0.83	19.00	0.00	15.00	0.00	7.00	0.00	0.00	0.00	5.00	0.00
Other*	66	55.00	16.94	6.52	50.97	28.91	5.89	1.25	1.24	1.83	2.88	2.03

Table 2.3. Means, standard deviations, and correlations between characteristics of cultural life script (CLS) and individual life story (ILS).

Variable	*M*	*SD*	1	2	3	4	5	6	7	8	9	10
1. CLS typicality	201.28	60.6	-	-.07	.19*	.14	-.34***	.37***	.01	.25**	.13	.03
2. CLS importance	5.77	0.64		-	.34***	.12	.34***	.02	.49***	.15	.20*	.19*
3. CLS valence	1.24	0.89			-	.08	.03	.09	.21*	.37***	.09	-.14
4. CLS pressure	4.46	1.04				-	-.13	.03	.14	.15	.32***	-.07
5. CLS ability	6.18	0.76					-	.17	.18	.04	-.01	.22*
6. ILS typicality	137.88	68.5						-	.14	.42***	.24**	-.18*
7. ILS importance	5.91	0.69							-	.29***	.26**	.17
8. ILS valence	0.95	1.03								-	.04	-.16
9. ILS pressure	3.84	1.18									-	.09
10. ILS ability	6.53	0.53										-

*$p \leq .05$, **$p \leq .01$, ***$p \leq .001$

Table 2.4. Means (and standard deviations) of subclinical depression and non-depressed groups, and subclinical PTSD and non-PTSD groups, for measures of cultural life script (CLS) and perceived individual life story (ILS).

Variable	Subclinical Dep	Non-Dep	Subclinical PTSD	Non-PTSD
CLS typicality	184.64 (59.2)	214.90 (58.8)	185.53 (52.3)	209.77 (63.4)
CLS importance	5.71 (0.68)	5.81 (0.61)	5.83 (0.64)	5.73 (0.64)
CLS valence	1.21 (1.02)	1.26 (0.78)	1.29 (1.05)	1.21 (0.80)
CLS pressure	4.35 (1.09)	4.54 (1.00)	4.57 (1.09)	4.39 (1.01)
CLS ability	6.15 (0.81)	6.21 (0.72)	6.33 (0.70)	6.11 (0.78)
ILS typicality	126.22 (59.3)	147.42 (74.3)	125.10 (63.7)	144.76 (70.4)
ILS importance	5.88 (0.66)	5.93 (0.71)	5.97 (0.70)	5.87 (0.68)
ILS valence	0.71 (1.05)	1.15 (0.99)	0.62 (1.12)	1.13 (0.95)
ILS pressure	4.03 (1.29)	3.69 (1.07)	4.29 (1.25)	3.60 (1.07)
ILS ability	6.53 (0.58)	6.53 (0.48)	6.51 (0.57)	6.54 (0.50)

Table 2.5. Mean emotional valence ratings (and standard deviations) of subclinical PTSD and non-PTSD groups for typical individual life story (ILS) events.

ILS event	Subclinical PTSD	Non-PTSD
Marriage	2.45 (1.04)	1.92 (1.16)
University graduation	1.50 (1.38)	2.15 (1.12)
Fall in love / first kiss	0.45 (1.86)	1.64 (1.21)
Begin university	0.79 (1.95)	1.56 (1.23)
Begin primary school	0.00 (1.87)	1.00 (1.53)
Major achievement	2.32 (1.12)	2.10 (0.94)
Settle on career	1.73 (1.35)	1.94 (1.30)
Making a long journey	1.88 (1.36)	1.89 (1.31)
Peer groups / friendships	-0.13 (2.34)	0.72 (2.09)
Beginning high school	-0.20 (1.87)	1.23 (2.03)

Table 2.6. The number and percentage of mentions of Cultural Life Script events (on the CLS task), and percentage that rated each event as typical (on the CLS knowledge task). Asterisk (*) denotes categories that were not considered part of the Malaysian Cultural Life Script according to Janssen and Haque (2018), whereas dashed line denotes the 4% threshold of Berntsen and Rubin (2004).

Category	Mentions (*N*)	Mentions (%)	Typical (%)
Marriage	120	54.30	89.57
Begin childcare / kindergarten	86	38.91	86.73
University graduation	78	35.29	90.52
First full-time job	76	34.39	88.63
Having children	75	33.94	86.26
Begin university	72	32.58	92.89
Birth (Own)*	72	32.58	89.57
Begin primary school	70	31.67	91.00
Fall in love / first kiss	61	27.60	89.57
Death (Own)	49	22.17	89.10
Beginning high school	44	19.91	90.52
Death of parents	42	19.00	91.94
Retirement	42	19.00	86.26
Adolescents / puberty	39	17.65	93.84
Major achievement	37	16.74	92.89
First birthday	32	14.48	80.57
Adulthood*	30	13.57	96.21
Learning to talk / first words	30	13.57	91.00
Learning to walk / first steps	30	13.57	91.47
Making a long journey	30	13.57	78.67
Peer groups / friendships	25	11.31	92.89
Settle on career	25	11.31	82.94
High school graduation	24	10.86	87.68
Buying house or other property	22	9.95	79.15
Engagement / proposal*	16	7.24	86.26
First play friend	15	6.79	67.30
Major failure*	14	6.33	82.46
First part-time job*	12	5.43	72.51
Meeting future partner	11	4.98	89.57
Serious illness (Own)	11	4.98	62.09

Death of grandparents*	10	4.52	87.68
First rejection / heartbreak	10	4.52	80.09
Children leave house / empty nest	9	4.07	69.19
Eighteenth birthday*	9	4.07	68.25
Twenty-first birthday*	9	4.07	75.83
Important promotion at work	8	3.62	77.25
Leave parents' / childhood home	8	3.62	85.31
Birth of younger sibling*	7	3.17	68.25
End primary school	7	3.17	75.36
First sexual experience	7	3.17	80.57
Having grandchildren	7	3.17	73.46
Accident	6	2.71	67.77
Death of sibling or friend	6	2.71	84.83
Learning to cycle or swim*	6	2.71	71.09
Getting a pet*	5	2.26	56.87
Problems at work*	5	2.26	78.67
Take post-graduate or professional courses*	5	2.26	56.87
Obtaining driver’s license	4	1.81	82.94
First tooth / teething*	3	1.36	72.51
Death of partner*	2	0.90	76.30
Hajj / pilgrimage*	2	0.90	25.12
Become an aunt / uncle*	1	0.45	62.09
Learning to read and write*	1	0.45	89.10
Moving to another house*	1	0.45	76.30
Problems at home*	1	0.45	78.67
Divorce (Own)*	0	0.00	32.23
Divorce of parents*	0	0.00	39.81
Serious illness of parents*	0	0.00	65.88
Sixteenth birthday*	0	0.00	54.03
Other	48	21.72	29.86

Table 2.7. Means (and standard deviations) of subclinical depression and non-depressed groups, and subclinical PTSD and non-PTSD groups, for measures of cultural life script (CLS).

Variable	Subclinical Dep	Non-Dep	Subclinical PTSD	Non-PTSD
CLS typicality	185.97 (66.4)	170.19 (72.8)	175.13 (69.4)	180.76 (70.1)
Total typical CLS events	47.71 (8.10)	44.76 (8.86)	47.77 (9.07)	45.40 (8.15)
Accuracy of typical CLS	29.96 (4.65)	28.76 (5.29)	29.84 (5.42)	29.12 (4.69)
Accuracy of atypical CLS	7.26 (3.86)	9.00 (3.99)	7.07 (4.07)	8.71 (3.85)

Table 3.1. Correlations between depression, trauma, memory specificity, and the CaR-FA-X components during minimal instructions AMT.

Variable	*M*	*SD*	1	2	3	4	5	6	7	8	9	10	11	12
1. Depression	20.87	9.91	-	-.74***	-.22*	.13	-.01	.14	.20*	-.08	.54***	.51***	.08	-.07
2. Trauma	25.24	15.15		-	-.20*	.10	-.04	.09	.26**	-.10	.59***	.64***	.13	-.23*
3. Specific memories	4.47	2.01			-	-.55***	-.07	-.67***	-.47***	-.12	-.16	-.09	.02	-.10
4. OGM	5.92	1.87				-	.71***	.25**	-.14	-.33***	.12	-.04	-.03	.05
5. Categorical memories	3.64	2.11					-	-.51***	-.01	-.21*	.01	-.07	-.06	.07
6. Extended memories	2.28	1.54						-	-.16	-.11	.13	.05	.05	-.04
7. Semantic associations	0.97	1.34							-	-.13	.16	.17	-.00	-.03
8. Omissions	0.64	1.03								-	-.11	.01	.02	.13
9. Rumination	23.69	5.67									-	.44***	.09	.00
10. Avoidant coping	28.61	7.19										-	-.01	-.08
11. Inhibition	0.00	1.87											-	.04
12. Final span	7.39	1.41												-

*$p \leq .05$, **$\leq .01$, ***$p \leq .001$

Table 3.2. Means (and standard deviations) of subclinical depression and non-depressed groups, and subclinical PTSD and non-PTSD groups, for measures for memory specificity and CaR-FA-X components during minimal instructions AMT.

Memory Specificity	Subclinical Dep	Non-Dep	Subclinical PTSD	Non-PTSD
Specific	4.18 (2.04)	4.75 (1.96)	3.82 (2.12)	4.73 (1.92)
OGM	6.23 (1.74)	5.64 (1.96)	6.21 (1.65)	5.81 (1.95)
Categorical	3.95 (2.06)	3.36 (2.14)	3.82 (1.85)	3.58 (2.21)
Extended	2.28 (1.78)	2.28 (1.29)	2.39 (1.92)	2.24 (1.38)
Semantic association	1.07 (1.40)	0.87 (1.25)	1.48 (1.70)	0.76 (1.12)
Omission	0.53 (0.89)	0.74 (1.14)	0.48 (1.00)	0.69 (1.04)
Rumination	24.84 (5.82)	21.51 (4.72)	27.67 (5.02)	22.14 (5.15)
Avoidant coping	30.09 (7.39)	25.83 (5.96)	34.39 (8.70)	26.36 (5.00)
Final span	7.40 (1.43)	7.37 (1.41)	6.85 (1.35)	7.60 (1.39)
Inhibition	0.12 (2.28)	-0.21 (0.61)	0.40 (3.36)	-0.15 (0.71)

Table 3.3. Correlations between depression, trauma, memory specificity, and the CaR-FA-X components during specific instructions AMT.

Variable	*M*	*SD*	1	2	3	4	5	6	7	8	9	10	11	12
1. Depression	20.45	10.94	-	.79***	-.17*	.19*	.17*	.10	.08	-.10	.59***	.41***	.05	-.03
2. Trauma	27.35	16.73		-	-.21*	.22**	.22**	.11	.12	-.14	.65***	.56***	.05	-.11
3. Specific memories	6.90	2.51			-	-.78***	-.59***	-.55***	-.42***	-.25**	-.14	-.12	.06	.08
4. OGM	3.80	2.21				-	.73***	.73***	-.09	-.15	.16	.18*	-.06	-.02
5. Categorical memories	1.81	1.52					-	.06	.02	-.16	.13	.16	-.03	-.15
6. Extended memories	1.99	1.51						-	-.14	-.06	.11	.11	-.06	.13
7. Semantic associations	0.80	1.29							-	-.04	.10	.02	.04	-.12
8. Omissions	0.50	1.00								-	-.13	-.13	-.06	-.01
9. Rumination	24.12	5.75									-	.49***	.08	.01
10. Avoidant coping	28.77	6.38										-	.15	.01
11. SSRT	189.23	110.19											-	-.02
12. Working memory	0.00	1.48												-

*$p \leq .05$, **$\leq .01$, ***$p \leq .001$

Table 3.4. Means (and standard deviations) of subclinical depression and non-depressed groups, and subclinical PTSD and non-PTSD groups, for measures for memory specificity and CaR-FA-X components during specific instructions AMT.

Memory Specificity	Subclinical Dep	Non-Dep	Subclinical PTSD	Non-PTSD
Specific	6.65 (2.58)	7.12 (2.44)	6.26 (2.52)	7.29 (2.43)
OGM	4.14 (2.33)	3.50 (2.06)	4.30 (2.22)	3.49 (2.16)
Categorical	2.05 (1.56)	1.61 (1.46)	2.17 (1.67)	1.59 (1.38)
Extended	2.09 (1.50)	1.89 (1.53)	2.13 (1.40)	1.90 (1.58)
Semantic association	0.82 (1.33)	0.78 (1.25)	1.08 (1.48)	0.63 (1.13)
Omission	0.40 (0.86)	0.59 (1.10)	0.36 (0.86)	0.59 (1.07)
Rumination	27.15 (4.71)	21.46 (5.26)	27.60 (4.87)	21.98 (5.20)
Avoidant coping	30.80 (6.72)	26.99 (5.52)	32.45 (6.64)	26.50 (5.05)
SSRT	196.45 (59.6)	182.88 (140.5)	196.70 (62.3)	185.86 (131.5)
Working memory	-0.10 (2.58)	0.09 (1.38)	-0.28 (1.69)	0.18 (1.31)

Table 4.1. Means (and standard deviations) of phenomenology of recent and remote positive and negative memories.

Phenomenology	Recent positive	Recent negative	Remote positive	Remote negative
Age (months)	14.92 (10.7)	14.81 (11.6)	59.68 (37.9)	70.80 (44.5)
Psychological distance	21.55 (7.73)	19.59 (8.30)	14.44 (8.41)	14.29 (8.23)
Recollective experience	5.06 (1.55)	4.66 (1.63)	4.01 (1.63)	3.98 (1.69)
Field perspective	5.34 (1.59)	5.23 (1.61)	4.29 (1.79)	4.37 (1.84)
Observer perspective	3.35(1.98)	3.00 (1.83)	3.62 (1.92)	3.63 (1.92)
Emotional intensity	2.40 (0.74)	2.35 (0.81)	1.98 (0.89)	2.17 (0.85)
Centrality	24.78 (6.34)	22.74 (7.34)	21.95 (8.15)	22.17 (7.88)

Table 4.2. Means (and standard deviations) of memory phenomenology of subclinical depression and non-depressed groups, and subclinical PTSD and non-PTSD groups.

Memory	Phenomenology	Subclinical Dep	Non-Dep	Subclinical PTSD	Non-PTSD
Recent positive	Psychological distance	20.17 (7.45)	22.55 (7.83)	20.32 (8.41)	22.14 (7.36)
	Recollective experience	5.02 (1.39)	5.10 (1.66)	4.90 (1.70)	5.14 (1.47)
	Field perspective	5.43 (1.50)	5.27 (1.65)	5.41 (1.52)	5.31 (1.63)
	Observer perspective	3.51 (1.97)	3.23 (2.00)	3.20 (2.00)	3.42 (1.98)
	Emotional intensity	2.32 (0.80)	2.45 (0.69)	2.44 (0.67)	2.38 (0.77)
	Centrality	24.43 (6.16)	25.03 (6.49)	25.95 (6.09)	24.21 (6.41)
Recent negative	Psychological distance	21.28 (8.07)	18.36 (8.31)	21.44 (8.61)	18.69 (8.06)
	Recollective experience	5.02 (1.54)	4.40 (1.66)	5.00 (1.79)	4.49 (1.53)
	Field perspective	5.47 (1.53)	5.05 (1.66)	5.66 (1.53)	5.02 (1.68)
	Observer perspective	2.91 (1.68)	3.07 (1.94)	2.59 (1.80)	3.20 (1.82)
	Emotional intensity	2.58 (0.69)	2.18 (0.86)	2.54 (0.75)	2.26 (0.83)
	Centrality	24.38 (7.04)	21.55 (7.37)	25.34 (7.21)	21.48 (7.11)
Remote positive	Psychological distance	14.30 (7.60)	14.53 (9.00)	13.63 (8.15)	14.82 (8.54)
	Recollective experience	4.06 (1.54)	3.97 (1.72)	3.71 (1.55)	4.15 (1.67)
	Field perspective	4.45 (1.67)	4.16 (1.88)	4.32 (1.81)	4.27 (1.80)
	Observer perspective	3.43 (1.93)	3.75 (1.92)	3.49 (2.03)	3.68 (1.88)
	Emotional intensity	1.89 (0.85)	2.05 (0.93)	1.88 (0.81)	2.04 (0.93)
	Centrality	21.38 (7.32)	22.37 (8.72)	22.61 (7.05)	21.64 (8.65)
Remote negative	Psychological distance	15.36 (8.91)	13.51 (7.67)	15.83 (9.10)	13.54 (7.73)

Recollective experience	4.09 (1.71)	3.89 (1.68)	3.95 (1.83)	3.99 (1.63)
Field perspective	4.72 (1.75)	4.12 (1.88)	4.46 (1.95)	4.33 (1.80)
Observer perspective	3.70 (1.99)	3.58 (1.88)	3.78 (2.12)	3.55 (1.82)
Emotional intensity	2.30 (0.70)	2.08 (0.94)	2.39 (0.63)	2.07 (0.92)
Centrality	23.43 (7.48)	21.25 (8.09)	24.83 (6.85)	20.88 (8.06)

Table 4.3. Correlations between depression, trauma, emotion regulation, and the memory phenomenology of recent positive and recent negative memories.

			Psychological distance	
Variable	Depression	Trauma	Recent positive	Recent negative
Recent positive				
Recollective experience	-.04	-.03	.66***	-
Field perspective	.01	.06	.39***	-
Observer perspective	.03	-.06	-.11	-
Emotional intensity	-.08	-.03	.23*	-
Centrality	-.01	.17	.18*	-
Recent negative				
Recollective experience	.20*	.20*	-	.60***
Field perspective	.12	.18*	-	.19*
Observer perspective	-.05	-.12	-	-.06
Emotional intensity	.21*	.24**	-	.03
Centrality	.18*	.29***	-	.21*
Cognitive reappraisal	-.34***	-.29***	.09	-.08
Expressive supression	.27**	.36***	-.21*	.02

*$p \leq .05$, **$\leq .01$, ***$p \leq .001$

Figures

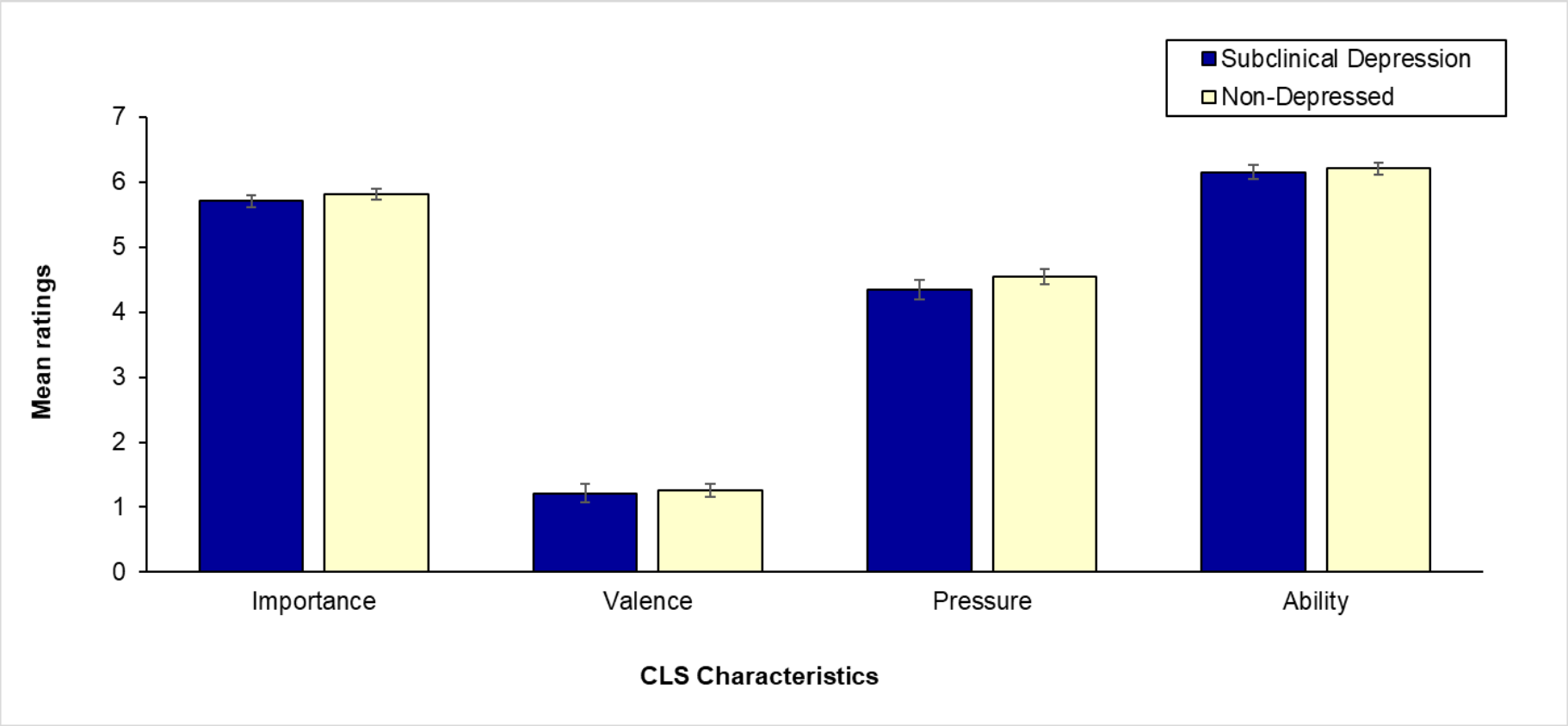


Figure 2.1. CLS characteristics in subclinical depression and non-depressed groups. No differences between subclinical depression and non-depressed groups were found in the CLS characteristics. Error bars represent standard errors.

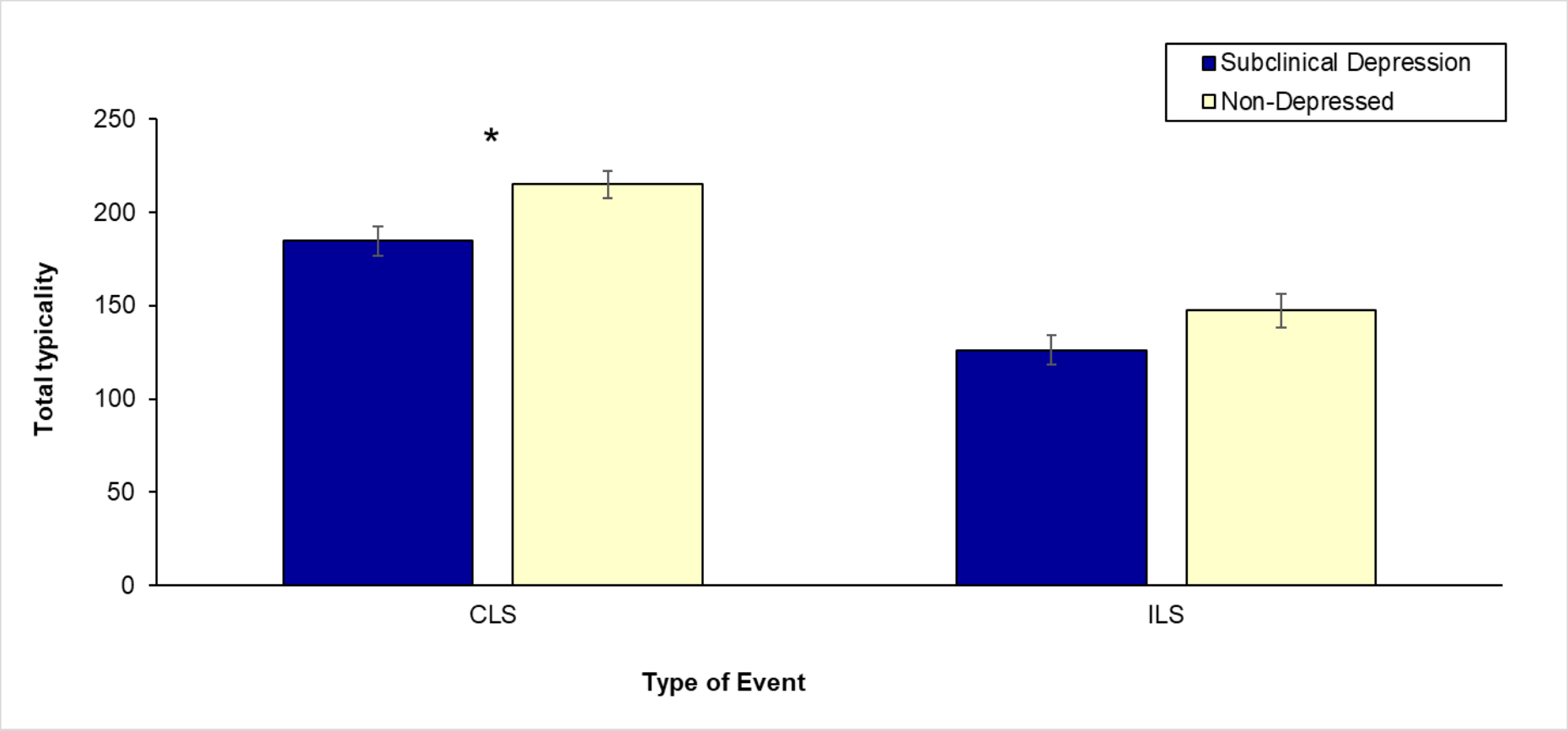


Figure 2.2. CLS and ILS typicality in subclinical depression and non-depressed groups. * = significant differences between the subclinical depression and non-depressed groups. Error bars represent standard errors.

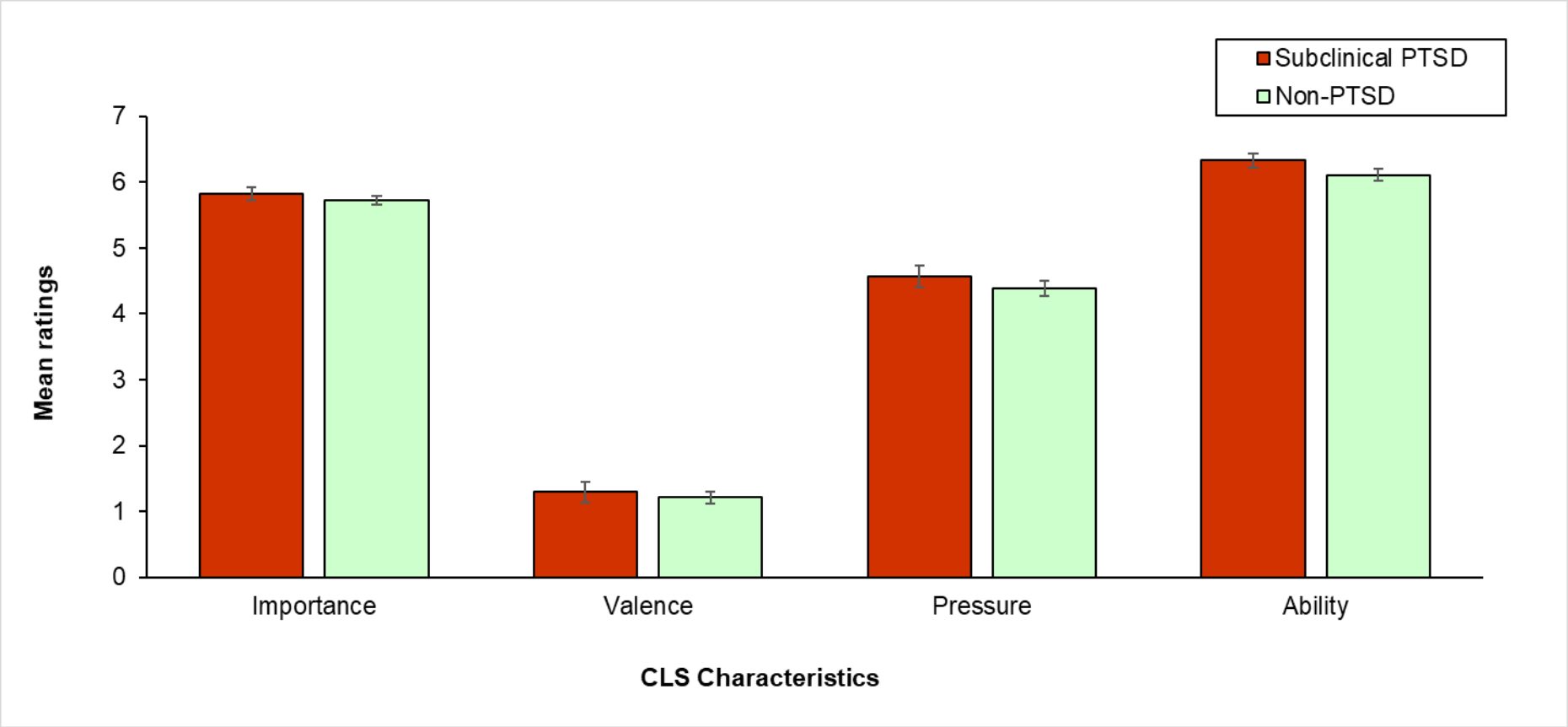


Figure 2.3. CLS characteristics in subclinical PTSD and non-PTSD groups. No differences between subclinical PTSD and non-PTSD groups were found in the CLS characteristics. Error bars represent standard errors.

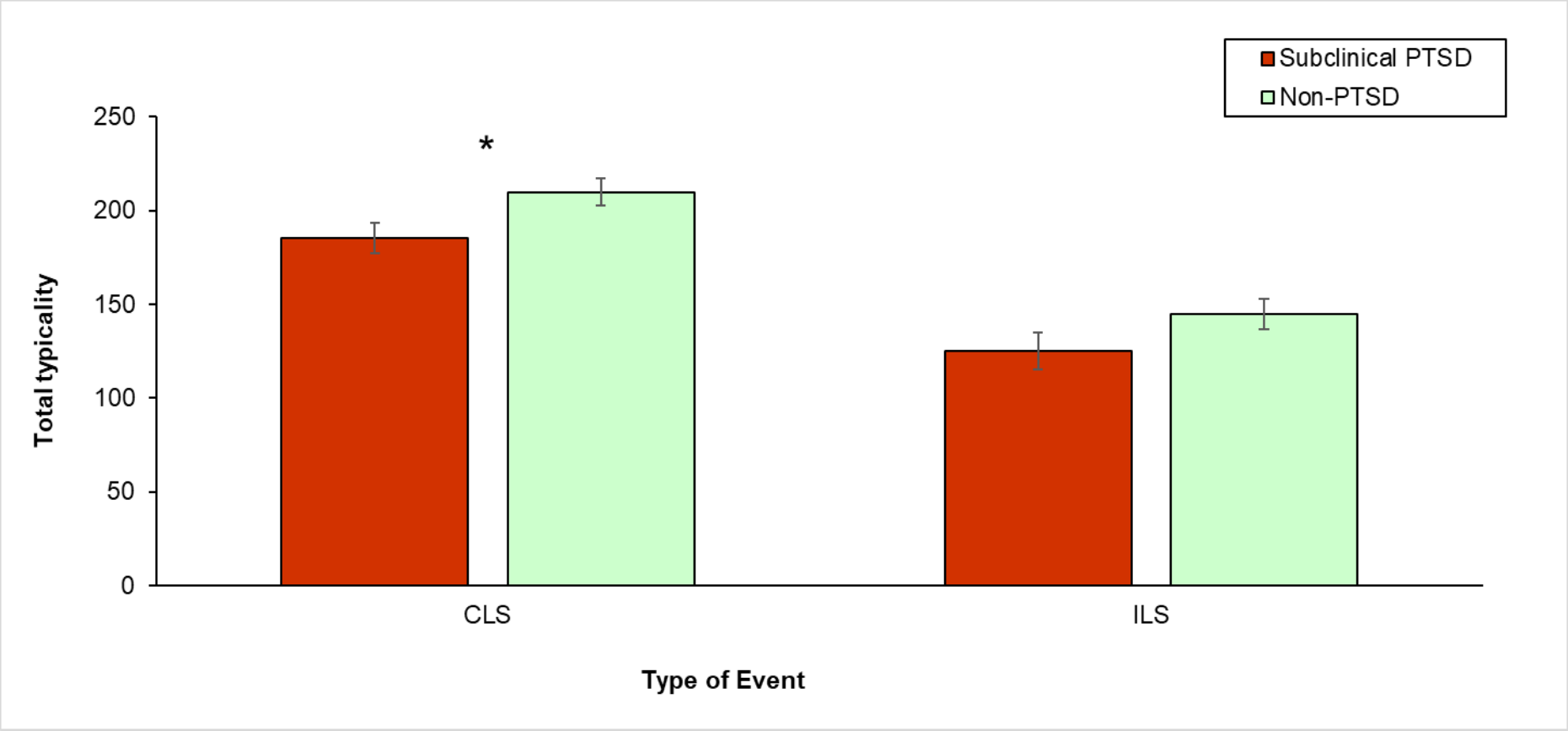


Figure 2.4. CLS and ILS typicality in subclinical PTSD and non-PTSD groups. * = significant differences between the subclinical PTSD and non-PTSD groups. Error bars represent standard errors.

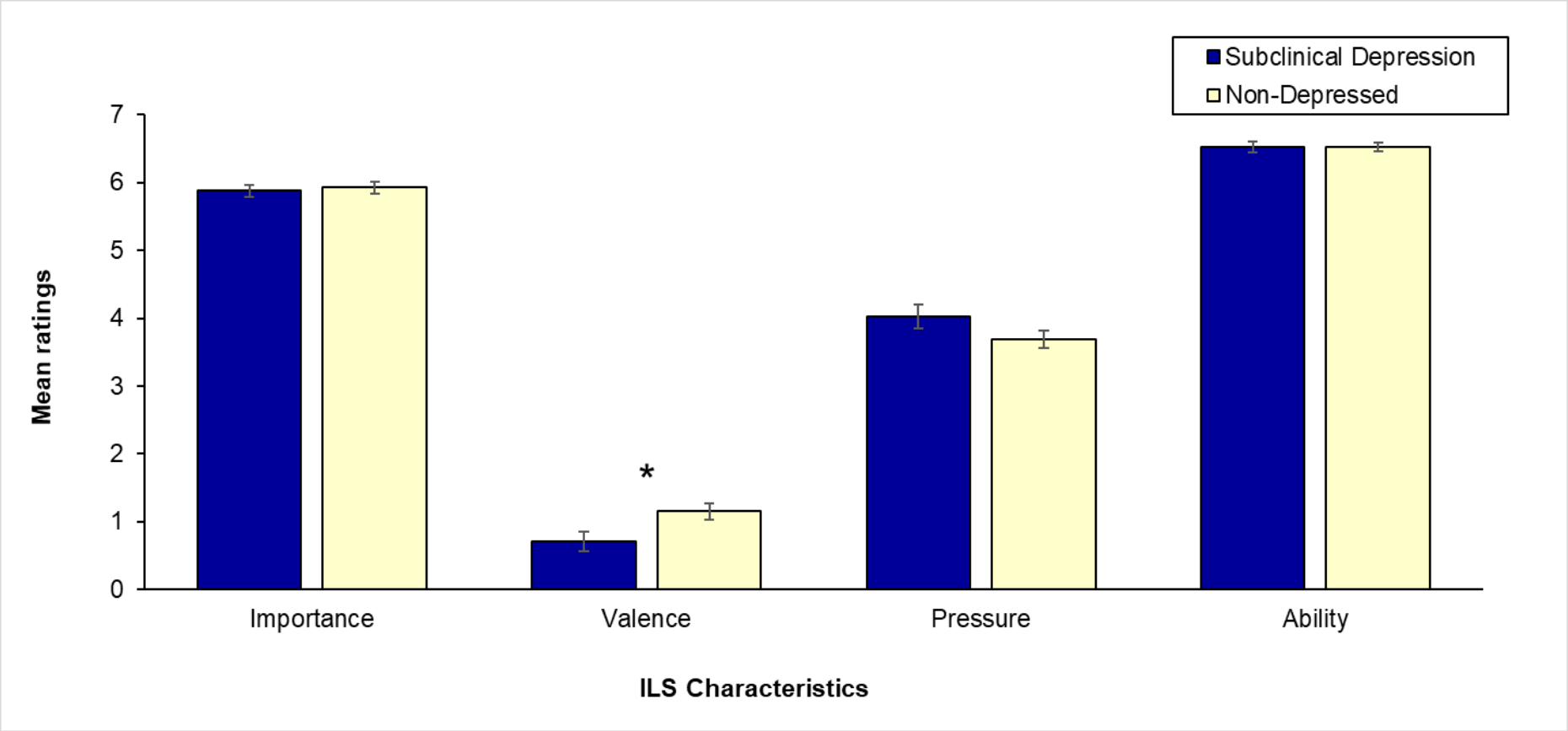


Figure 2.5. ILS characteristics in subclinical depression and non-depressed groups. * = significant differences between the subclinical depression and non-depressed groups. Error bars represent standard errors.

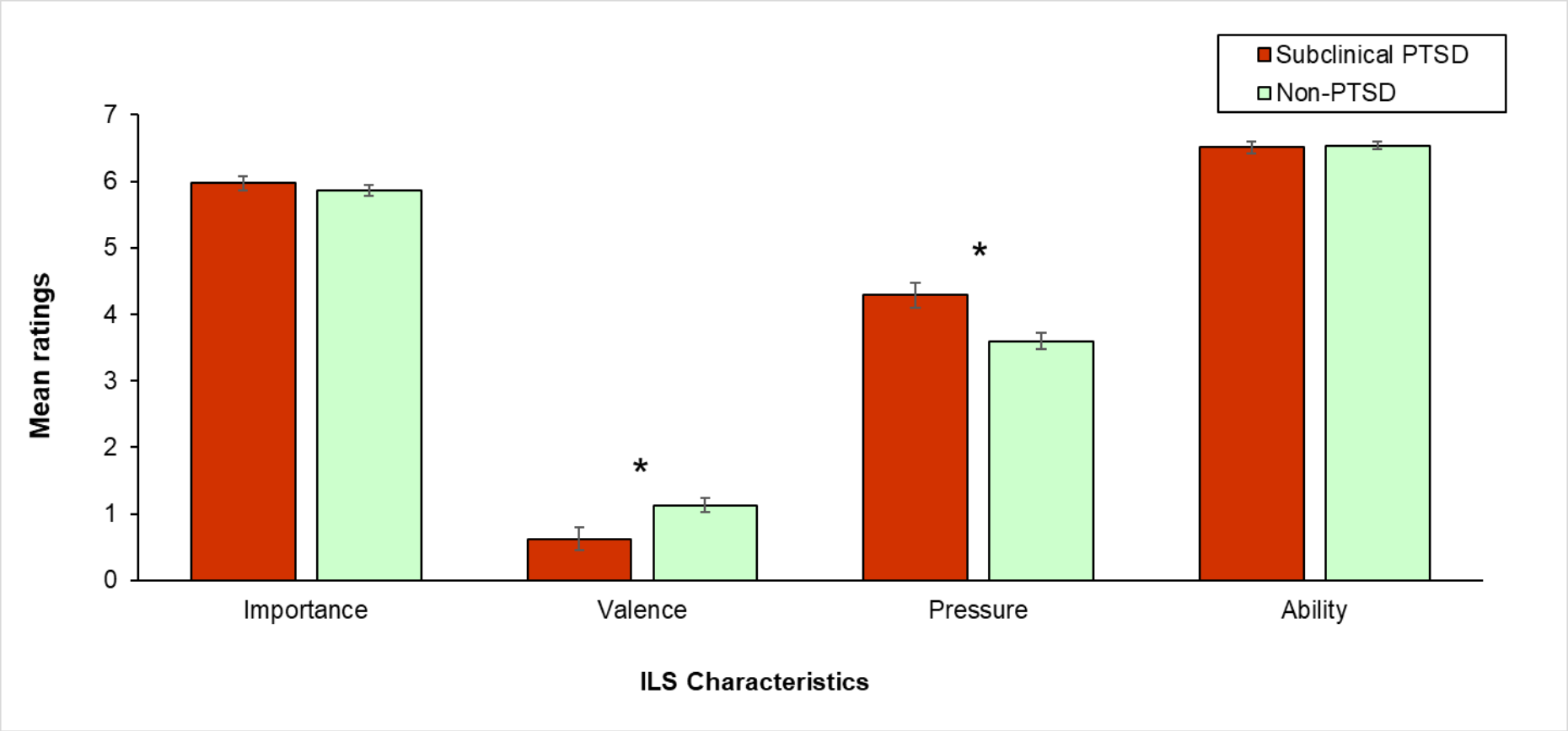


Figure 2.6. ILS characteristics in subclinical PTSD and non-PTSD groups. * = significant differences between the subclinical PTSD and non-PTSD groups. Error bars represent standard errors.

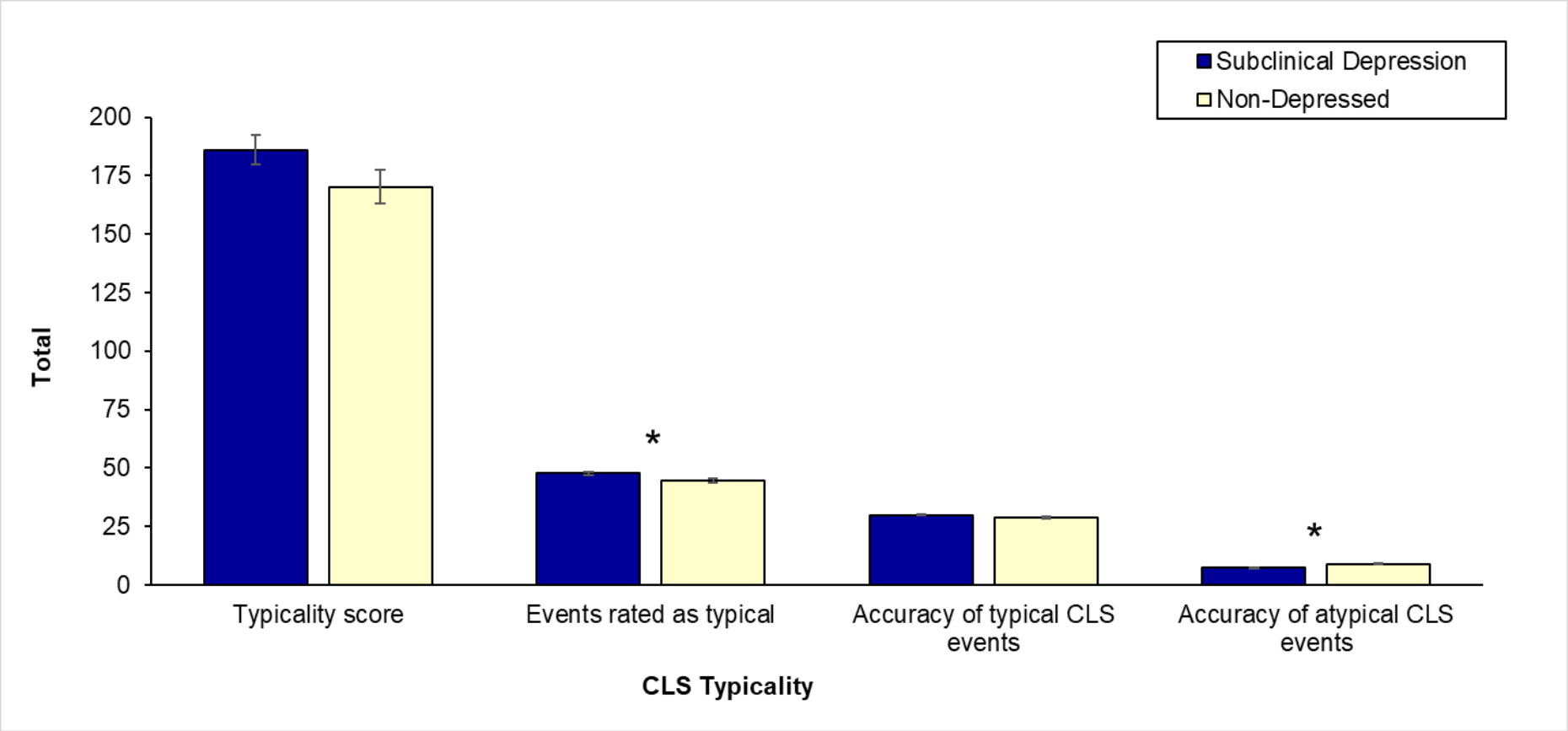


Figure 2.7. CLS typicality and accuracy in subclinical depression and non-depressed groups. * = significant differences between the subclinical depression and non-depressed groups. Error bars represent standard errors.

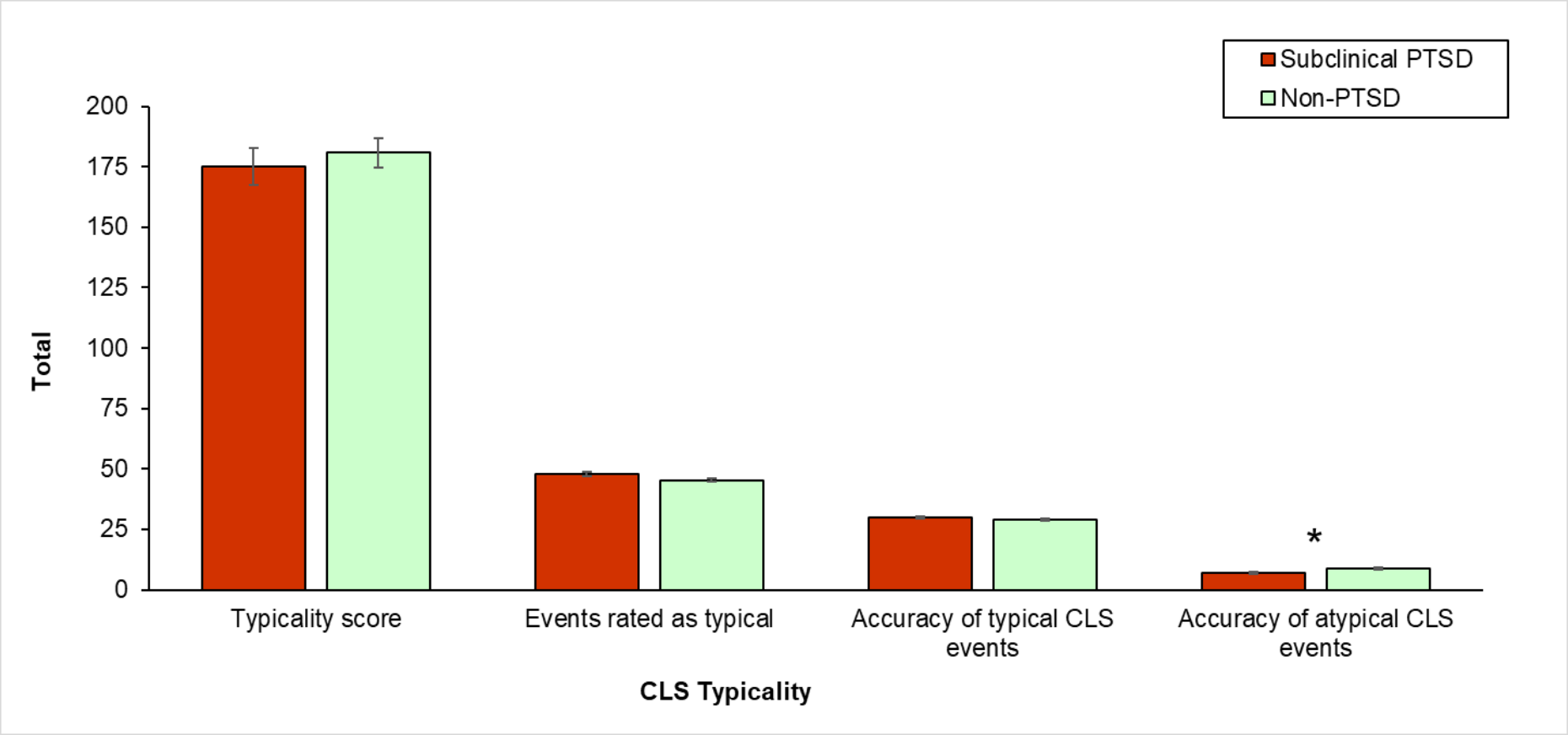


Figure 2.8. CLS typicality and accuracy in subclinical PTSD and non-PTSD groups. * = significant differences between the subclinical PTSD and non-PTSD groups. Error bars represent standard errors.

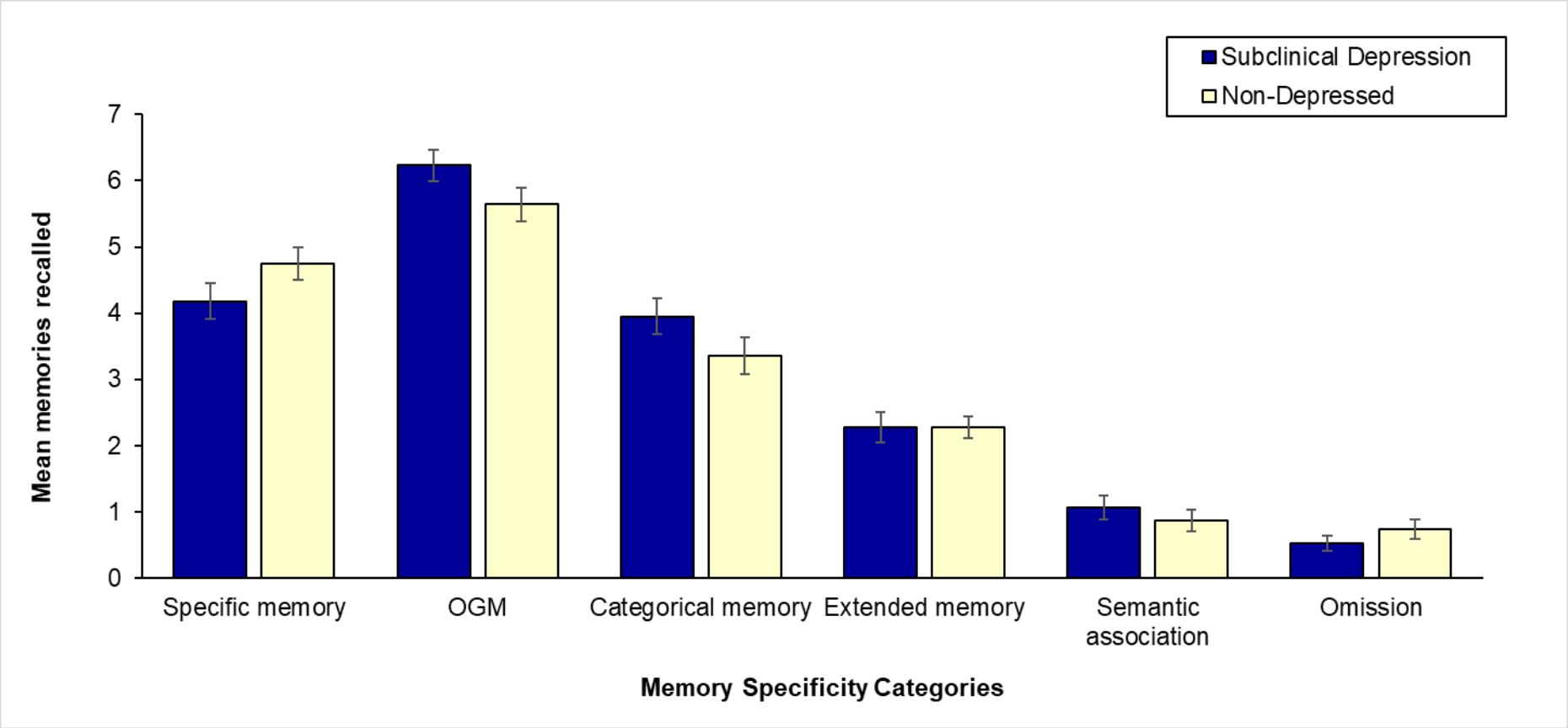


Figure 3.1. Mean memory specificity in subclinical depression and non-depressed groups when minimal instructions were given in the AMT. No differences between subclinical depression and non-depressed groups were found in the memory specificity categories. Error bars represent standard errors.

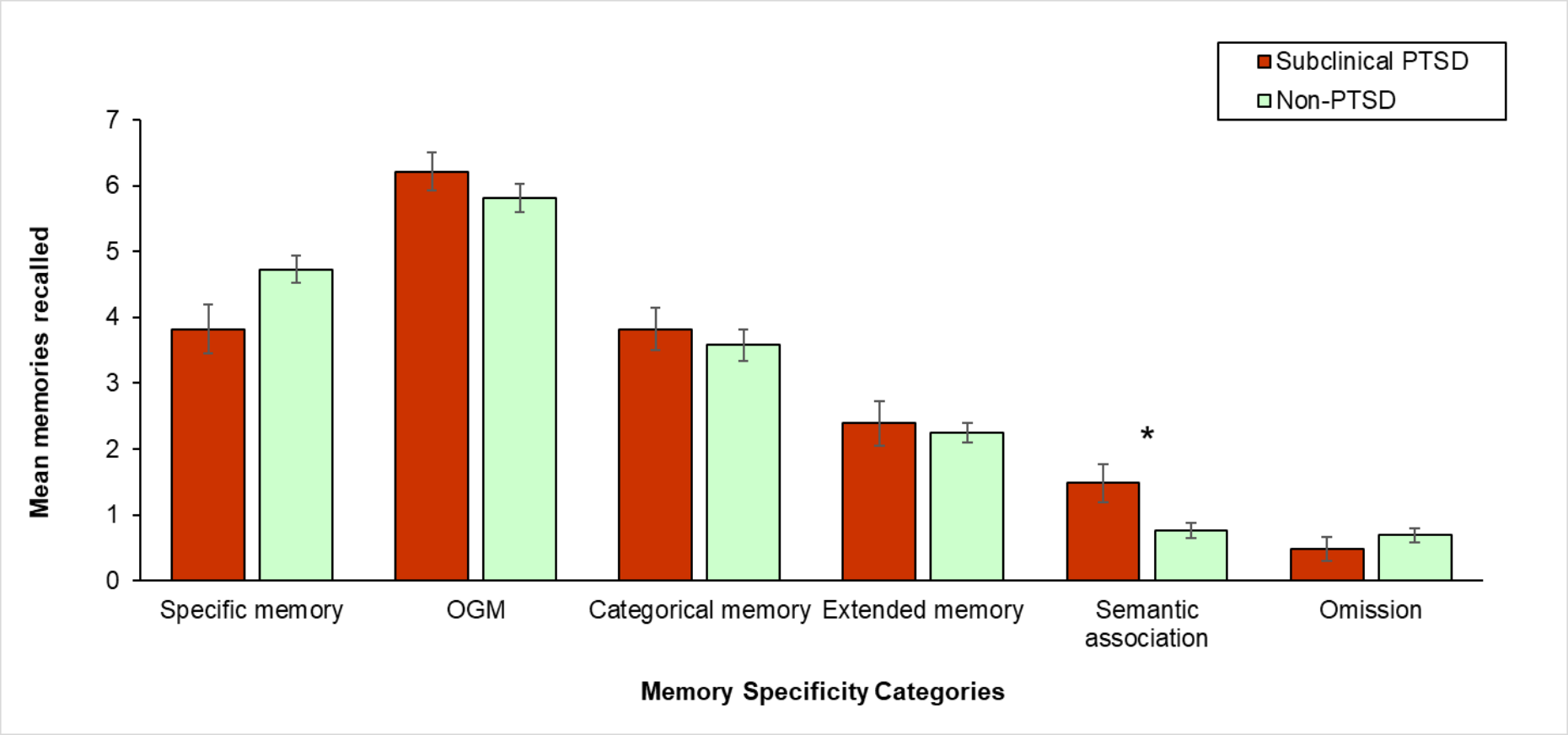


Figure 3.2. Mean memory specificity in subclinical PTSD and non-PTSD groups when minimal instructions were given in the AMT. * = significant differences between the subclinical PTSD and non-PTSD groups. Error bars represent standard errors.

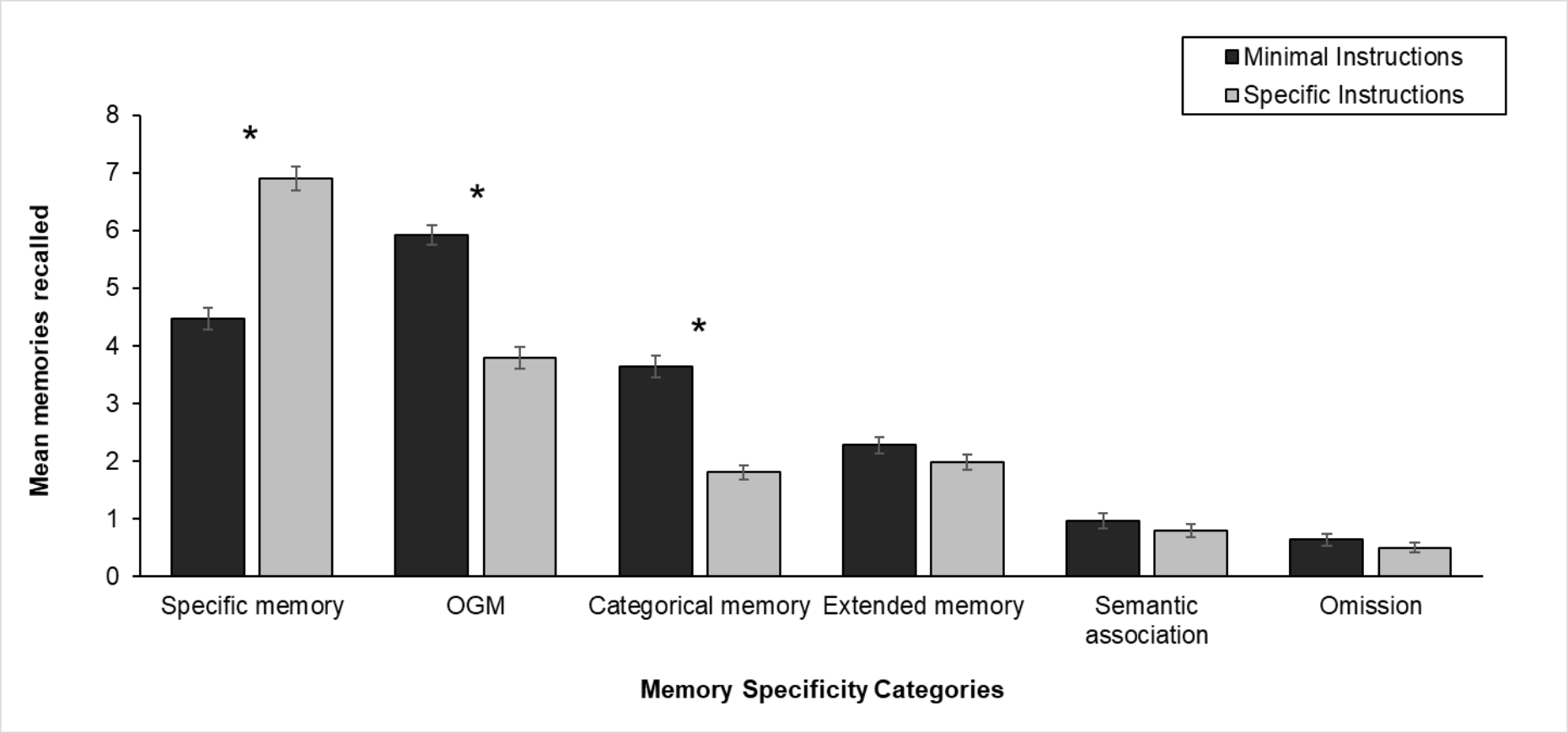


Figure 3.3. Mean memory specificity when minimal instructions and specific instructions were given in the AMT. * = significant differences between minimal instructions and specific instructions. Error bars represent standard errors.

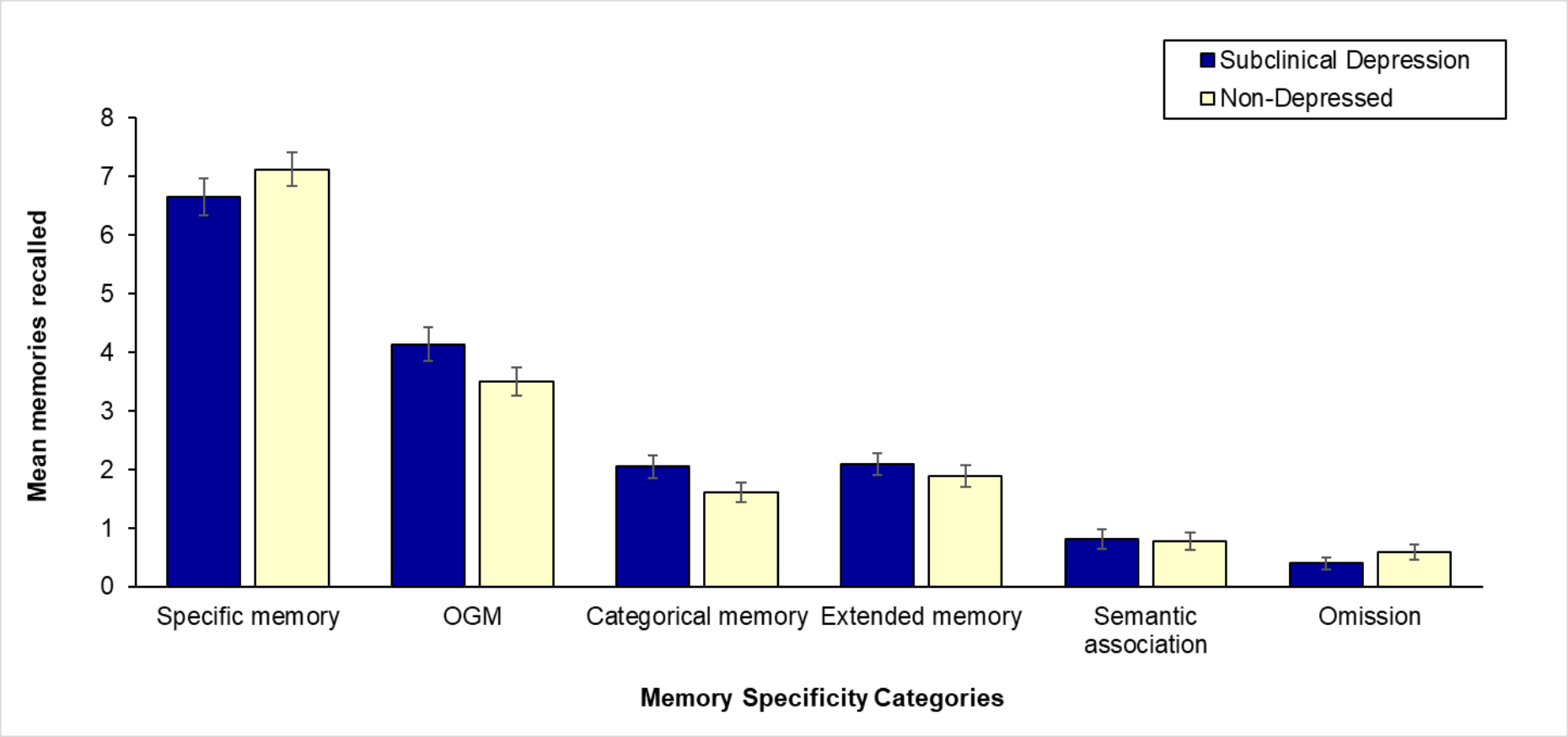


Figure 3.4. Mean memory specificity in subclinical depression and non-depressed groups when specific instructions were given in the AMT. No differences between subclinical depression and non-depressed groups were found in the memory specificity categories. Error bars represent standard errors.

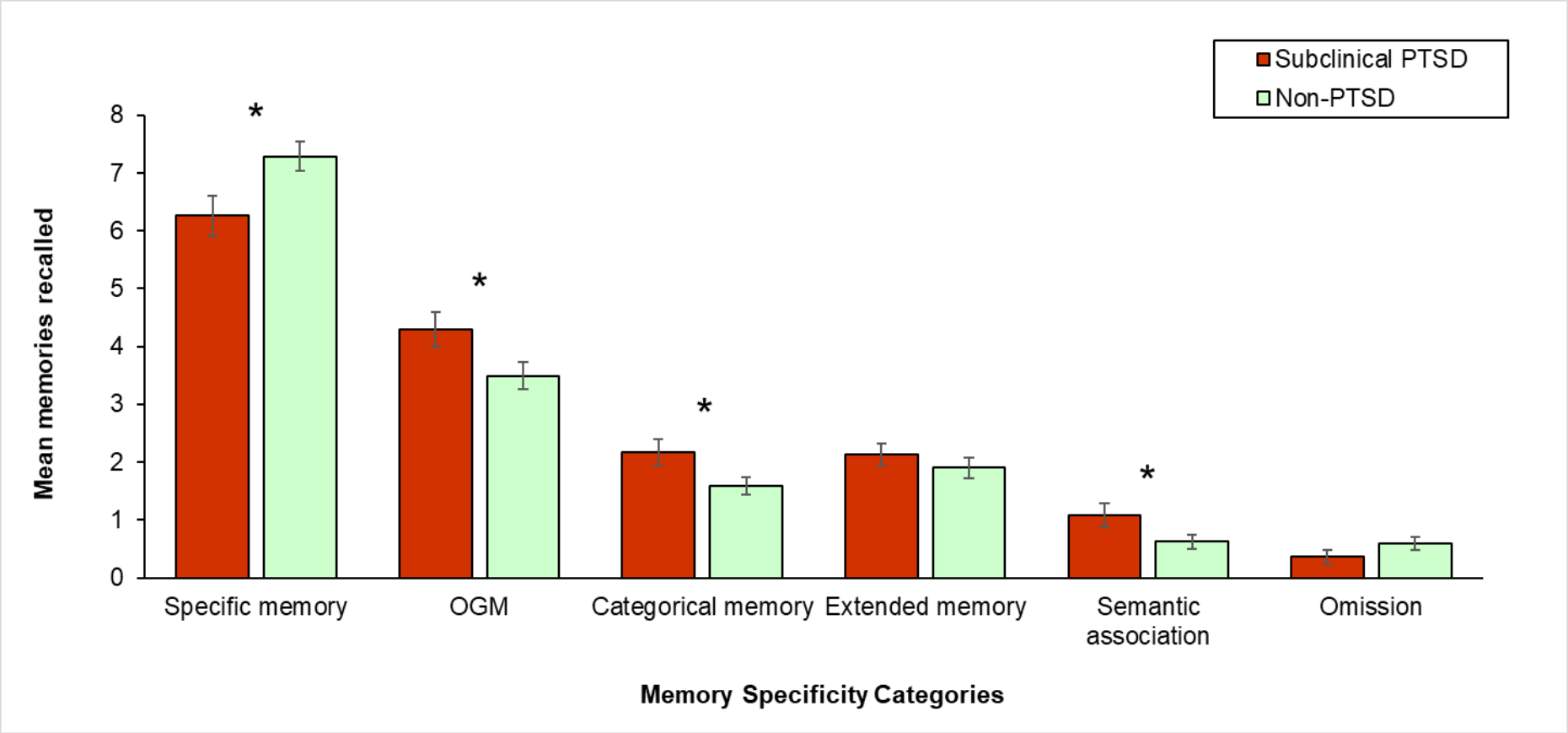


Figure 3.5. Mean memory specificity in subclinical PTSD and non-PTSD groups when specific instructions were given in the AMT. * = significant differences between the subclinical PTSD and non-PTSD groups. Error bars represent standard errors.

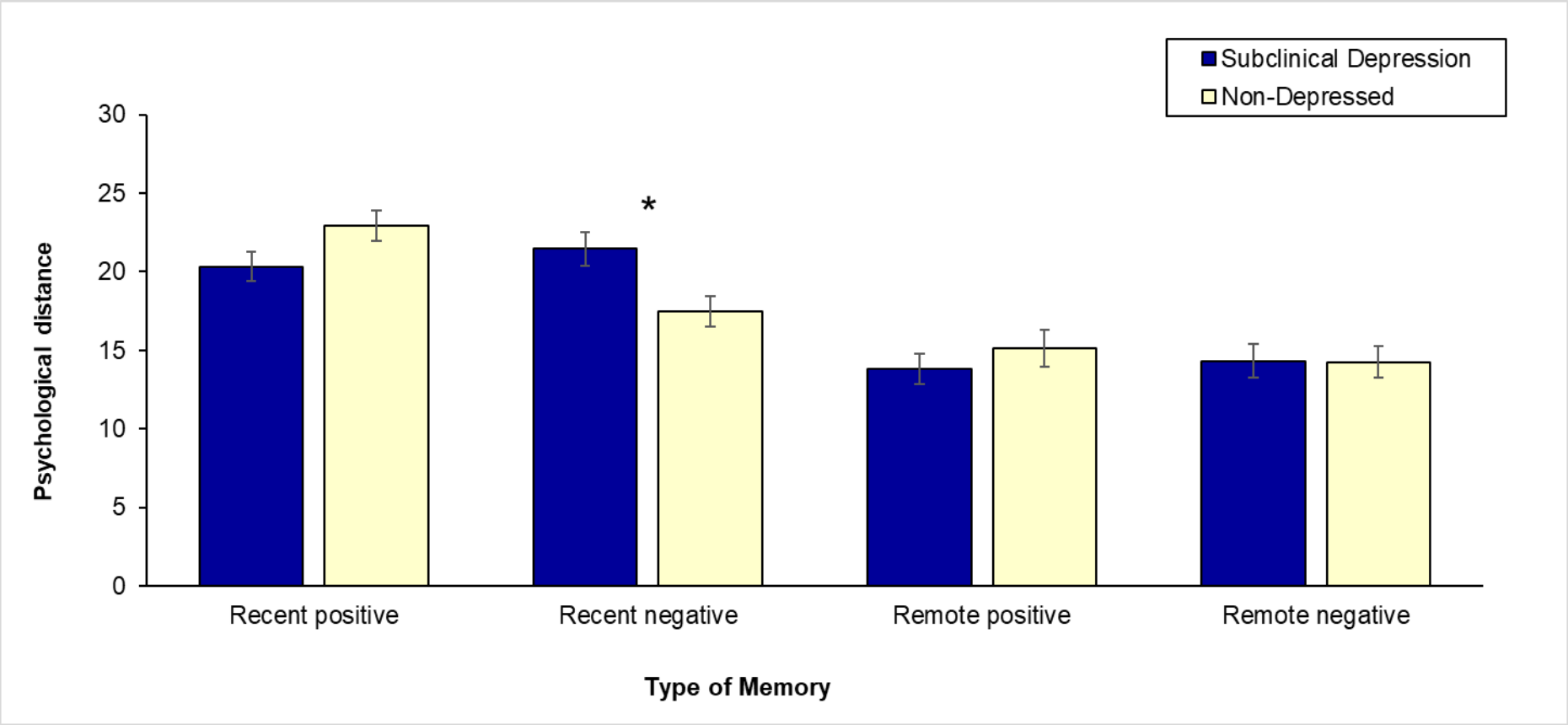


Figure 4.1. Psychological distance of memory in subclinical depression and non-depressed groups. * = significant differences between the subclinical depression and non-depressed groups. Error bars represent standard errors.

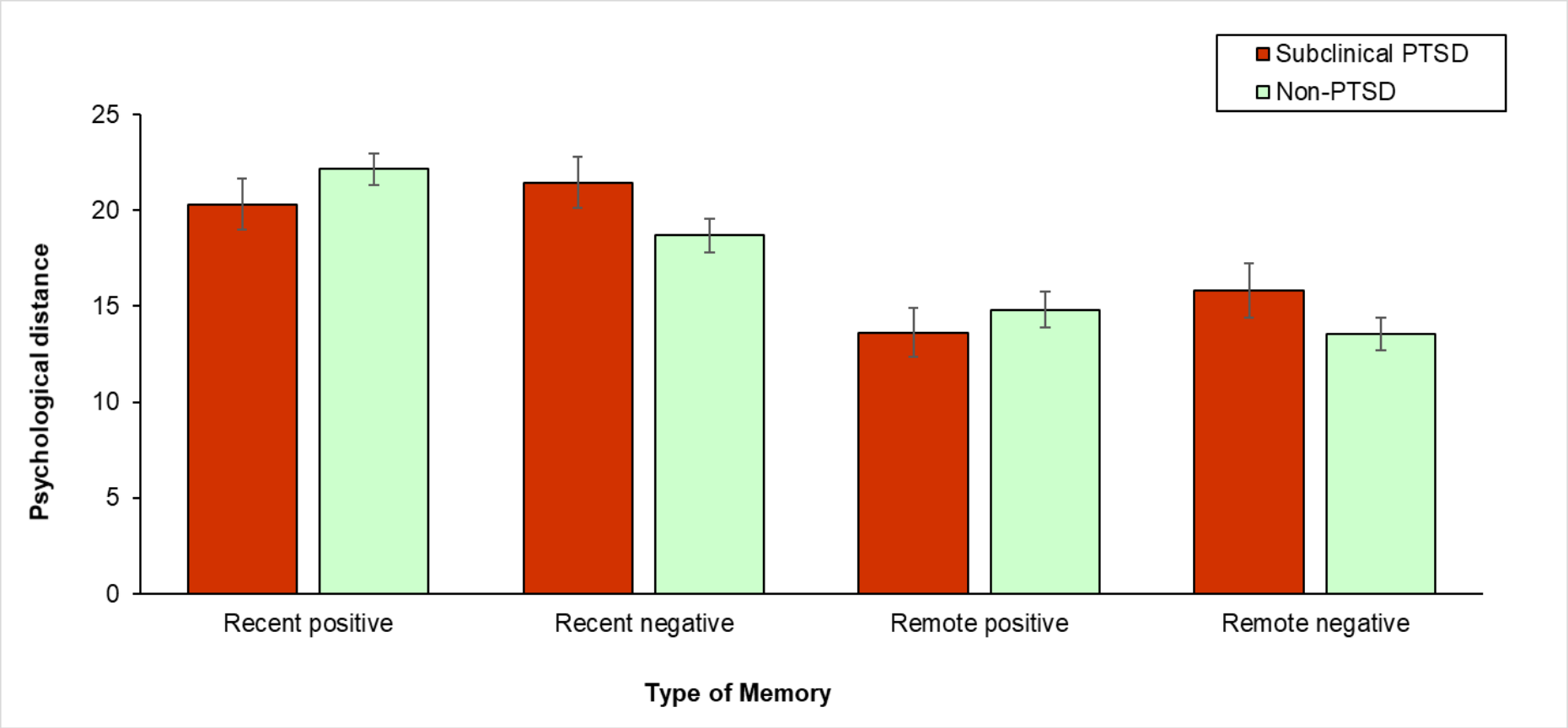


Figure 4.2. Psychological distance of memory in subclinical PTSD and non-PTSD groups. No differences between subclinical PTSD and non-PTSD groups were found in the psychological distance of memories. Error bars represent standard errors.

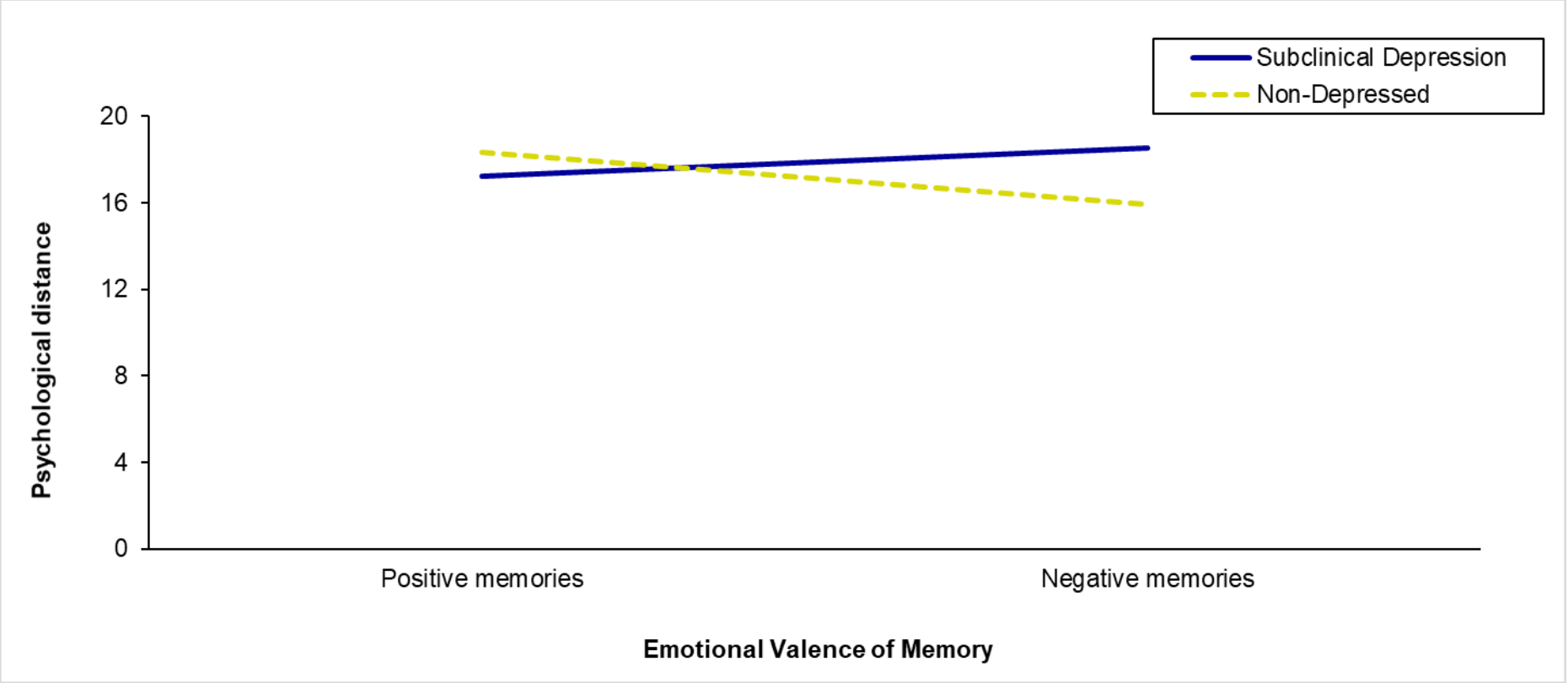


Figure 4.3. Psychological distance of positive and negative memories in subclinical depression and non-depressed groups. There was a significant interaction of depression and memory valence on psychological distance. Error bars represent standard errors.

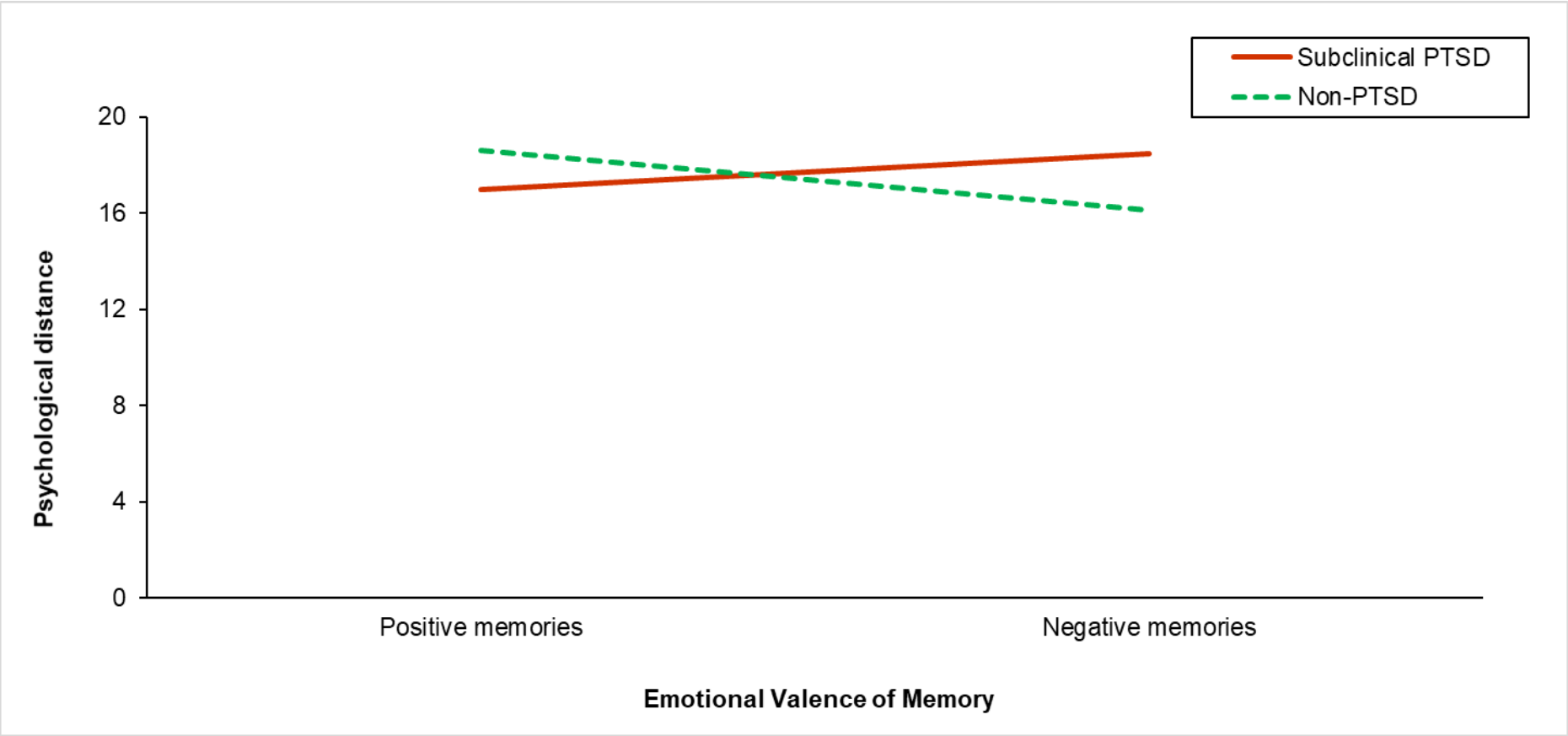


Figure 4.4. Psychological distance of positive and negative memories in subclinical PTSD and non-PTSD groups. There was a significant interaction of trauma and memory valence on psychological distance. Error bars represent standard errors.

Appendices

Appendix A

Depression Anxiety Stress Scale (DASS) (Lovibond, 1995)

Instructions: Please read each statement and circle a number 0, 1, 2 or 3 which indicates how much the statement applied to you *over the past week*. There are no right or wrong answers. Do not spend too much time on any statement.

The rating scale is as follows:	
0	Did not apply to me at all
1	Applied to me to some degree, or some of the time
2	Applied to me to a considerable degree, or a good part of time
3	Applied to me very much, or most of the time

1.	I found myself getting upset by quite trivial things	0	1	2	3
2.	I was aware of dryness of my mouth	0	1	2	3
3.	I couldn't seem to experience any positive feeling at all	0	1	2	3
4.	I experienced breathing difficulty (e.g., excessively rapid breathing, breathlessness in the absence of physical exertion)	0	1	2	3
5.	I just couldn't seem to get going	0	1	2	3
6.	I tended to over-react to situations	0	1	2	3
7.	I had a feeling of shakiness (e.g., legs going to give way)	0	1	2	3
8.	I found it difficult to relax	0	1	2	3
9.	I found myself in situations that made me so anxious I was most relieved when they ended	0	1	2	3
10.	I felt that I had nothing to look forward to	0	1	2	3
11.	I found myself getting upset rather easily	0	1	2	3
12.	I felt that I was using a lot of nervous energy	0	1	2	3
13.	I felt sad and depressed				
14.	I found myself getting impatient when I was delayed in any way (e.g., lifts, traffic lights, being kept waiting)	0	1	2	3

15.	I had a feeling of faintness	0	1	2	3
16.	I felt that I had lost interest in just about everything	0	1	2	3
17.	I felt I wasn't worth much as a person	0	1	2	3
18.	I felt that I was rather touchy	0	1	2	3
19.	I perspired noticeably (e.g., hands sweaty) in the absence of high temperatures or physical exertion	0	1	2	3
20.	I felt scared without any good reason	0	1	2	3
21.	I felt that life wasn't worthwhile	0	1	2	3

Appendix B

PTSD Checklist for DSM-5 (PCL-5) (Weathers et al., 2013)

Instructions: Below is a list of problems that people sometimes have in response to a very stressful experience. Please read each problem carefully and then circle one of the numbers to the right to indicate how much you have been bothered by that problem **in the past month.**

The rating scale is as follows:	
0	Not at all
1	A little bit
2	Moderately
3	Quite a bit
4	Extremely

In the past month, how much were you bothered by:

1.	Repeated, disturbing, and unwanted memories of the stressful experience?	0	1	2	3	4
2.	Repeated, disturbing dreams of the stressful experience?	0	1	2	3	4
3.	Suddenly feeling or acting as if the stressful experience were actually happening again (as if you were actually back there reliving it)?	0	1	2	3	4
4.	Feeling very upset when something reminded you of the stressful experience?	0	1	2	3	4
5.	Having strong physical reactions when something reminded you of the stressful experience (for example, heart pounding, trouble breathing, sweating)?	0	1	2	3	4
6.	Avoiding memories, thoughts, or feelings related to the stressful experience?	0	1	2	3	4
7.	Avoiding external reminders of the stressful experience (for example, people, places, conversations, activities, objects, or situations)?	0	1	2	3	4

8.	Trouble remembering important parts of the stressful experience?	0	1	2	3	4
9.	Having strong negative beliefs about yourself, other people, or the world (for example, having thoughts such as: I am bad, there is something seriously wrong with me, no one can be trusted, the world is completely dangerous)?	0	1	2	3	4
10.	Blaming yourself or someone else for the stressful experience or what happened after it?	0	1	2	3	4
11.	Having strong negative feelings such as fear, horror, anger, guilt, or shame?	0	1	2	3	4
12.	Loss of interest in activities that you used to enjoy?	0	1	2	3	4
13.	Feeling distant or cut off from other people?	0	1	2	3	4
14.	Trouble experiencing positive feelings (for example, being unable to feel happiness or have loving feelings for people close to you)?	0	1	2	3	4
15.	Irritable behavior, angry outbursts, or acting aggressively?	0	1	2	3	4
16.	Taking too many risks or doing things that could cause you harm?	0	1	2	3	4
17.	Being “superalert” or watchful or on guard?	0	1	2	3	4
18.	Feeling jumpy or easily startled?	0	1	2	3	4
19.	Having difficulty concentrating?	0	1	2	3	4
20.	Trouble falling or staying asleep?	0	1	2	3	4

Appendix C

Individualism and Collectivism Scale (Triandis & Gelfand, 1998)

Instructions: For each statement below, please rate how often you feel the way described by use the scale below and writing a number between 1 and 9 in the space provided.

1----------2----------3----------4----------5----------6----------7----------8----------9

Never or Definitely No **Moderately** **Always or Definitely Yes**

1. I'd rather depend on myself than others. _____
2. If a coworker gets a prize, I would feel proud. _____
3. It is important that I do my job better than others. _____
4. Parents and children must stay together as much as possible. _____
5. I rely on myself most of the time; I rarely rely on others. _____
6. The well-being of my coworkers is important to me. _____
7. Winning is everything. _____
8. It is my duty to take care of my family, even when I have to sacrifice what I want. _____
9. I often do “my own thing”. _____
10. To me, pleasure is spending time with others. _____
11. Competition is the law of nature. _____
12. Family members should stick together, no matter what sacrifices are required. _____
13. My personal identity, independent of others, is very important to me. _____
14. I feel good when I cooperate with others. _____
15. When another person does better than I do, I get tense and aroused. _____
16. It is important to me that I respect the decisions made by my groups. _____

Appendix D

Center for Epidemiologic Studies Depression Scale (CES-D) (Radloff, 1977)

Instructions: Below is a list of the ways you might have felt or behaved. Please tell me how often you have felt this way **during the past week.**

The rating scale is as follows:	
0	Rarely or none of the time (less than 1 day)
1	Some or a little of the time (1-2 days)
2	Occasionally or a moderate amount of time (3-4 days)
3	Most or all of the time (5-7 days)

1.	I was bothered by things that usually don't bother me.	0	1	2	3
2.	I did not feel like eating; my appetite was poor.	0	1	2	3
3.	I felt that I could not shake off the blues even with help from my family or friends.	0	1	2	3
4.	I felt I was just as good as other people.	0	1	2	3
5.	I had trouble keeping my mind on what I was doing.	0	1	2	3
6.	I felt depressed.	0	1	2	3
7.	I felt that everything I did was an effort.	0	1	2	3
8.	I felt hopeful about the future.	0	1	2	3
9.	I thought my life had been a failure.	0	1	2	3
10.	I felt fearful.	0	1	2	3
11.	My sleep was restless.	0	1	2	3
12.	I was happy.	0	1	2	3
13.	I talked less than usual.	0	1	2	3
14.	I felt lonely.	0	1	2	3
15.	People were unfriendly.	0	1	2	3
16.	I enjoyed life.	0	1	2	3
17.	I had crying spells.	0	1	2	3
18.	I felt sad.	0	1	2	3
19.	I felt that people dislike me.	0	1	2	3

20. I could not get ‘going’. 0 1 2 3

Appendix E

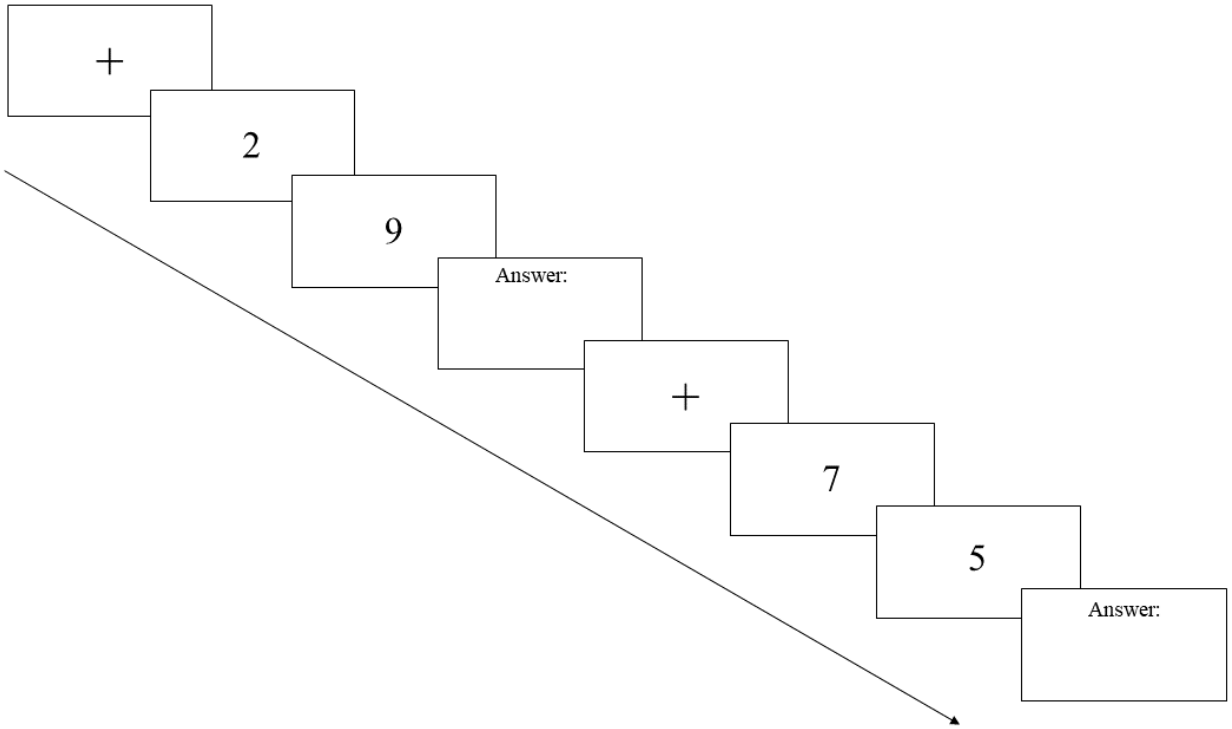
Emotional valence and intensity values of word cues (Warriner et al., 2013)

Cue Word	Valence	Intensity
Satisfied	7.16	3.95
Calm	6.89	1.67
Relaxed	7.25	2.49
Happy	8.47	6.05
Excited	8.11	6.43
Surprised	6.57	5.95
Bored	2.95	3.65
Sad	2.10	3.49
Depressed	2.27	4.25
Distressed	3.38	6.28
Afraid	2.25	5.12
Angry	2.53	6.20

Note. For valence, values closer to 9 indicate stronger positive valence, whereas values closer to 0 indicate stronger negative valence. For intensity, values closer to 9 indicate stronger intensity or arousal, whereas values closer to 0 indicate weaker intensity or arousal.

Appendix F

Schematic Procedure for the Digit Span



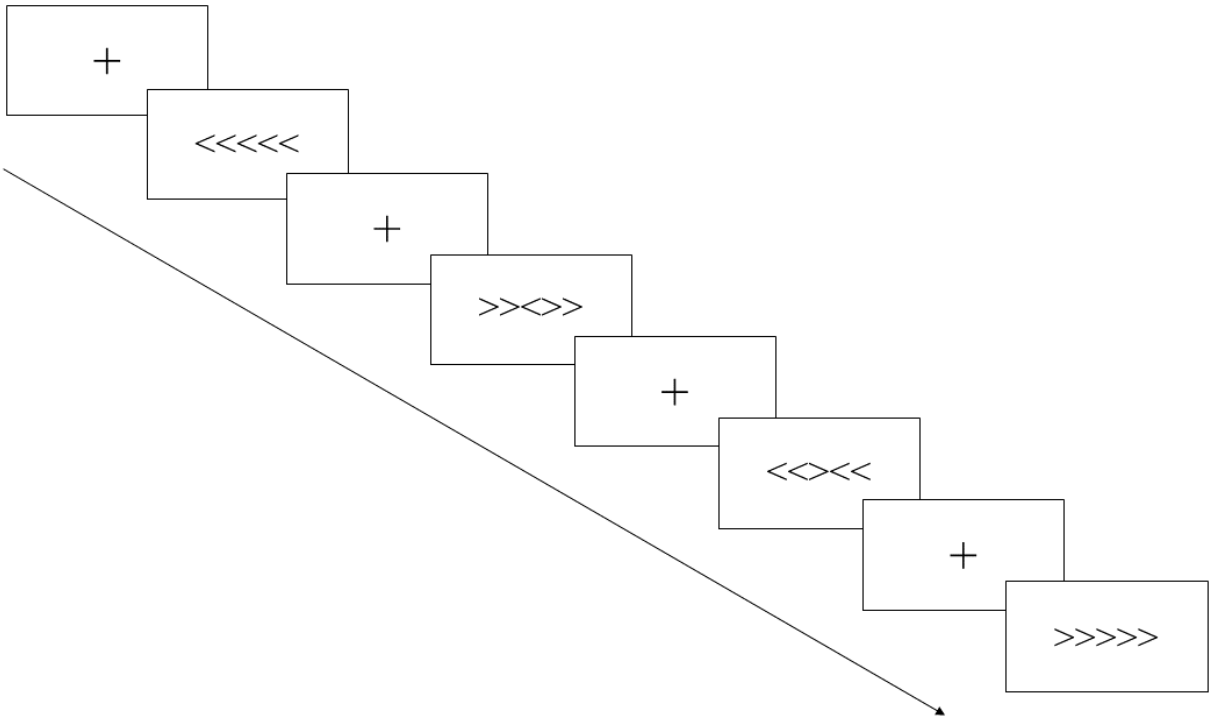
Appendix G

Stimuli used in the Digit Span

Span	Trial	Digits
Practice	1	1 4
	2	8 3
2	1	2 9
	2	7 5
3	1	9 3 1
	2	5 2 7
4	1	6 1 3 8
	2	4 9 5 2
5	1	3 6 2 8 1
	2	7 5 9 1 4
6	1	2 8 4 6 3 7
	2	9 2 6 3 1 5
7	1	8 3 5 4 7 1 6
	2	4 7 2 6 8 5 9
8	1	1 9 4 8 2 7 6 3
	2	5 7 1 3 9 4 2 6
9	1	3 9 6 2 4 7 1 5 8
	2	6 1 4 7 3 5 9 6 2

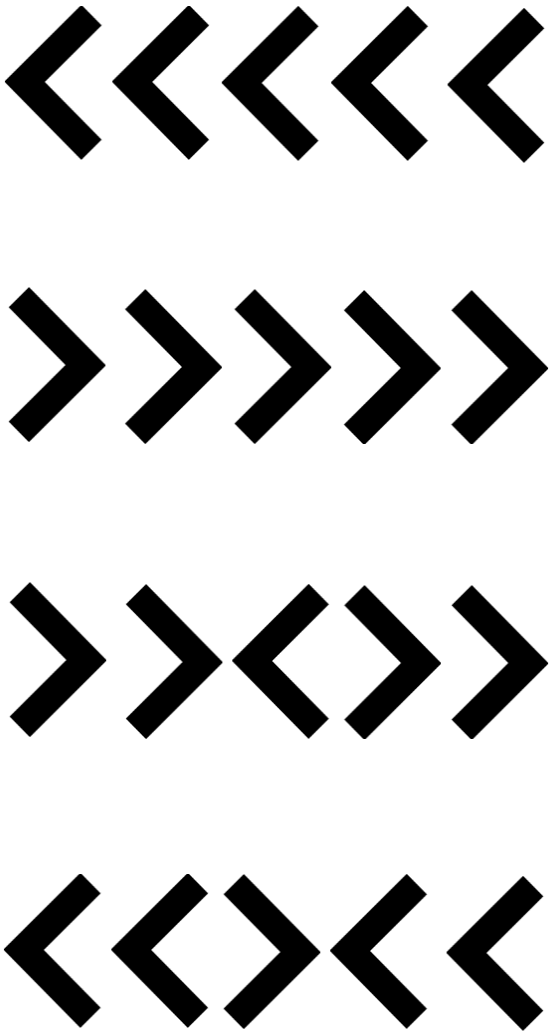
Appendix H

Schematic Procedure for the Flanker Task



Appendix I

Stimuli used in the Flanker Task



Appendix J

Ruminative Response Scale – Short Form (RRS-SF; Nolen-Hoeksema & Morrow, 1991)

Instructions: People think and do many different things when they feel sad or stressed. Please read each of the items below and **indicate how often** you think or do each one when you feel down or sad or depressed. Please indicate what you GENERALLY DO, not what you think you should do.

The rating scale is as follows:	
1	Almost never
2	Sometimes
3	Often
4	Almost always

1.	Think “What am I doing to deserve this?”	1	2	3	4
2.	Analyze recent events to try to understand why you are depressed	1	2	3	4
3.	Think “Why do I always react this way?”	1	2	3	4
4.	Go away by yourself and think about why you feel this way	1	2	3	4
5.	Write down what you are thinking about and analyze it	1	2	3	4
6.	Think about a recent situation, wishing it had gone better	1	2	3	4
7.	Think “Why do I have problems other people don’t have?”	1	2	3	4
8.	Think “Why can’t I handle things better?”	1	2	3	4
9.	Analyze your personality to try to understand why you are depressed	1	2	3	4
10.	Go someplace alone to think about your feelings	1	2	3	4

Appendix K

COPE Inventory (Carver et al., 1989)

Instructions: We are interested in how people respond when they confront difficult or stressful events in their lives. There are lots of ways to try to deal with stress. This questionnaire asks you to indicate what you generally do and feel, when you experience stressful events. Obviously, different events bring out somewhat different responses, but think about what you usually do when you are under a lot of stress. Then respond to each of the following items by circling a number for each, using the response choices listed just below. Please try to respond to each item separately in your mind from each other item. Choose your answers thoughtfully, and make your answers as true FOR YOU as you can. Please answer every item. There are no "right" or "wrong" answers, so choose the most accurate answer for YOU--not what you think "most people" would say or do. Indicate what YOU usually do when YOU experience a stressful event.

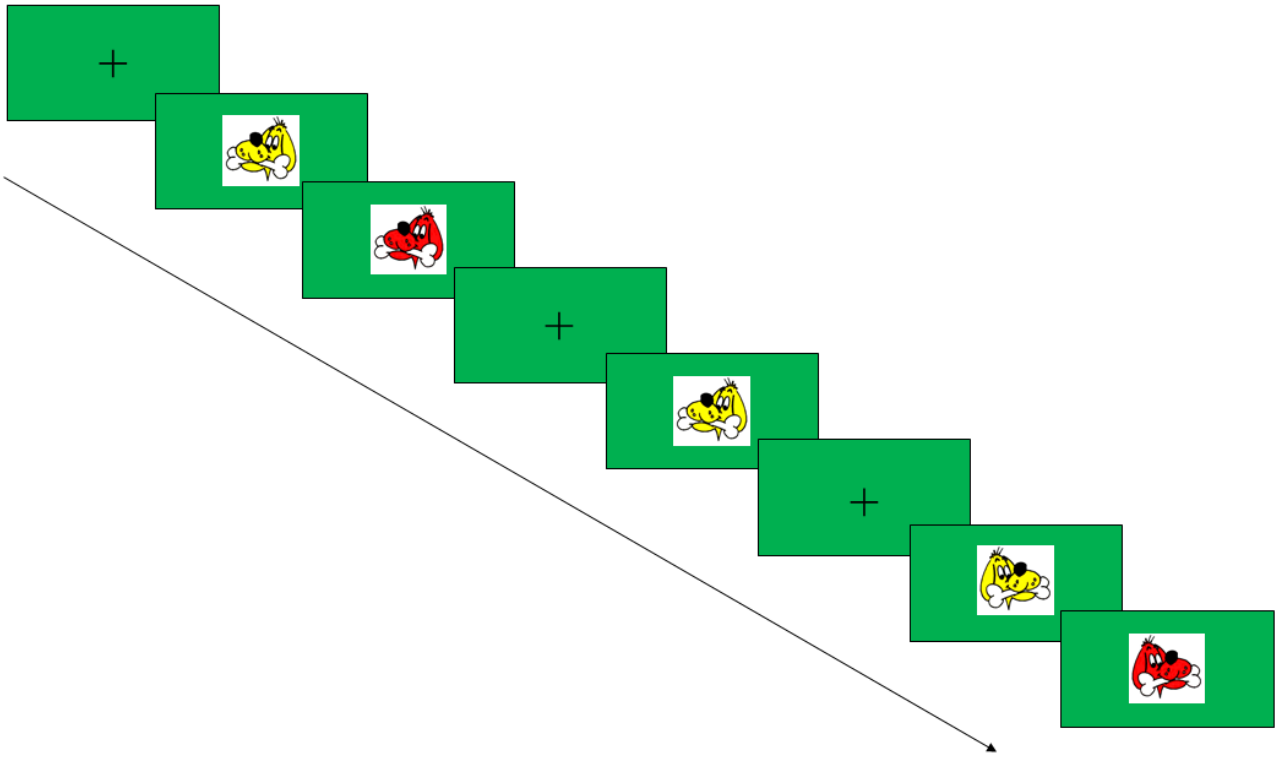
The rating scale is as follows:	
1	I usually don't do this at all
2	I usually do this a little bit
3	I usually do this a medium amount
4	I usually do this a lot

1.	I turn to work or other substitute activities to take my mind off things.	1	2	3	4
2.	I say to myself "this isn't real."	1	2	3	4
3.	I admit to myself that I can't deal with it, and quit trying.	1	2	3	4
4.	I use alcohol or drugs to make myself feel better.	1	2	3	4
5.	I daydream about things other than this.	1	2	3	4
6.	I just give up trying to reach my goal.	1	2	3	4
7.	I try to lose myself for a while by drinking alcohol or taking drugs.	1	2	3	4
8.	I refuse to believe that it has happened.	1	2	3	4
9.	I sleep more than usual.	1	2	3	4

10.	I drink alcohol or take drugs, in order to think about it less.	1	2	3	4
11.	I give up the attempt to get what I want.	1	2	3	4
12.	I pretend that it hasn't really happened.	1	2	3	4
13.	I go to movies or watch TV, to think about it less.	1	2	3	4
14.	I reduce the amount of effort I'm putting into solving the problem	1	2	3	4

Appendix L

Schematic Procedure for the Stop Signal Task

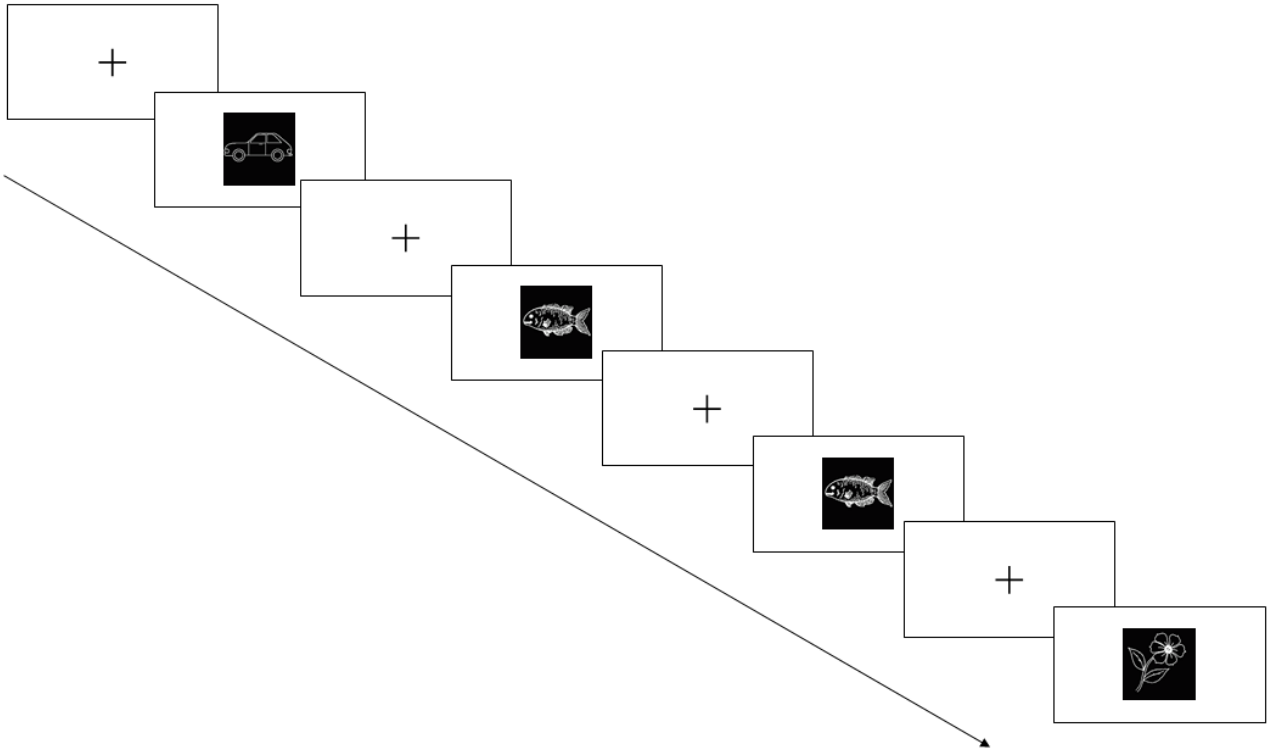


Appendix M

Stimuli used in the Stop Signal Task (de Vries & Geurts, 2014)

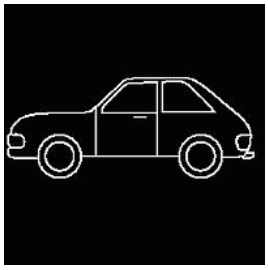
Appendix N

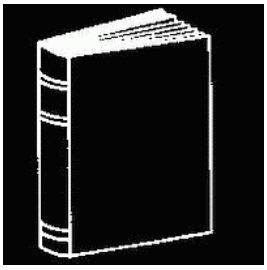
Schematic Procedure for the n-back task

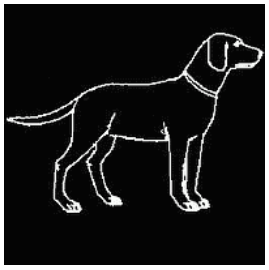


Appendix O

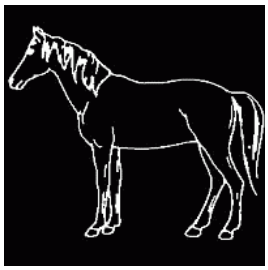
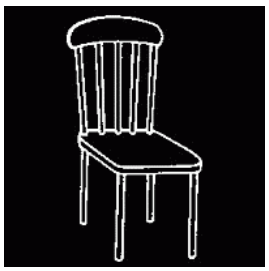
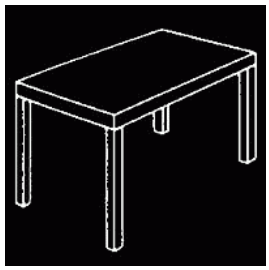
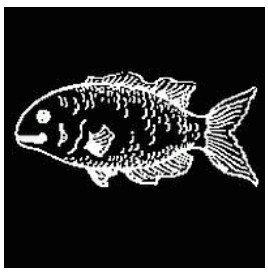
Stimuli used in the n-back task (de Vries & Geurts, 2014)







Appendix P

Autobiographical Memory Questionnaire (AMQ) (Rubin et al., 2003)

Use the scale below for the following questions, and write a number between 1 and 7 in the space provided.

1----------2----------3----------4----------5----------6----------7

Not at all **Vaguely** **Distinctly** **As clearly as if it were happening right now**

1. As I remember the event, I feel as though I am *reliving* the original event. _____
2. As I remember the event, I can *hear* it in my mind. _____
3. As I remember the event, I can *see* it in my mind. _____
4. As I remember the event, I or other people are *talking*. _____
5. As I remember the event, I know its *spatial layout*. _____
6. As I remember the event, I can feel now the *emotions* that I felt then. _____
7. As I remember the event, I can recall the *setting* where it occurred. _____

Use the scale below for the following questions, and write a number between 1 and 7 in the space provided.

1----------2----------3----------4----------5----------6----------7

Not at all **Completely**

8. As I remember the event, I see it from my own eyes. _____
9. As I remember the event, I see it as an observer or outsider. _____

Use the scale below for the following questions, and write a number between 1 and 7 in the space provided.

1----------2----------3----------4----------5----------6----------7

Not at all **Vaguely** **Distinctly** **As much as any memory**

10. Sometimes people know something happened to them without being able to actually remember it. As I think about the event, I can actually *remember* it rather than just knowing that it happened. _____
11. As I remember the event, it comes to me *in words*. _____
12. As I remember the event, I feel that I travel *back to the time when it happened*, that I am a subject in it again, rather than an outside observer tied to the present. _____
13. As I remember the event, it comes to me in words or in pictures *as a coherent story* or episode and not as an isolated fact, observation, or scene. _____
14. This memory is *significant* for my life because it imparts an important message for me or represents an anchor, critical juncture, or a turning point. _____

The following questions had unique scales. Circle a response for questions with scales or multiple choice options, and fill in the blanks for questions that have empty spaces.

15. Since it happened, I have *thought* or *talked about* this event.

1----------2----------3----------4----------5----------6----------7

Not at all **As often as any event in my life**

16. Please *date* the memory (month/day/year) as accurately as you can. Please fill in a month, day, and year even if you must estimate. If the memory extended over a period of time, report the approximate middle of the period.

    _____

17. To the best of your knowledge, is the memory of an event that occurred *once* at one particular time and place, a summary or *merging* of many similar or related events, or

for events that occurred over a fairly continuous *extended* period of time lasting more than a day?

1 once

2 merging

3 extended

18. Rate the emotional intensity of this event.

(-3)----------(-2)----------(-1)----------0----------1----------2----------3

Extremely negative **Neutral** **Extremely positive**

Appendix Q

Psychological Distance Scale (Ross & Wilson, 2002)

1. How long ago does the event feel?

1-------2-------3-------4-------5-------6-------7-------8-------9-------10-------11

like a very **like**

long time ago **yesterday**

2. How far away does the event feel?

1-------2-------3-------4-------5-------6-------7-------8-------9-------10-------11

very distant **very close**

3. How close do you feel today to your 'past self' in the event?

1-------2-------3-------4-------5-------6-------7-------8-------9-------10-------11

very distant **very close**

Appendix R

Centrality of Event Scale – short version (CES) (Berntsen & Rubin, 2006)

Instructions: Please think back upon the most stressful or traumatic event in your life and answer the following questions in an honest and sincere way, by writing a number between 1 and 5 in the space provided.

1----------2----------3----------4----------5

Totally disagree **Totally agree**

1. I feel that this event has become part of my identity. _____
2. This event has become a reference point for the way I understand myself and the world. _____
3. I feel that this event has become a central part of my life story. _____
4. This event has coloured the way I think and feel about other experiences. _____
5. This event permanently changed my life. _____
6. I often think about the effects this event will have on my future. _____
7. This event was a turning point in my life. _____

Appendix S

Emotion Regulation Questionnaire (ERQ) (Gross & John, 2003)

Instructions: We would like to ask you some questions about your emotional life, in particular, how you control (that is, regulate and manage) your emotions. The questions below involve two distinct aspects of your emotional life. One is your emotional experience, or what you feel like inside. The other is your emotional expression, or how you show your emotions in the way you talk, gesture, or behave. Although some of the following questions may seem similar to one another, they differ in important ways. For each item, please answer using the following scale:

1----------2----------3----------4----------5----------6----------7

Strongly disagree **Neutral** **Strongly agree**

1. When I want to feel more *positive* emotion (such as joy or amusement), I *change what I'm thinking about*. _____
2. I keep my emotions to myself. _____
3. When I want to feel less *negative* emotion (such as sadness or anger), I *change what I'm thinking about*. _____
4. When I am feeling *positive* emotions, I am careful not to express them. _____
5. When I'm faced with a stressful situation, I make myself *think about it* in a way that helps me stay calm. _____
6. I control my emotions by *not expressing them*. _____
7. When I want to feel more *positive* emotion, I *change the way I'm thinking* about the situation. _____
8. I control my emotions by *changing the way I think* about the situation I'm in. _____
9. When I am feeling *negative* emotions, I make sure not to express them. _____
10. When I want to feel less *negative* emotion, I *change the way I'm thinking* about the situation. _____