# CROSS-CULTURAL EXAMINATION OF INTRUSIVE AUTOBIOGRAPHICAL MEMORIES RECALLED DURING DEPRESSION

**STELLA MIHAILOVA**

GDipPsych, PGDipPsych

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| | |
|---|---|
| **ACT** | Acceptance and Commitment Therapy |
| **ANOVA** | Analysis of variance |
| **BDI-II** | Beck Depression Inventory - version 2 |
| **BPD** | Borderline Personality Disorder |
| **CBT** | Cognitive Behavior Therapy |
| **CES-D** | Centre for Epidemiologic Studies Depression Scale |
| **DAH** | Differential Activation Hypothesis |
| **DASS** | Depression Anxiety Stress Scales |
| **DBT** | Dialectical Behavior Therapy |
| **DID** | Diagnostic Inventory for Depression |
| **DSM-5** | Diagnostic and Statistical Manual of Mental Disorders – version 5 |
| **HRSD** | Hamilton Rating Scale for Depression |
| **IES** | Impact of Event Scale |
| **III** | Interpretation of Intrusions Inventory |
| **IISS** | Independent and Interdependent Self Scale |
| **IPT** | Interpersonal Therapy |
| **MBCT** | Mindfulness-Based Cognitive Therapy |
| **MDD** | Major Depressive Disorder |
| **NICE** | National Institute for Health and Care Excellence |
| **PCL-5** | The Posttraumatic Stress Disorder Checklist for DSM-5 |
| **PHQ-9** | Patient Health Questionnaire |
| **PTSD** | Posttraumatic Stress Disorder |
| **RIQ** | Responses to Intrusions Questionnaire |
| **RRS-revised** | Rumination Response Scale-Revised |
| **SAQOR** | Systematic Assessment of Quality in Observational Research |
| **SCID-5-RV** | Structured Clinical Interview for DSM-5, research version |
| **SHADS** | Hospital Anxiety and Depression Scale |
| **SMS** | Self-Memory System |
| **WHO** | World Health Organization |

**Abstract**

Major depressive disorder (MDD) is a disabling psychological condition characterized primarily by a persistent low mood and/or anhedonia (American Psychiatric Association, 2013). Globally, the number of people affected by MDD increased by close to 18% between 2005 and 2015 (Vos et al., 2016). Almost a third of those currently living with depression reside in South-East Asia, in countries such as China (World Health Organization, 2017). Given the growth and geographical spread of depression, theoretical models and clinical interventions targeting depression need to be either broadly applicable or able to be culturally tailored to meet the needs of different client cohorts. To date, however, research has largely been conducted with Western samples and the influence of culture has largely been overlooked (Bernal & Scharró-del-Río, 2001; Ferrari et al., 2013). The current research project investigated the influence of culture in relation to one factor implicated in the maintenance of depression - intrusive negative autobiographical memories (e.g., Brewin, Reynolds, & Tata, 1999; Newby & Moulds, 2011). Potential cultural variance was examined with regard to the perceptual experience of memories, the narrative content of memories, and cognitive responses to the intrusive memories.

Study 1 (Paper 1) employed meta-analytic techniques to investigate relationships between depression and intrusive memory characteristics and cognitive responses to memories. It was found that depression was positively associated with memory frequency, distress, negative memory appraisals, memory avoidance and memory rumination. Paper 1 also revealed that past research has predominantly been conducted in Western cultural contexts and no study has undertaken a cross-cultural comparison of intrusive memories. A cross-cultural empirical study (Study 2) was, therefore, conducted to compare memory characteristics and cognitive memory responses in those with and without depression, from a

European Australian (*n*=46) versus East Asian (*n*=45) cultural background. Findings from Study 2 were reported in two separate papers.

Paper 2 reported results relating to memory characteristics; findings indicated that the two cultural groups largely experienced memories in similar ways. Paper 2 also considered the narrative content of memories and found that the memory content was also largely similar across the two cultural groups, with the exception of specificity, whereby European Australians reported more specific intrusive memories compared to East Asian participants. Finally, Paper 2 qualitatively examined the thematic category of memories, finding that negative interpersonal events were reported most frequently across all groups. With regard to depression specific findings, Paper 2 reported that memory content and characteristics largely did not differentiate those with and without depression. However, those with depression, regardless of cultural background, experienced intrusive memories as more frequent, distressing and numbing than healthy controls.

Paper 3 reported results relating to cognitive responses to memories (appraisals, cognitive avoidance, and brooding-rumination). It was found that regardless of cultural background, those with depression reported greater maladaptive appraisals (negative, control and responsibility appraisals) and more brooding-rumination, compared to control participants. Cognitive avoidance of memories was also higher among those with depression, compared to controls, but only for participants from East Asian backgrounds.

Overall, the findings suggest that intrusive memories are associated with depression and warrant clinical attention for both cultural groups. Interventions targeting culturally specific memory content (e.g., the degree of autonomy expressed in the memory) at this preliminary stage seem unneeded. Instead, as depression appears to be associated with similar unhelpful responses to intrusive memories cross-culturally, interventions focusing on

memory appraisals and brooding may be beneficial. Further research is needed to examine the cross-cultural efficacy of such interventions.

## Publications during enrolment

A number of the studies reported in this thesis have either been published, submitted for publication, or have been disseminated as conference presentations as outlined below:

**Peer-reviewed journal articles:**

Mihailova, S., & Jobson, L. (2018). Association between intrusive negative autobiographical memories and depression: A meta-analytic investigation. *Clinical Psychology & Psychotherapy*, *25*(4), 509-524. doi:10.1002/cpp.2184

Mihailova, S., & Jobson, L. (in press). The impact of depression and culture on responses to intrusive autobiographical memories: Cognitive appraisals, cognitive avoidance, and brooding rumination. *British Journal of Clinical Psychology*. doi:10.1111/bjc.12232

**Manuscripts submitted for publication and currently under review:**

Mihailova, S., & Jobson, L. (Under Review). Cross-cultural exploration of the characteristics, Content and themes of intrusive autobiographical memories recalled during depression. *Memory.*

**Conference presentations:**

Mihailova, S., & Jobson, L. (November, 2016). *Depression and intrusive autobiographical memories of negative past events: A meta-analysis*. Poster presented at the 7th Annual National Conference of The Australian Clinical Psychology Association (ACPA), Melbourne, Australia.

## Thesis including published works declaration

I hereby declare that this thesis contains no material which has been accepted for the award of any other degree or diploma at any university or equivalent institution and that, to the best of my knowledge and belief, this thesis contains no material previously published or written by another person, except where due reference is made in the text of the thesis.

This thesis includes two original papers published in peer reviewed journals and one submitted publications. The core theme of the thesis is cultural influences on the experience of intrusive autobiographical memories experienced by those with and without depression. The ideas, development and writing up of all the papers in the thesis were the principal responsibility of myself, the student, working within the Department of Psychology under the supervision of Dr Laura Jobson.

The inclusion of co-authors reflects the fact that the work came from active collaboration between researchers and acknowledges input into team-based research**.**

In the case of three chapters my contribution to the work involved the following:

| Thesis Chapter | Publication Title | Status | Nature and % of student contribution | Co-author name, Nature and % of Co-author's contribution | Co-author(s), Monash student Y/N |
|---|---|---|---|---|---|
| 4 | Association between intrusive negative autobiographical memories and depression: A meta-analytic investigation | Published | 75%. Formulation of research design; data collection; analysis; and writing first draft | Dr Laura Jobson, input into manuscript 25% | No |
| 6 | The impact of depression and culture on responses to intrusive autobiographical memories: Cognitive appraisals, cognitive avoidance, and brooding rumination | In press | 75%. Formulation of research design; data collection; analysis; and writing first draft | Dr Laura Jobson, input into manuscript 25% | No |
| 7 | Cross-cultural exploration of the characteristics, content and themes of intrusive autobiographical memories recalled during depression | Submitted (Under Review) | 75%. Formulation of research design; data collection; analysis; and writing first draft | Dr Laura Jobson, input into manuscript 25% | No |

I have renumbered sections of submitted or published papers in order to generate a consistent presentation within the thesis.

**Student signature:** **Date:** 28.10.19

The undersigned hereby certify that the above declaration correctly reflects the nature and extent of the student's and co-authors' contributions to this work. In instances where I am not the responsible author I have consulted with the responsible author to agree on the respective contributions of the authors.

**Main Supervisor signature:** **Date:** 28.10.19

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# CHAPTER 1

## Depression and Autobiographical Memory

### 1.1 Definition of Depression

Major depressive disorder (MDD) is characterized by a persistent low mood and/or anhedonia, with accompanying cognitive, behavioral and somatic symptoms, which impair daily functioning (American Psychiatric Association, 2013; World Health Organization, 2018). Symptoms can include weight loss or weight gain, sleep disturbances, reduced concentration, feelings of worthlessness or guilt, and suicidality (American Psychiatric Association, 2013). According to the Diagnostic and Statistical Manual of Mental Disorders – version 5 (DSM-5; American Psychiatric Association, 2013), the diagnostic criteria for depression is met when five or more depressive symptoms have been present for at least two continuous weeks, with at least one of the symptoms being persistent depressed mood or anhedonia, Moreover, these symptoms have to cause significant distress or functional impairment.

### 1.2 Prevalence

Globally, depression is estimated to affect over 320 million people (World Health Organization, 2017). Cross-nationally, 12-month prevalence rates of depression are fairly consistent (Kessler & Bromet, 2013). Estimates based on the World Health Organization (WHO) Mental Health Survey indicated that across 18 countries, the weighted average 12-month prevalence rate for a major depressive episode was 5.5% in the ten high-income countries surveyed and 5.9% in the eight included low-income countries (Bromet et al., 2011). In Australia, comparable estimates have been documented, with the 12-month prevalence rate for a depressive episode ranging from 4.1% (Slade, Johnston, Oakley

Browne, Andrews, & Whiteford, 2009) to 5.8% (Henderson, Andrews, & Hall, 2000). There is considerable cross-national variability, however, in epidemiological estimates of *lifetime* prevalence of depression. Data from the WHO Mental Health Survey indicated that lifetime prevalence was lowest in China (6.5%) and Japan (6.6%) and highest in France (21%) and the United States (19.2%) (Bromet et al., 2011). Similar patterns have been documented in other studies, with the estimated lifetime prevalence of depression typically higher in high-income countries compared to low-income countries (Kessler & Bromet, 2013). These findings may imply that depression is more common in Western, wealthy cultural contexts. However, as noted by Ferrari and colleagues (2013) in their meta-analysis of global variation in depression prevalence, the majority of literature in this area has been conducted in "Western Europe and North America, with much less from non-Western regions" (p. 475). Variation may thus reflect, or at least be influenced by, cultural biases in depression research. To address the geographical asymmetry in data collection and better understand the factors driving cross-national variance in depression prevalence estimates, Kessler and Bromet (2013) have called for greater cross-cultural comparisons in depression, including longitudinal studies.

**1.3 Quality of Life, Comorbidity and Mortality**

Almost two-thirds of individuals suffering from depression report that their quality of life is severely impaired (Rapaport, Clary, Fayyad, & Endicott, 2005). In a review of the relationship between depression and reduced quality of life, Papakostas and colleagues (2004) found that those with depression were more likely to report difficulties with interpersonal relationships, financial stress, occupational difficulties, and impaired physical health functioning. Indeed, depression is comorbid with a range of physical disorders (Mulugeta, Zhou, King, & Hyppönen, 2019), including chronic pain (Holmes, Christelis, & Arnold, 2013; Leo, 2005), heart disease (Wu et al., in press) and diabetes (Mezuk, Eaton,

Albrecht, & Golden, 2008; Nowakowska et al., 2019). Additionally, depression is a risk factor for the onset of medical conditions, such as diabetes, obesity and cardiovascular diseases (Barth, Schumacher, & Herrmann-Lingen, 2004; Knol et al., 2006; Luppino et al., 2010; Van der Kooy et al., 2007). Furthermore, depression increases medical treatment non-adherence (DiMatteo, Lepper, & Croghan, 2000; Gonzalez et al., 2008) and increases mortality risk for those with physical health conditions, such as heart disease (Barth et al., 2004).

Depression is also highly comorbid with a range of other mental health disorders, including anxiety, substance use, and personality disorders (Andrade et al., 2003; Friborg et al., 2014; Hasin et al., 2005; Lai, Cleary, Sitharthan, & Hunt, 2015). Additionally, depression is associated with an increased mortality risk generally (Ösby, Brandt, Correia, Ekbom, & Sparén, 2001) and an increased risk of death by suicide specifically (Angst, Stassen, Clayton, & Angst, 2002). According to psychological autopsy studies, between 28-67% of people who die by suicide had major depression at the time of their death (Conwell, Duberstein, & Caine, 2002; Harwood, Hawton, Hope, & Jacoby, 2001; Henriksson et al., 1993, 1995). Collectively, these findings highlight the need for effective treatments for depression.

**1.4 Societal and Economic Burden**

In addition to depression being associated with these individual costs, depression also poses considerable familial and societal burdens. In the context of the family, there is a bidirectional causal relationship between depression and marital satisfaction (Fincham, Beach, Harold, & Osborne, 1997). Furthermore, parental depression impacts a child's psychological, social, behavioural, and academic functioning, and increases the risk of a child developing depressive symptomatology (Downey & Coyne, 1990; Luoma et al., 2001; Olfson, Marcus, Druss, Pincus, & Weissman, 2003). Depression can also impact occupational functioning, either through time taken off work (absenteeism) or reductions in performance

while at work (presenteeism) (Cocker et al., 2011). A multi-national survey of primary care attendees with untreated depression indicated that the average rate of absenteeism was 2.9 days in Australia (Chisholm et al., 2003). In relation to presenteeism, almost 50% of employed Australians, with lifetime depression and symptoms in the past year, reported that their occupational functioning had been impaired due to symptoms of depression (Cocker et al., 2011). In a US sample of employees, depression was associated with an average of 8.7 days per year of absenteeism and 18.2 days of presenteeism (Kessler et al., 2006). The combined economic impact of this lost productivity due to employee depression is estimated to be US$36.6 billion per annum in the United States (Kessler et al., 2006) and AUD$12.6 billion per annum in Australia (Cocker, Sanderson, & LaMontagne, 2017). While national economic burden estimates vary due to differences in health care systems, policies and research methodologies, a systematic review of cost-of-illness studies concluded that depression is “associated with an substantial increase of direct and indirect costs, leading to a high economic burden for nations” (Luppa, Heinrich, Angermeyer, König, & Riedel-Heller, 2007, p. 42).

**1.5 Psychological Treatment and Relapse**

In light of the significant costs and impacts of depression on the individual, family and society, effective treatments for depression are needed. The predominant evidence-based psychological treatments for depression are Cognitive Behavioral Therapy (CBT; Beck, Rush, Shaw, & Emery, 1979) and Interpersonal Therapy (IPT; Klerman, Weissman, Rounsaville, & Chevron, 1984). While meta-analyses have documented the efficacy of CBT and IPT for depression (Butler, Chapman, Forman, & Beck, 2006; Cuijpers, Andersson, Donker, & van Straten, 2011; Cuijpers et al., 2013), intervention studies have predominantly recruited "White, middle-class, English-speaking" participants (Bernal & Scharró-del-Río, 2001, p. 329) and samples have not been sufficiently diverse to conduct cross-cultural

analyses of intervention effectiveness (Miranda et al., 2005). These recruitment practices reflect the broader eurocentric bias within psychological research, with studies relying primarily on Western samples (Henrich, Heine, & Norenzayan, 2010). This raises the question of whether depression treatments developed and evaluated within one cultural group can be generalized to other cultural groups (Bernal & Scharró-del-Río, 2001).

Furthermore, despite the existence of evidence-based psychological treatments, depression remains highly recurrent. Prospective population-based studies indicate that between 35% and 85% of participants will have more than one depressive episode over a 15-23 year time span (Eaton et al., 2008; Mueller et al., 1999). Relapse typically occurs within five years of the first depressive episode (Belsher & Costello, 1988; Lewinsohn, Clarke, Seeley, & Rohde, 1994) and those with a history of depression typically experience between five (Kessler & Walters, 1998) and nine (Kessler, Zhao, Blazer, & Swartz, 1997) lifetime episodes. In addition to the psychological distress associated with experiencing a relapse, each relapse compounds the risk of further episodes. It is estimated that following a first depressive episode there is around a 50% chance of experiencing a relapse, and once an individual has experienced three depressive episodes the risk of subsequent relapses is 90% (Bockting, Hollon, Jarrett, Kuyken, & Dobson, 2015). While current psychotherapeutic interventions have been shown to be effective in treating specific depressive episodes, they are less effective in preventing relapse. A recent meta-analysis found that around 40% of participants with depression who completed some form of psychotherapy experienced at least one relapse, when followed up 2 years and beyond (Steinert, Hofmann, Kruse, & Leichsenring, 2014). Furthermore, depression remains unremitting for 15% of individuals (Eaton et al., 2008).

In light of such facts, some researchers have suggested that in addition to established interventions, such as CBT and IPT, symptom-specific interventions should be developed and

trialled - such as treatments targeting intrusive memories (Brewin et al., 2009). Pilot studies have investigated several intrusive memory specific treatments for those with depression, including imagery rescripting (Brewin et al., 2009), imaginal exposure (Kandris & Moulds, 2008), and computerized cognitive bias modification to alter memory appraisals (Lang, Moulds, & Holmes, 2009; Newby, Lang, Werner-Seidler, Holmes, & Moulds, 2014). However, as these investigations were preliminary they did not consider potential cultural variance in the experience of intrusive memories, thus it is unclear if these treatment approaches are cross-culturally applicable.

**1.6 Theoretical Frameworks for Understanding Depression**

Since Beck's (1967; 1976; 2008; Beck et al., 1979) seminal theoretical account of depression, the disorder has largely been conceptualized in cognitive terms. According to Beck's (1967; 1976; 2008; Beck et al., 1979) cognitive model of depression, stressful life events can activate latent negative self-schemas—developed during childhood—which distort how the individual processes information relating to themselves, the world and the future. Several subsequent cognitive models have similarly proposed that negative interpretations of self-referent information, following stressful life events, can play a central role in the onset of depressive symptoms (Abramson, Metalsky, & Alloy, 1989; Beevers, 2005; Hankin & Abramson, 2001; Teasdale, 1988). These models suggest that the onset of a dysphoric mood can reinforce negative information processing biases, which initially precipitated the low mood, thus creating a vicious cycle that perpetuates depressive symptoms (Beevers, 2005; Ingram, 1984).

Despite the prominence of cognitive accounts of depression, a range of environmental, biological and evolutionary influences have also been proposed to confer vulnerabilities for developing depression (Allen & Badcock, 2006; Hagen, 2011; Hammen, 2005; Klein, Kotov, & Bufferd, 2011; Nettle, 2004; Sullivan, Neale, & Kendler, 2000;

Sweeney, Anderson, & Bailey, 1986). A recent unified model of depression proposed that genetic risk factors and developmental adversity predispose individuals to have a heightened biological response to stress as well as develop negative cognitive information processing biases (e.g., attention and memory) (Beck & Bredemeier, 2016). These factors collectively contribute to the development of depressogenic beliefs about the self, the world, and the future, which in the context of a stressor can result in the individual believing that they have lost an important investment (e.g., relationship) (Beck & Bredemeier, 2016). To compensate for the perceived loss, a range of energy preservation mechanisms are activated (e.g., anhedonia), which is adaptive evolutionarily (Beck & Bredemeier, 2016). While a complex interplay of cognitive, biological and environmental vulnerabilities likely account for the aetiology of depression (Beck & Bredemeier, 2016), the current research project focuses on the relationship between depression and one specific cognitive factor—autobiographical memory.

According to the Differential Activation Hypothesis (DAH; Teasdale, 1988), a cognitive model of depression, memory plays a central role in maintaining depression. Like the other cognitive models outlined above, the DAH model contends that a dysphoric mood can increase the accessibility of negative experiences and constructs, thereby, making it easier for a depressed individual to perceive and interpret subsequent events in a mood-congruent manner. Additionally, the DAH posits that during depression the recall of autobiographical memories is likely to align with this negative bias, resulting in selective memory for negative past events (Teasdale, 1988). The mood-congruent pattern predicted by the DAH model is supported by findings that those with depression exhibit a bias for recalling negative autobiographical experiences and negative information more generally (Dalgleish & Werner-Seidler, 2014; Gaddy & Ingram, 2014; Matt, Vázquez, & Campbell, 1992). This suggests that depressed mood may increase the accessibility of negative

memories, which in turn reinforces symptomatology by skewing the individual's perception of their current circumstances and their future (Dalgleish & Werner-Seidler, 2014).

### 1.7 The Involuntary Retrieval of Intrusive Negative Memories during Depression

The role of autobiographical memory disturbances in the onset and maintenance of depression has attracted significant research attention in recent years (Dalgleish & Werner-Seidler, 2014; Holmes, Blackwell, Burnett Heyes, Renner, & Raes, 2016). Autobiographical memory is defined as memory for personal events from one's past (Mathews & MacLeod, 2005; Wang & Ross, 2007). While depression is associated with several different memory disturbances (Burt, Zembar, & Niederehe, 1995; Dalgleish & Werner-Seidler, 2014; Mathews & MacLeod, 2005; van Vreeswijk & de Wilde, 2004), the current thesis focuses on the involuntary retrieval of intrusive negative autobiographical memories (hereon referred to as intrusive memories).

Cognitive studies indicate that involuntary remembering is universal and occurs as frequently as the voluntary recall of memories (Berntsen, 2010, 2012; Watson, Berntsen, Kuyken, & Watkins, 2012). When involuntary memories occur in the context of psychopathology they are described as ‘intrusive’ because the memories are usually experienced as distressing and uncontrollable (Holmes et al., 2016). While intrusive memories are the hallmark diagnostic feature of posttraumatic stress disorder (PTSD; American Psychiatric Association, 2013), intrusive memories are increasingly being recognised as a transdiagnostic phenomenon (Brewin, Gregory, Lipton, & Burgess, 2010; Krans, 2011). Over 20 years of research has now documented that depression is associated with the recall of intrusive memories relating to negative past events (e.g., Brewin, Watson, McCarthy, Hyman, & Dayson, 1998; Bywaters, Andrade, & Turpin, 2004; Kuyken & Brewin, 1994; Newby & Moulds, 2011; Parry & O'Kearney, 2014). Indeed, a recent meta-analysis estimated that intrusive memories are reported by 76% of adults with depression

(Payne, Kralj, Young, & Meiser-Stedman, 2019). Furthermore, intrusive memory prevalence remains high whether or not depressed participants have comorbid PTSD (Payne et al., 2019). In addition to being highly prevalent, such memories have been found to play a maintenance role in depression (Brewin, Reynolds, & Tata, 1999; Brewin et al., 1998; Holmes, Lang, & Deeprose, 2009; Lawrence-Wood, Van Hooff, Baur, & McFarlane, 2016). Given that intrusive memories are experienced by the majority of those with depression, contribute to the persistence of depressive symptomology, and cannot be solely attributed to comorbid posttraumatic symptomatology, they are likely to be an important treatment target in depression.

**1.7.1 Intrusive memory characteristics.** Depressed, recovered and never-depressed individuals all report intrusive memories, but intrusive memories are experienced as more frequent, distressing and vivid by those with depression when compared to healthy never-depressed controls (Bywaters et al., 2004; Newby & Moulds, 2011; Parry & O'Kearney, 2014; Payne et al., 2019). Indeed, early studies of intrusive memories in depression found that intrusion frequency was positively associated with depression severity (Brewin, Hunter, Carroll, & Tata, 1996; Kuyken & Brewin, 1994). Furthermore, intrusive memories are typically associated with sadness, guilt, helplessness, shame, anxiety and anger (Brewin et al., 1996; Patel et al., 2007; Reynolds & Brewin, 1999) as well as the maladaptive cognitive features characteristic of depression, such as lower self-esteem and greater negative attribution style (Williams & Moulds, 2010).

**1.7.2 Thematic memory categories.** Several studies have compared the thematic content of intrusive memories reported by those with depression versus those with PTSD. Reynolds and Brewin (1999) found that, compared to participants with PTSD, depressed individuals were more likely to report intrusive memories relating to others—either the death, illness or injury of family members or interpersonal problems. Participants with PTSD, by

contrast, were more likely to report intrusive memories relating to their own assault, illness or injury (Reynolds & Brewin, 1999). Similarly, Parry and O'Kearney (2014) found that 52% of depressed participants reported an intrusive memory relating to a negative interpersonal event, while the largest category reported by the PTSD group was personal assault or abuse (35%). However, this distinction has not been observed consistently in the literature. Brewin, Hunter, Carroll, and Tata (1996) found that those with depression experienced intrusive memories relating predominantly to illness/death (55.7%), followed by relationships/family concerns (21.4%), abuse/assault (18.6%), and work/finance (4.3%), compared to those without depression. Therefore, around three-quarters of intrusive memories fell in categories typically associated with trauma-associated intrusions. It is unclear, however, if Brewin and colleagues assessed whether participants also met diagnostic criteria for PTSD. Therefore, these findings may potentially reflect involuntary remembering related to trauma rather than depression.

The thematic content of intrusive memories has also been assessed by studies focusing specifically on depression. Like the results of studies comparing depression and PTSD, these investigations have similarly found that the majority of depression-related intrusive memories relate to interpersonal concerns. Williams and Moulds (2007a) found that 61% of intrusive memories reported by university students, 28% of whom met diagnostic criteria for depression, were about upsetting interpersonal episodes. Dysphoric participants have also been found to experience intrusive memories predominantly relating to interpersonal concerns (66-78% of sampled memories) (Moulds, Kandris, Williams, & Lang, 2008; Williams & Moulds, 2010). Similarly, Newby and Moulds (2012) found that almost three-quarters of sampled community participants with a current depression diagnosis reported intrusive memories relating to negative interpersonal incidents, such as relationship breakups.

**1.7.3 Intrusive memory specificity.** A specific memory is a memory whereby the recalled event "happened at a particular place and time and lasted for a day or less" (Williams et al., 2007, p. 123). It is well-established that during depression the specificity of voluntarily retrieved memories is impaired (Liu, Li, Xiao, Yang, & Jiang, 2013; Sumner, Griffith, & Mineka, 2010; Williams et al., 2007; Williams & Broadbent, 1986). By contrast, memory specificity does not appear to be impaired during the involuntary retrieval of memories by those with depression (Kvavilashvili & Schlagman, 2011; Watson, Berntsen, Kuyken, & Watkins, 2013). Thus, while overgeneral (i.e., non-specific) autobiographical memory is considered a cognitive marker of depression—one which may confer vulnerability for relapse (van Vreeswijk & de Wilde, 2004; Williams et al., 2007a) – this may not be the case for intrusive memories. However, as discussed in Chapter 2, intrusive memory specificity during depression is yet to be examined from a cross-cultural perspective.

## 1.8 Theoretical Model of Involuntary Memory Retrieval

One prominent model of autobiographical memory is the Self-Memory System (SMS; Conway & Pleydell-Pearce, 2000). The SMS provides a framework for understanding the memory impairments observed during depression, including the recall of intrusive memories. The model is also suited to cross-cultural memory research as it explicitly acknowledges that the encoding, storage and retrieval of autobiographical memories is influenced by one's 'conceptual self', which is either independently or interdependently oriented depending on the cultural and social context (Conway & Jobson, 2012; Jobson, 2009). The model further recognises that culture influences remembering by shaping the goals of the 'working self' - a structure proposed to modulate the retrieval of information. These culturally mediated processes will be considered in greater detail in Chapter 2.

The SMS model proposes that remembering is reconstructive, rather than arising out of a search for discrete, fossilized memory records, and can occur via two pathways: a

generative route and a direct route (Conway & Pleydell-Pearce, 2000). Both routes are activated in response to an external or internal cue. However, the generative retrieval route is effortful and slow while the direct retrieval route is spontaneous and fast. Generative (i.e., voluntary) retrieval occurs via an intentional, iterative process, whereby top-down executive processes search for cue-relevant information. A cycle of "search-evaluate-elaborate" continues until the relevant autobiographical knowledge is found and forms a memory (Conway, 2005, p. 616). This search occurs across a database of autobiographical information, organised hierarchically beginning with 'life story schema' at the highest level, followed by general events (e.g., buying a house), and finally event-specific knowledge (e.g., child's first day at school) (Conway, 2005; Conway, Singer, & Tagini, 2004; Conway & Pleydell-Pearce, 2000). For a memory to be reconstructed via the generative route, autobiographical representations need to be activated across the units of the knowledge base (Conway & Pleydell-Pearce, 2000; Conway et al., 2004). Generally, autobiographical memories contain information from a general event and one or more associated event specific details (Conway, 2001). The lifetime period tier may not be activated as it often maps onto several general events (Conway, 2001). Importantly, the generative route search parameters are constrained by the 'working self' - defined as a control mechanism that acts to modulate the encoding, consolidation, accessibility and reconstruction of memories, in accordance with an individual's active personal goals (Conway, 2001, 2005; Conway & Pleydell-Pearce, 2000). By moderating and filtering remembering, the working self ensures that remembering supports, rather than distracts from, current personal goals (Conway, 2005). According to the SMS model, the primary function of autobiographical memory is to document the evolution of our goals, and in so doing, also guide the self in future pursuits (Conway, 2001; Conway & Pleydell-Pearce, 2000).

In contrast to generative retrieval, direct retrieval is proposed to occur via bottom-up activation when a cue maps directly onto and activates autobiographical information associated with a single specific event (Conway, 2001, 2005). According to Conway and Pleydell-Pearce (2000), the autobiographical knowledge base is extremely sensitive to cues, both internal and external, thus resulting in the memory system continuously being activated. The model proposes that an executive or control mechanism prevents activations entering into awareness unless they relate to an active personal goal that aligns with the self (Conway & Loveday, 2015; Conway & Pleydell-Pearce, 2000). Without such a control mechanism, individuals would constantly be flooded by a stream of memories that detract focus from current goals (Conway & Pleydell-Pearce, 2000). During depression, executive control is typically impaired (Rock, Roiser, Riedel, & Blackwell, 2014; Wagner, Doering, Helmreich, Lieb, & Tadić, 2012). This may result in a greater number of memories involuntarily arising into consciousness via the direct retrieval route, when a cued sensory-perceptual representation (e.g., a smell) links directly with a specific past event and lifetime period (Conway, 2001). When such directly activated representations relate to an aversive past event, the memory may be experienced as intrusive and unwanted.

### 1.9 Theoretical Model of Intrusive Memory Maintenance during Depression

While the SMS model explains how negative autobiographical intrusions may occur during depression, Williams and Moulds (2010a) proposed a model of cognitive factors that may contribute to the persistence of intrusive memories during depression. Theoretical frameworks accounting for the persistence of intrusions during PTSD were used to inform this model. Specifically, Ehlers and Steil's (1995) PTSD appraisal model suggests that trauma-related intrusions and PTSD symptoms are maintained, not by the frequency of intrusive memories, but by their appraisals. The tendency to ascribe a negative or maladaptive appraisal to an intrusive memory determines the intensity of the associated

distress, which in turn predicts the likelihood of engaging in control strategies to mitigate the distress. Use of cognitively avoidant strategies in turn maintains intrusive memory occurrence by obstructing the emotional processing of the trauma memory content; a process necessary for the reduction of intrusive memories (Foa, Steketee, & Rothbaum, 1989). Such PTSD models have been used to inform Williams and Moulds' depression model because in both disorders intrusive memories are experienced as equally vivid and distressing (Birrer, Michael, & Munsch, 2007; Parry & O'Kearney, 2014; Reynolds & Brewin, 1999) and are associated with a comparable use of maladaptive coping strategies in response to memories (Reynolds & Brewin, 1998).

Williams and Moulds (2010a) propose that when intrusive memories are experienced during depression, maladaptive appraisals about the intrusions interact with beliefs about needing to control intrusions, which in turn leads to distress. To cope with the distress, depressed individuals use a range of cognitive avoidance strategies as a way of distancing themselves from the emotional intensity of the memory (Williams & Moulds, 2010a). As with PTSD, while the depressed individual uses cognitive avoidance to reduce intrusion distress, avoidance mechanisms are proposed to contribute to intrusion maintenance by impeding emotional processing of the memory's affective elements (Williams & Moulds, 2010a). The sections below will briefly consider the role of appraisals and avoidance strategies in relation to intrusive memories. Chapter 2 will subsequently consider appraisals and cognitive avoidance strategies from a cross-cultural perspective.

**1.9.1 Maladaptive memory appraisals.** Starr and Moulds (2006) found that the negative meanings ascribed to intrusive memories (i.e., "something is wrong with me") were correlated with depressive symptoms, in a non-clinical sample, even after controlling for the frequency of intrusions. Additionally, stepwise multiple regression analyses involving intrusion frequency, severity, dissociation, rumination, suppression and negative appraisals,

indicated that negative appraisals were the strongest predictor of depressive symptoms (Starr & Moulds, 2006). Negative appraisals of intrusive memories were also positively associated with the use of cognitive avoidance strategies, such as rumination and suppression. Starr and Moulds concluded "that it is the meaning that individuals give to intrusive memories, rather than the intrusions themselves, that is associated with low mood" (p. 131). These findings were replicated by Williams and Moulds (2008) who found that ascribing a negative meaning to an intrusive memory was positively associated with intrusion-related distress, the use of cognitive avoidance strategies and dysphoria in a non-clinical sample. Furthermore, Newby and Moulds (2011) found that ascribing a negative interpretation to intrusive memories predicted depressive symptoms at six-month follow-up.

Several different appraisal themes have been documented. Newby and Moulds (2010) reported that, compared to controls, depressed participants reported a stronger belief that their memory signalled a psychological problem, they endorsed more critical self-evaluations in response to the memory, and they had a greater need to control their memory. Williams and Moulds (2008) also found that dysphoria was positively associated with beliefs that intrusive memories need to be controlled. Additionally, endorsing a strong need to control appraisals is associated with intrusion-related distress and the use of cognitive avoidance strategies (Williams & Moulds, 2008) Overall these findings provide empirical support for Williams and Moulds' (2010a) model.

**1.9.2 Avoidance of intrusive memories.** Spenceley and Jerrom (1997) found that cognitive avoidance of intrusive memories was associated with depression severity. Specifically, severely depressed women engaged in twice as much avoidance in response to their intrusive memories compared to healthy and moderately depressed women. Non-clinical studies have similarly found that intrusive memory avoidance is significantly associated with dysphoria (Starr & Moulds; 2006; Williams & Moulds, 2007b). Thus, cognitive avoidance of

memories is likely to be an important cognitive factor to target during treatment for depression, given that the severity of attempts to avoid intrusions have been found to predict depression at six-month follow up (Brewin et al., 1999).

Rumination in response to intrusive memories has also been proposed to be maladaptive (Williams & Moulds, 2010a), given that rumination can also function as a cognitive avoidance strategy (Dickson, Ciesla, & Reilly, 2012; Watkins & Moulds, 2007). Rumination has traditionally been defined as the process of repetitively and passively thinking about the causes and consequences of depressive symptoms (Nolen-Hoeksema, 1991, 2000). Refinements to rumination models have recognized that rumination is not a unitary construct but rather encompasses separate rumination sub-types (e.g., Trapnell & Campbell, 1999; Treynor, Gonzalez, & Nolen-Hoeksema, 2003; Watkins & Teasdale, 2001, 2004). One distinction identified through factor analyses of rumination self-report measures is the contrast between brooding-rumination (i.e., passive "why" focused dwelling on problems and symptoms) and reflective-rumination (i.e., active solution-focused introspection) (Armey et al., 2009; Schoofs, Hermans, & Raes, 2010; Treynor et al., 2003). Brooding-rumination is proposed to be maladaptive, given that it is positively associated with an attentional bias towards negative stimuli and those with depression engage in significantly greater brooding-rumination compared to controls (Joormann, Dkane, & Gotlib, 2006). Furthermore, brooding predicts depressive symptoms both concurrently and longitudinally (Burwell & Shirk, 2007; Schoofs et al., 2010; Treynor et al., 2003; Watkins, 2009).

Brooding-rumination is associated with the use of avoidant coping strategies (Burwell & Shirk, 2007; Moulds, Kandris, Starr, & Wong, 2007). Rumination can function as an avoidance strategy by solidifying the individual's belief that they have little control over their situation, thus relieving them of responsibility for addressing difficult situations and temporarily reducing their distress (Nolen-Hoeksema, Wisco, & Lyubomirsky 2008).

Rumination is also proposed to function as an avoidance mechanism by enabling the individual to think about problems in abstract terms, and thus distance themselves from the associated physiological and affective responses (Cribb, Moulds, & Carter, 2006; Watkins & Moulds, 2007). In relation to intrusive memories specifically, rumination and depressive intrusions appear to have a bi-directional impact on each other. Newby and Moulds (2012) found that 92% of clinically depressed participants reported that their intrusive memory triggered rumination, and 75% of the same sample reported that rumination triggered further intrusive memories. This is consistent with Williams and Moulds' (2010b) finding that analytical rumination during dysphoria is associated with more distressing and negative intrusive memories, and negative mood, compared to distraction. Ruminating in response to intrusive memories has also been associated with attributing a negative meaning to intrusions (Starr & Moulds, 2006) and beliefs that intrusions should be controlled (Williams & Moulds, 2008). These findings are consistent with Williams and Moulds' (2010a) model of intrusive memories in depression, which posits that avoidance strategies, such as rumination, are employed in response to the distress elicited by negative appraisals of memories. While clinical studies suggest that brooding is maladaptive, brooding-rumination will be considered from a cultural perspective in Chapter 2, as cross-cultural studies suggest that use of this strategy may be culturally influenced.

**1.10 Summary**

Depression is a highly prevalent, disabling psychological disorder that remains recurrent despite the existence of evidence-based treatments. Prominent models of depression propose that cognitive factors play a key role in the onset and maintenance of the disorder. Of relevance to the current thesis are theoretical models and empirical studies highlighting the role of autobiographical memory disturbances, in particular the involuntary retrieval of intrusive negative memories. Intrusive memories are highly prevalent and frequent during

depression and are experienced as distressing and vivid. Consistent with the negative recall biases characteristic of depression, intrusive memories relate predominantly to themes of interpersonal difficulties. Williams and Moulds' (2010a) model of intrusive memory maintenance during depression proposes that intrusion recurrence is facilitated by maladaptive memory appraisals and the subsequent use of avoidance strategies to downregulate distress. While evidenced-based treatments exist for depression, with some treatments specifically targeting memory disturbances, to date, there has been little consideration of the potential influence of culture on intrusive remembering during depression.

# CHAPTER 2

# The Influence of Culture on Autobiographical Remembering and Responses to Emotional Experiences

## 2.1 What about Culture?

The potential role of culture is notably absent from models of depression (e.g., Beck & Bredemeier, 2016), including models of intrusive autobiographical memories recalled during depression (Williams & Moulds, 2010a). This is pertinent to consider because alongside the clinical literature investigating memory disturbances in depression, a growing body of cross-cultural studies have consistently demonstrated that culture influences autobiographical memory. Cross-cultural studies have also documented cultural variance in psychological processes such as appraisals of events and the regulation of distress – the exact processes hypothesized to contribute to the maintenance of intrusive memories during depression. Therefore, it is timely that findings from the clinical and cross-cultural research streams are integrated, thereby allowing an investigation of potential cultural differences and similarities in the experience of intrusive memories during depression. This chapter will discuss key findings from the cross-cultural literature relevant to this aim.

### 2.2 Definition of Culture

Culture is a fluid, dynamic concept that is not tied to specific group membership but rather represents "shared, learned behavior and meanings" (Marsella & Yamada, 2007, p. 801). Culture can be represented psychologically (i.e., values) and materially (i.e., institutions), with these internal and external cultural frameworks evolving over time and being socially transferred (Adams & Markus, 2004; Markus & Kitayama, 2010; Marsella & Yamada, 2007). Through these frameworks culture acts as a symbolic information system

that provides individuals with a lens through which to understand and interpret the world (Geertz, 1973; Marsella & Yamada, 2007; Schneider, 1976).

**2.3 How Do Cultures Differ?**

In a seminal paper, Markus and Kitayama (1991) proposed that cultures vary in their understanding of the relationship between the *self and others.* More specifically, cultures are proposed to differ with regard to whether it is normative for the social environment to be comprised of independent actors, who are primarily attuned to their subjective internal experience, or alternatively interdependent actors, who are attuned to the thoughts, feelings and behaviours of those around them (Markus & Kitayama, 2010). Within cultures where an independent self is normative (typically 'Western'; European countries), the individual seeks to establish and maintain a sense of autonomy and uniqueness, and others primarily serve a comparative purpose (Markus & Kitayama, 1991, 2010; Nisbett & Masuda, 2007). Therefore, it is culturally adaptive to perceive oneself as separate from others and adopt an egocentric focus on private cognitions, emotions, and goals (Markus & Kitayama, 1991; 2010). This independent orientation is purported to stem back to ancient Greece, from which modern European civilization emerged (Nisbett, Peng, Choi, & Norenzayan, 2001). As a society, ancient Greece located "power in the individual" and thus personal choice, freedom and autonomy were seen as foundational rights (Nisbett et al., 2001, p. 292).

By contrast, East Asian cultures have been influenced by ancient Chinese culture, which located power in the collective (Nisbett et al., 2001). As a result, an interdependent self orientation is purported to be normative in East Asian cultures, meaning that the individual self is focused on social connections, obligations and reciprocity, and group harmony is prioritized over personal goals and expression (Markus & Kitayama, 1991; 2010; Nisbett et al., 2001). Therefore, in interdependent cultures it is normative to seek to conform and adjust to the social context rather than assert one's distinctiveness (Markus & Kitayama, 2010).

Importantly, these independent and interdependent self-construals are considered to be dimensional, rather than categorical, meaning that while one aspect of self may be dominant, every individual is likely to exhibit or endorse elements of both (Conway & Jobson, 2012; Markus & Kitayama, 1991). That is, while different cultural belief systems may preferentially foster the independence or interdependence of individuals, members of a society typically seek to both establish social bonds and distinguish themselves from others (Markus & Kitayama, 2010; Wang & Conway, 2004).

In addition to the proposed distinction between independent and interdependent self-orientations at the individual level, researchers have also contrasted cultures at a country-level on the basis of individualism/autonomy and collectivism/relatedness (Hofstede, 1983; Markus & Kitayama, 1991, 2010; Sato, 2001; Triandis, 1995). Individualistic cultures are purported to prioritize the needs of the individual, perceive the individual self as being fixed regardless of the context, and explain behaviour in terms of internal attributes (Triandis, 2004). By contrast, collectivist cultures prioritize the goals of the ingroup, rather than the individual, acknowledge the influence of contextual factors, and thus perceive the individual self as flexible across different environments, and see behaviour as being shaped by external influences, such as social roles and expectations (Triandis, 2004). Accumulating evidence demonstrates that cultural differences in self orientation influence a wide range of cognitive processes, including autobiographical memory (Boduroglu, Shah, & Nisbett, 2009; Chua, Boland, &. Nisbett, 2005; Masuda & Nisbett, 2001; Nisbett & Masuda, 2003; Ross & Wang, 2010).

### 2.4 The Influence of Culture on Autobiographical Remembering

Culture and memory have a dynamic, reciprocal relationship (Wang & Brockmeier, 2002). According to cross-cultural theorists, cultural beliefs promoted at the macro level may influence what self-referent information (e.g. personal achievements versus compliance with

social duties) is attended to, encoded, stored and retrieved by an individual (Markus & Kitayama, 1991; Wang & Conway, 2004). Remembering may in turn reinforce one's existing, dominant cultural self-construal, such that a memory either supports the formation of an autonomous, separate sense of self, or the formation of an identity anchored in interrelatedness (Conway & Jobson, 2012; Wang & Brockmeier, 2002). This section will review how the SMS model of autobiographical memory, discussed in Chapter 1, accounts for the role of culture in remembering, before outlining documented cultural differences and similarities with regard to autobiographical memory, appraisals and emotion regulation.

**2.4.1 Theoretical framework accounting for the influence of culture on autobiographical memory.** The SMS model of autobiographical memory explicitly acknowledges the role of self in remembering (Conway 2005; Conway & Pleydell-Pearce, 2000). According to the SMS, autobiographical remembering requires the working self to interact with both the autobiographical knowledge base (where self-referent information is stored) and the conceptual self (Conway, 2005; Conway et al., 2004). According to Conway and colleagues (2004) the conceptual self is comprised of "socially-constructed schemas and categories that help to define the self, other people, and typical interactions with others and the surrounding world" (p. 500). The conceptual self is thus shaped by influences particular to one's historical, political, and social context. Therefore, the dominant cultural orientation towards selfhood (i.e., independent; interdependent) within which the individual is situated, influences one's conceptual self, which in turn influences remembering (Jobson, 2009). Cultural variation in conceptions of self is also proposed to influence remembering by impacting the working self (Jobson, 2009). The function of the working self is to regulate remembering in accordance with one's current goals (Conway & Pleydell-Pearce, 2000). The working self is proposed to influence what information is encoded to ensure it is goal-relevant (Conway & Pleydell-Pearce, 2000; Wang, 2016). Furthermore, during retrieval an

individual's current goals, including those that are culturally shaped, are likely to influence what stored information is accessed and how that information is elaborated in order to reconstruct a memory (Wang & Ross, 2007). Fundamental goals, such as autonomy and relatedness, co-exist with regard to the working self (Conway & Jobson, 2012). However, culturally prioritized goals are likely to be dominant in regulating remembering (Conway & Jobson, 2012; Wang, 2016). Thus, within cultures where independence is valued, autobiographical memory is likely to emphasize the individual's autonomy and uniqueness (Wang, 2016). By contrast, within cultures where interdependence is prioritized, memory content is likely to be relationally focused on significant others and social interactions (Wang, 2016).

**2.4.2 Memory content differences with non-clinical samples.** Cross-cultural non-clincial research has documented several differences in the content of voluntarily retrieved autobiographical memories. More specifically, compared to those from interdependent cultures, participants from independent cultures are more likely to retrieve memories that emphasize their autonomy and individuality - with memory content focusing on their personal thoughts, beliefs, emotions, and roles (Wang, 2016). By contrast, those from interdependent cultures recall memories that have a greater emphasis on social roles and engagement with others, when compared to those from independent cultures (Wang, 2016). Furthermore, memories reported by those from independent cultures tend to be lengthier and exhibit a positivity bias, whereas those from interdependent cultures report briefer memories that are more balanced in their valence (Wang, 2016). Those from independent cultures also retrieve memories that are more specific (i.e., refer to an event taking place at a particular time and place; Dritschel, Kao, Astell, Neufeind, & Lai, 2011), compared to those from interdependent cultures, who instead recall memories that are more general in their focus (Dritschel et al., 2011; Wang, 2016). As noted by Wang (2001), these patterns are consistent

with theoretical differences in self-construal. Those with a dominant independent self-concept provide detailed, specific, and self-focused accounts of their personal history thereby supporting the process of differentiating themselves from others (the independent self). Such a differentiating function may be less adaptive in an interdependently oriented culture, where value is placed on the individual complying with social roles and prioritizing group connectedness over self-distinction (Wang, 2001).

**2.4.3 Memory similarities within clinical samples.** While cross-cultural differences in remembering are well established, recent clinical research has also documented cultural similarities in voluntary autobiographical remembering in those with emotional disorders. With regard to depression, Jobson and colleagues (2018) found that both Malay and British participants with depression exhibited a negativity bias in the structure of their autobiographical life stories, compared to controls. Furthermore, Dritschel, Kao, Astell, Neufeind, and Lai (2011) reported that both British and Taiwanese depressed groups exhibited reduced memory specificity compared to their non-depressed counterparts. Impairments in memory specificity have similarly been observed pan-culturally in those with high trauma exposure (Humphries & Jobson, 2012) and PTSD (Jobson, Moradi, Rahimi-Movaghar, Conway, & Dalgleish, 2014), compared to control groups. Moreover, certain cultural differences in memory content, observed in non-clinical samples, are not evidenced in the context of psychopathology. For example, while healthy control participants from independent cultures have been found to express greater autonomy and self-determination when remembering, autonomous-themed memory content does not differ cross-culturally in those with PTSD (Jobson et al., 2014; but see Jobson, 2011). Collectively, these findings suggest that in the context of psychopathology the influence of culture on remembering may be minimized, such that memory content and specificity is similar cross-culturally. The precise mechanism by which emotional disorders disrupt the influence of culture on

remembering is unclear. However, it is possible that processes associated with memory impairments in the context of psychopathology, such as rumination and avoidance, may override cultural differences in self-construal, thus resulting in similar memory disturbances cross-culturally (Dritschel et al., 2011; Watson & Dritschel, 2015).

In sum, cross-cultural research has documented both differences and similarities in the content of voluntarily retrieved autobiographical memories. It is unclear, however, if these cultural patterns extend to involuntarily retrieved intrusive memories in depression.

## 2.5 The Potential Influence of Culture on Responses to Memories

In addition to influencing the content of autobiographical memories, culture may also influence the way in which intrusive memories are appraised and responded to. There are documented cultural differences in the perception of emotions and the use of emotion regulation strategies, which are discussed below. This is important to consider given that intrusive memory appraisals and cognitive avoidance strategies used in response to memory distress are proposed to contribute to the maintenance of intrusions during depression (Williams & Moulds, 2010a).

**2.5.1 Theoretical accounts of cultural differences in appraisals and responses to emotional experiences.** A pan-cultural view of emotional experiences would suggest that all individuals strive for a life based on hedonism, where positive emotions are prioritized over negative emotions (Kuppens, Realo, & Diener, 2008). Several researchers, however, have questioned this by highlighting the role of culture in moderating the appraisal of emotional experiences (Bagozzi, Wong, & Yi, 1999; De Vaus, Hornsey, Kuppens, & Bastian, 2018; Kuppens, et al., 2008; Nisbett et al., 2001). Cultural differences in the appraisal of emotions relate to the dominant cognitive orientation of a culture (Mesquita & Walker, 2003). More specifically, Western cultures are hypothesized to rely on an analytical cognitive orientation. This orientation stems back to ancient Greece, where understanding was pursued through

formal logic, the deconstruction of the whole into discrete parts, and a resolution of contradiction through dichotomous arbitration (Nisbett et al., 2001). Such an orientation is proposed to result in emotions being perceived as existing in distinct, opposing valence categories, where negative emotions are appraised as an aversive obstacle to happiness and well-being (Bagozzi et al., 1999; De Vaus et al., 2018). Furthermore, according to Kuppens, Realo, and Diener (2008), the perception of negative emotions as aversive, and thus to be avoided, is likely to be particularly pertinent in independent cultures because negative experiences violate the cultural norms of self-distinction. Indeed, in independent cultures the individual seeks to achieve recognition through positive accomplishments that set them apart from others (Mesquita & Walker, 2003).

By contrast, Eastern cultures are purported to have adopted the ancient Chinese holistic, dialectical cognitive orientation, whereby attention is directed to the broader context rather than discrete focal objects, and apparent contradictions are resolved through synthesis (Nisbett et al., 2001). Therefore, within cultures that appraise experiences through a dialectical perspective, emotions of different valence are likely to be perceived as being able to co-exist (De Vaus et al., 2018). That is, negative emotions may not be seen as personally threatening because they do not negate one's ability to experience positive emotions. This is supported by empirical research showing that those from interdependent cultures, such as Japan, report equally frequent negative and positive emotions and appraise their emotional lives as neither positive or negative (Kitayama, Markus, & Kurokawa, 2000; Mesquita & Karasawa, 2002). This suggests that East Asian cultures may not perceive negative and positive emotions as mutually exclusive. By contrast, those from independent cultures, such as America, report more frequent positive, compared to negative emotions, and appraise their emotional lives as more positive than neutral - reflecting the cultural value placed on maintaining a positive self view (Kitayama et al., 2000; Mesquita & Karasawa, 2002).

Furthermore, individual negative experiences, such as failure, may be better tolerated in interdependent cultures, as such experiences may function to provide information about how to meet one's social obligations in the future (Kuppens et al., 2008). Indeed, self-criticism and modesty are likely to be adaptive in interdependent cultures as they ensure that the individual remains focused on fitting in with the group, rather than demonstrating personal distinction (Mesquita & Walker, 2003). It is not yet known if these theoretical distinctions in cultural orientation influence the perception and appraisal of negative intrusive memories, in those with and without depression.

**2.5.2 Cultural differences in appraisals of emotional experiences.** As discussed in Chapter 1, Williams and Moulds (2010a) proposed that intrusive memories recalled during depression are maintained in part by the attribution of maladaptive memory appraisals. Compared to healthy controls, those with depression assign stronger negative meanings to the experience of intrusive memories - namely, that involuntarily remembering negative experiences signals psychological dysfunction (Newby & Moulds, 2010; Williams & Moulds, 2010a). The tendency to ascribe such appraisals by those with depression may not be specific to the experience of intrusive autobiographical memories, but instead may "reflect beliefs about the experience of any negative emotion or experience" (Williams & Moulds, 2010a, p. 370). Such appraisals may be influenced not only by psychopathology but also by cultural norms. In independent cultures the individual is perceived to influence their environment through stable, internal attributes (Heine & Hamamura, 2007). It is thus culturally adaptive to perceive oneself in a positive light - as a competent and intelligent individual capable of exercising agency in pursuit of their goals (Heine & Hamamura, 2007). This cultural bias towards positive self-appraisals is reflected in findings that those from Western backgrounds tend to assume greater responsibility for positive events and discount negative feedback, when compared to those from Asian cultures (Anderson, 1999; Heine,

Kitayama, & Lehman, 2001). Furthermore, meta-analyses indicate that Westerners engage in significantly more self-enhancement (i.e., positively appraise themselves) than East Asians (Heine & Hamamura, 2007). Given the independent cultural emphasis on maintaining a positive self-view, those from Western cultures may minimize negative appraisals of intrusive memories.

By contrast, those from East Asian backgrounds may judge their intrusive memories more harshly, given that individuals in Asian cultures exhibit a stronger tendency to be self-critical, compared to those from Western cultures (Heine & Lehman, 1999). Attending to negative information about oneself may be adaptive in East Asian cultures given that a focus on personal weaknesses is purported to function as a motivator for working towards self-improvement (Heine & Hamamura, 2007; Kitayama, Markus, Matsumoto, & Norasakkunkit, 1997). In particular, cross-cultural theorists have proposed that self-critical appraisals can be interpersonally beneficial in certain contexts. By being sensitive to social standards and potential personal transgressions the individual can take remedial action and thus continue to fit in with the social unit (Kitayama et al., 1997). Such an outcome is valued in an interdependent cultural context because the individual succeeds not through personal achievement but by demonstrating to significant others that they are meeting their social roles (Heine & Hamamura, 2007). For those from East Asia, intrusive memories may be experienced as reminders of personal failings, prompting a self-critical response that is reflected in stronger negative memory appraisals, compared to those from Western cultures.

In addition to negative memory appraisals, Williams and Moulds' (2010a) model also posited that appraisals about needing to control intrusions are implicated in the persistence of intrusive memories. Control appraisals of intrusive memories may also vary culturally. The perception of having control over events is likely to be adaptive in independent cultures, as it accords with the cultural emphasis on the self-determining individual exercising agency over

their environment (Cheng, Cheung, Chio, & Chan, 2013; Markus & Kitayama, 2010). By contrast, in interdependent cultures the individual is seen as being embedded in, and changed by, their social context (Markus & Kitayama, 1991; Nisbett & Masuda, 2007). Therefore, in interdependent cultures the perception of individual control over events may not be culturally normative. This is supported by findings that those from interdependent cultures (e.g., Asia) endorse having less personal control over events (O'Connor & Shimizu, 2002; Sastry & Ross, 1998) are instead are more likely to attribute control over events to external factors, such as chance, fate or powerful figures, compared to those from independent cultures (Cheng et al., 2013; Wrightson & Wardle, 1997). These proposed cultural distinctions also highlight that control may not be a unitary construct. That is, in Western contexts like America, the individual seeks to exert control by trying to influence their external environment, while in East Asian contexts like Japan, the individual endeavours to control their internal experience in order to accommodate themselves to the environment (Tweed, White, & Lehman, 2004; Weisz, Rothbaum, & Blackburn, 1984).

In the context of psychopathology, depressed Caucasian participants endorse having greater control over stressful past events, compared to depressed Asian participants (Fry & Grover, 1982). Furthermore, the importance of perceived personal control in independent cultures is reflected in the fact that British trauma survivors with PTSD ascribe less personal control when recalling a trauma memory (Engelbrecht & Jobson, 2014) and report using fewer cognitive control strategies (Jobson & O'Kearney, 2009), compared to British trauma survivors without PTSD. By contrast, perceptions of control do not differ between those with and without PTSD from interdependent cultures, when recalling negative or traumatic memories (Engelbrecht & Jobson, 2014). Furthermore, among European Australian trauma survivors, PTSD symptoms are strongly predicted by reduced perceived personal control, but reduced control is only moderately predictive of PTSD symptoms among Asian Australian

trauma survivors (Bernardi & Jobson, 2019). The relationship between control appraisals and trauma symptomatology was mediated by the strength of an individual's endorsement of independent self-construals (Bernardi & Jobson, 2019). Collectively, these findings suggest that for those from independent cultures trauma may threaten the individual's sense of autonomy, leading to reductions in perceived control over events, which is incongruous with independent cultural norms (Engelbrecht & Jobson, 2014; Jobson, 2009). Reduced control thus appears to be psychologically and culturally maladaptive in independently oriented contexts. It is unclear if psychopathology and culture will interact in a similar way with regard to appraisals of intrusive memories during depression.

A third appraisal type, which is absent from Williams and Moulds' (2010a) model but has been shown to vary culturally and is potentially relevant to intrusive memories, is the assumption of responsibility for stressful events. Those from Asian backgrounds assume greater self-responsibility for the occurrence of negative events, compared to Caucasian participants (Anderson, 1999; Bjorck, Cuthbertson, Thurman, & Lee, 2001; Fry & Grover, 1982; Tweed et al., 2004). For those in Western, independent cultures, downplaying responsibility for negative events is consistent with the value placed on maintaining a positive self-view (Mesquita & Karasawa, 2002; Mesquita & Walker, 2003). By contrast, for those in Asian cultures, assuming responsibility for negative experiences may be seen as consistent with the tendency to be self-critical, in order to prevent and redress personal violations of expected social roles (Heine et al., 2001; Heine & Lehman, 1999; Heine, Lehman, Markus, & Kitayama, 1999; Kuppens et al., 2008; Mesquita & Karasawa, 2002; Mesquita & Walker, 2003).

**2.5.3 Cultural differences in the use of avoidant emotion regulation strategies.** Cross-cultural studies have also documented differences in the use and impact of emotion regulation strategies. This is pertinent to the experience of intrusive memories during

depression, given the hypothesized role of avoidant coping in maintaining intrusions (Williams & Moulds, 2010a). While several avoidant coping strategies have been proposed to maintain intrusive memories (Williams & Moulds, 2010a), this section will highlight cultural differences in the use of cognitive avoidance and brooding-rumination.

Those from interdependent cultures engage in higher avoidance of unwanted cognitions and emotions in response to stressful events, compared to those from independent cultures (Bjorck et al., 2001; Cook & Hayes, 2010; Sheu & Sedlacek, 2004). Furthermore, interdependent self-construals are positively correlated with the tendency to engage in avoidance coping (Kuo, Roysircar, & Newby-Clark, 2006), and to set goals focused on avoiding negative outcomes (i.e., not meeting social expectations) (Elliot, Chirkov, Kim, & Sheldon, 2001). Indeed, the desire to avoid negative outcomes is of greater concern to those from East Asian cultures than those from Western backgrounds (Hamamura, Meijer, Heine, Kamaya, & Hori, 2009). For those from interdependent cultures, such avoidance tendencies may function to enable the individual to continue to fit in socially, by minimizing in-group tensions and maintaining focus on complying with social roles (Kuo et al., 2006). Furthermore, being approach-focused (i.e., trying to change the environment) may not be compatible with interdependent cultural norms given the tendency to ascribe responsibility for the occurance of events to factors outside of oneself (e.g., fate) (Kuo et al., 2006). By contrast, in independent cultures where self-determination is valued, exerting effort to change circumstances is culturally normative, while avoidance is culturally incongruous as it implies passivity on the part of the self-determined individual (Kuo et al., 2006).

In addition to avoidance, those from interdependent cultures have also been found to engage in more rumination, compared to independent cultures (Chang, Tsai, & Sanna, 2010; Tsai, Chang, Sanna, & Herringshaw, 2011). As noted in Chapter 1, recent theoretical discussions have noted that rumination is a complex construct that appears to encompass

different subtypes of ruminative thinking. More specifically, Treynor et al. (2003) proposed a distinction between adaptive reflective-rumination and maladaptive brooding-rumination, which is a passive, repetitive thinking style. The tendency to engage in brooding-rumination, like rumination more broadly, has been found to vary culturally. A cross-country comparison, for example, found that Chinese adolescents (interdependent culture) reported a higher tendency to engage in brooding-rumination compared to adolescents in New Zealand (independent culture) (Jose, Kramar, & Hou, 2014). Similarly, Korean college students (interdependent culture) reported brooding more frequently compared to American students (independent culture) (Kwon, Yoon, Joormann, & Kwon, 2013). Likewise, Russian participants (although European endorse interdependent cultural norms) reported a higher tendency to engage in rumination and brooding-rumination than European Americans (Grossman & Kross, 2010).

Culture appears to influence not only the tendency to brood (ruminate) but also the degree to which it is associated with maladjustment. For instance, while rumination and depressive symptomatology are positively associated in both Asian American and European American participants, the association is significantly weaker among those from an Asian background (Chang et al., 2010). Furthermore, Asian Americans who score high on measures of happiness, also reported greater rumination, compared to European Americans, suggesting that rumination does not negatively impact happiness for those from Asian cultures (Tsai et al., 2011). However, there is some inconsistency in this literature. Kwon, Yoon, Joormann, and Kwon (2013) found that brooding-rumination and depressive symptomatology were similarly associated among both Korean and American participants, suggesting that brooding is maladaptive cross-culturally. These inconsistencies may reflect differences in the measurement and use of rumination as a broader construct, versus the more specific brooding-rumination. Rumination may be adaptive in interdependent cultures, such as those

in Asia, as it may partly function to focus the individual's attention on maintaining expected social roles and remaining integrated with the group (Jose, Kramar, & Hou, 2014). By contrast, for those from independent cultures rumination is likely to be maladaptive as it focuses one's attention on negative affective states, which is incongruent with cultural norms emphasizing the individual as a capable and confident agent.

**2.6 Summary**

While theories and treatments have been developed for intrusive negative memories experienced during depression, to date this work has implicitly assumed that remembering is uniform across cultures. Yet theoretical models of autobiographical memory recognize that abstract cognitive structures, such as the working and conceptual selves proposed by the SMS (Conway & Jobson, 2012; Conway & Pleydell-Pearce, 2000; Conway et al., 2004), are influenced by the sociocultural context. Thus, remembering is likely to reflect normative cultural conceptions of selfhood. Indeed, as outlined above, empirical studies have established that memory content and a range of emotion regulation processes are influenced by cultural paradigms. These cultural differences are pertinent to intrusive memories because models of intrusion maintenance propose that maladaptive appraisals and associated avoidant coping strategies are central in the persistence of intrusions (Williams & Moulds, 2010a). However, past cross-cultural memory research has focused on *voluntarily* retrieved memories. Additionally, past cross-cultural research examining appraisals and emotion regulation strategies has not investigated these processes in the context of intrusive memory. Research is yet to investigate if, and how, previously documented cultural differences and similarities manifest when intrusive negative memories are recalled during depression.

# CHAPTER 3

## Overview and Research Aims

As outlined in Chapter 1, depression is a significantly disabling psychological condition affecting over 320 million people globally (World Health Organization, 2017). Depression is primarily characterized by a persistent low mood and anhedonia, in addition to disturbances in sleep, appetite or weight, energy, cognitive and psychomotor functioning, and pervasive feelings of guilt, worthlessness, and/or suicidality. Depression is a persistent, leading cause of global disease burden (Ferrari et al., 2013; James et al., 2018), with the disorder associated with diminished quality of life, marked occupational impairment and lost productivity, comorbid physical and psychological health problems, and increased mortality (Angst et al., 2002; Barth et al., 2004; Cuijpers & Smit, 2002; Lai et al., 2015; Nowakowska et al., 2019).

In light of the recent global growth in depression (Vos et al., 2016), theoretical models and clinical treatments for depression need to be broadly applicable and cross-culturally appropriate. Indeed, the need for culturally appropriate, evidenced-based treatment for depression has been explicitly recognized by leading health bodies (Australian Psychological Society, 2007; National Institute for Health and Care Excellence, 2009; World Health Organization, 2013). Yet, the efficacy of existing evidenced-based treatments has been established using predominantly European American samples (Bernal & Scharró-del-Río, 2001). This reflects the broader geographical bias within psychological research, with studies primarily being conducted in Western countries (Ferrari et al., 2013; Henrich, Heine, & Norenzayan, 2010) and samples being treated as culturally homogenous (Miranda et al., 2005). Theoretical frameworks of depression have similarly neglected to consider possible

cross-cultural variability in vulnerabilities associated with the disorder (e.g., Beck & Bredemeier, 2016). There is, therefore, a need for further basic research to consider potential cultural variability in cognitive factors that may contribute to the onset and maintenance of depression, which can in turn be targeted in psychological interventions.

One such cognitive factor - and the focus of the current thesis - is autobiographical memory. It is widely accepted that depression is characterized by a range of disruptions and disturbances in autobiographical memory (Dalgleish & Werner-Seidler, 2014). One key disturbance is the preferential recall of negative memories (Clark & Teasdale, 1982; Teasdale & Fogarty, 1979), including intrusive negative memories (Kuyken & Brewin, 1994). Intrusive memories are reported by 76% of those with clinical depression (Payne et al., 2019) and are proposed to play a maintenance role in depression (Williams & Moulds, 2010a). It is currently unclear, however, if the experience of intrusive memories during depression is consistent cross-culturally. This is of potential concern given cross-cultural literature documenting cultural differences in autobiographical remembering in non-clinical samples (Cohen & Gunz, 2002; Sutin & Robins, 2007; Wang & Brockmeier, 2002; Wang, 2001, 2004; Wang & Conway, 2004). Furthermore, clinical cross-cultural literature has reported that in the context of psychopathology, similar autobiographical memory disturbances are observed across cultures (Dritschel et al., 2011; Humphries & Jobson, 2012; Jobson et al., 2014, 2018). However, these past cross-cultural studies have focused on *voluntarily* retrieved autobiographical memories. Research is thus needed to investigate if intrusive memory characteristics, content, themes, and associated cognitive responses differ culturally. This is important as cultural variation may imply the need for cultural adaptation to memory interventions for those with depression.

The aim of the current thesis was, therefore, to amalgamate findings from clinical and cross-cultural research streams to address the noted gaps in literature examining intrusive

memories during depression. The thesis firstly reviewed the depression-related intrusive memory literature and employed meta-analytic techniques to investigate the associations between depressive symptomatology and intrusive memory characteristics and cognitive responses (Study 1/Paper 1). Such a review was timely as it has been over twenty years since the first study investigated intrusive memories in depressed samples (Kuyken & Brewin, 1994) and a quantitative synthesis of the intrusive memory literature remained absent. The thesis subsequently undertook an empirical cross-cultural investigation of the experience of intrusive memories by those with and without depression. More specifically, Study 2 employed a cross-sectional methodology to investigate if intrusive memory characteristics, content and themes differed culturally (European Australian and East Asian) in those with and without depression (Paper 2). This study also investigated whether the cognitive responses to intrusive memories (i.e., memory appraisals, cognitive avoidance, and brooding rumination) differed culturally in those with and without depression (Paper 3).

# CHAPTER 4

## Association between Intrusive Negative Autobiographical Memories and Depression: A meta-analytic investigation (Paper 1)

## 4.1 Declaration for Thesis Chapter Four

**Declaration of the Candidate:** In the case of Chapter Four, the nature and extent of my contribution to the work was the following:

| Nature of Contribution | Extent of Contribution |
|---|---|
| Conceptualisation, literature search and analysis and writing the manuscript. | 75% |

The following co-authors contributed to the work:

| Name | Nature of Contribution |
|---|---|
| Laura Jobson | Discussion of ideas expressed in the manuscript and critical review of manuscript. |

The undersigned hereby certify that the above declaration correctly reflects the nature and extent of the candidate and co-authors' contributions to this work.

**Candidate's Signature:**

**Main Supervisor's Signature:**

*Original Article*

**Association between intrusive negative autobiographical memories and depression: A meta-analytic investigation.**

**Authors:**

Stella Mihailova[1] and Laura Jobson[1]

1. Monash Institute of Cognitive & Clinical Neurosciences and School of Psychological Sciences, Monash University, VIC

This chapter constitutes a manuscript accepted for publication in *Clinical Psychology & Psychotherapy* and is formatted in accordance with requirements set by the journal. References have been changed to APA citation format to be consistent with the remainder of the thesis.

**Mihailova, S.,** & Jobson, L. (2018). Association between intrusive negative autobiographical memories and depression: A meta-analytic investigation. *Clinical Psychology & Psychotherapy*, *25*(4), 509-524. doi:10.1002/cpp.2184

## 4.2 Abstract

The study investigated several associations between depression and intrusive negative autobiographical memories. A systematic literature search identified 23 eligible studies ($N$ = 2,582), which provided 59 effect sizes. Separate meta-analyses indicated that depression was moderately, positively associated with intrusive memory frequency, memory distress, maladaptive memory appraisals, memory avoidance and memory rumination. Intrusive memory vividness was not significantly associated with depression. There was insufficient data to examine the relationship between depression and memory vantage perspective. Between study heterogeneity was high for intrusive memory frequency and memory avoidance, and the percentage of females in studies significantly moderated the relationship between these variables and depression. An additional exploratory meta-analysis (3 studies; $N$ = 257) indicated that intrusive memories were experienced more frequently by those with posttraumatic stress disorder than those with depression. Overall, the findings suggest that intrusive memories warrant clinical attention as they may contribute to the maintenance of depressive symptomatology.

*Keywords:* meta-analysis; depression; autobiographical memory; intrusive memory; involuntary memory; posttraumatic stress disorder.

## 4.3 Key Practitioner Messages

- Depression is associated with intrusive negative autobiographical memories.
- Meta-analyses indicate that the frequency of intrusive memories and the distress elicited by intrusive memories are moderately associated with depression.
- Assigning a maladaptive appraisal to an intrusive memory is similarly moderately associated with depression.
- Maladaptive emotion regulation strategies, such as avoidance and rumination, in response to intrusive memories are also moderately associated with depression.

## 4.4 Introduction

Depression is characterised by disruptions and distortions in autobiographical memory (Dalgleish & Werner-Seidler, 2014). Autobiographical memory is defined as memory for information related to the self and personal events, anchored to a particular time and place (Brewer, 1986; Dritschel, Kao, Astell, Neufeind, & Lai, 2011). Over two decades of research has documented that autobiographical memory disruptions during depression occur not only when memories are voluntarily recalled but also extend to the involuntary recall of aversive past events. In the clinical literature, the involuntary retrieval of autobiographical memories is described as 'intrusive' because the memories arise without intentional recall and are typically experienced as distressing and uncontrollable (Holmes, Blackwell, Burnett Heyes, Renner, & Raes, 2016). While intrusive memories are often attributed a central role in posttraumatic stress disorder (PTSD), they are increasingly being recognised as a transdiagnostic phenomenon (Brewin, Gregory, Lipton, & Burgess, 2010; Krans, 2011). Yet, there remains relatively little research focused on intrusive negative autobiographical memories (hereon referred to as 'intrusive memories') in depression (Holmes et al., 2016; Newby, Lang, Werner-Seidler, Holmes, & Moulds, 2014).

Up to 96% of clinically depressed people report experiencing intrusive memories (Newby & Moulds, 2010). This prevalence rate cannot be attributed solely to comorbid PTSD or subclinical PTSD symptoms, because even in non-trauma exposed depressed samples, 90% of participants report experiencing intrusive memories (Birrer, Michael, & Munsch, 2007). Furthermore, longitudinal epidemiological findings have shown that even when intrusive memories are trauma-related, in the absence of a PTSD diagnosis, continuing to experience intrusive memories 20 years after a trauma, predicts the presence of clinical depression at 28 year follow-up (Lawrence-Wood, Van Hooff, Baur, & McFarlane, 2016). Additionally, those reporting intrusive memories are four times more likely to have

depression at 28 year follow-up compared to participants not experiencing intrusive memories 20 years after the trauma (Lawrence-Wood at al., 2016).

Recent literature reviews examining the experience of negative mental imagery, including intrusive memories, during depression have highlighted that research in this area is timely because such imagery is likely to contribute to the maintenance of depression (Holmes, Lang, & Deeprose, 2009; Holmes et al., 2016; Weβlau & Steil, 2014). Whilst these reviews provided impressive syntheses of past findings, their conclusions were not based on a systematic search of the literature or a quantitative summary of previously published effect sizes. The aim of the current study, therefore, was to conduct the first systematic search of literature examining the relationship between depression and intrusive memories and to quantify effect sizes using meta-analytic techniques.

**4.5 Intrusive Memory Frequency, Distress and Vividness during Depression**

Within the general population, involuntary memory retrieval is common, universal and occurs as frequently as the recall of voluntary memories (Berntsen, 2010, 2012; Brewin, Christodoulides, & Hutchinson, 1996; Watson, Berntsen, Kuyken, & Watkins, 2012). However, during depression the phenomenological quality of involuntary remembering appears to change, potentially rendering autobiographical memories as unwanted. Depressed participants report that intrusive memories are significantly more vivid than ordinary, voluntary autobiographical memories (Patel et al., 2007). Additionally, depressed participants experience intrusive memories as significantly more vivid, more distressing, and more frequent, compared to non-depressed control participants (Newby & Moulds, 2011). Furthermore, the frequency of intrusive memories about aversive childhood events and depression severity are positively correlated (Brewin, Hunter, Carroll, & Tata, 1996; Kuyken & Brewin, 1994), and intrusion frequency at baseline predicts depression at six month follow up, even after controlling for initial severity of depression symptoms (Brewin, Reynolds, &

Tata, 1999). Consistent with these findings, Weβlau and Steil's (2014) literature review proposed that imagery frequency, vividness and distress may differentiate clinically depressed and healthy populations.

### 4.6 Intrusive Memory Appraisals and the use of Emotion Regulation Strategies in Response to Intrusive Memories

According to Williams and Moulds (2010), it is more than the mere presence of intrusive memories that is associated with depression. Instead, they propose that intrusive memories may be maintained due to the involvement of maladaptive cognitive features that characterise depression (e.g., negative cognitive appraisal style, avoidance, rumination). While these strategies (discussed further below) may provide temporary relief from any distress elicited by the intrusive memories, they ultimately maintain depression because these coping processes become associated with low mood, the disruption of successful emotional processing, and the escalation of depressive symptomatology (Williams & Moulds, 2010).

#### 4.6.1 Memory Appraisals

In a preliminary conceptual framework of intrusive memories in depression, Williams and Moulds (2010) suggest that intrusive memories may prompt maladaptive memory appraisals (e.g., 'something is wrong with me') - potentially reflecting the depressogenic, negative interpretation style characteristic of depression. Weβlau and Steil (2014) similarly suggest that intrusive memories may facilitate the recall of additional negative material, such as negative appraisals, negative automatic thoughts or beliefs and even alter information-processing by providing greater attention to negative stimuli. Cross-sectional research has shown that negative appraisals of intrusive memories are more prominent in depressed individuals, as compared to never-depressed individuals (Newby & Moulds, 2010). Additionally, ascribing maladaptive appraisals to an intrusive memory has been shown to be positively associated with dysphoria, distress, and use of maladaptive emotion regulation

strategies aimed at dampening the experience of the memory (Starr & Moulds, 2006; William & Moulds, 2008b) - thus potentially contributing to a vicious cycle.

### 4.6.2 Rumination

Williams and Moulds' (2010) framework further suggests that if a depressed individual ascribes a maladaptive appraisal to an intrusive memory, they will experience distress, which may prompt the use maladaptive emotion regulation strategies, such as rumination (i.e., the repetitive, passive, negative cyclic thinking about the causes and consequences of depressive symptoms, Nolen-Hoeksema, 1991, 2000). Rumination is positively correlated with depression (Aldao, Nolen-Hoeksema, & Schweizer, 2010) and has generally been shown to be an ineffective coping strategy as it encourages a passive focus on the distress rather than active problem-solving (Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008). Williams and Moulds thus propose that rumination prevents successful emotional processing of the memory—a process necessary for the reduction of intrusive memories. Weβlau and Steil (2014) have similarly proposed that rumination may contribute to the maintenance of intrusive memories during depression.

### 4.6.3 Avoidance

In addition to rumination, avoidant coping strategies used in response to intrusive memories may also contribute to the maintenance of depressive symptomatology (Weβlau & Steil, 2014; Williams & Moulds, 2010). Given that depression is generally characterised by avoidance, depressed individuals may use a range of behavioural, cognitive and experiential avoidance strategies (Aldao et al., 2010; Ottenbreit & Dobson, 2004; Trew, 2011) in response to intrusive memories. Attempts to cognitively avoid aversive memories, however, may lead to rebound effects (i.e., increased intrusive memories) (Wenzlaff & Wegner, 2000), thus heightening distress and prompting additional avoidance attempts (Williams & Moulds, 2007c; Williams & Moulds, 2010). This cycle may thus contribute to the persistence of

intrusive memories, although empirical support for the negative role of suppression and its rebound effect in the maintenance of intrusive thoughts and memories has been mixed (Kelly & Kahn, 1994; Wismeijer, 2012). In addition to methodological concerns regarding the measurement of the rebound effect (Rassin, 2003), suppression has been found to downregulate negative affect during unpleasant intrusions (Gagnepain, Hulbert & Anderson, 2017) and retrieval suppression can gradually diminish the tendency for memories to intrude into awareness (see Hu, Bergstrom, Gagnepain & Anderson, 2017, for review). Therefore, there is ongoing debate about the effectiveness of suppression as an emotion regulation strategy (Wismeijer, 2012).

#### 4.6.4 Observer Vantage Perspective

Another proposed strategy for modulating the distress associated with intrusive memories is the use of an 'observer' perspective (Williams & Moulds, 2010), where the event is recalled from an external, detached viewpoint, as if watching one's self in a movie (Nigro & Neisser, 1983). In the general population, autobiographical memories are typically reported from a 'field' perspective, where the event is experienced as if observing it through one's own eyes (Nigro & Neisser, 1983; Robinson & Swanson, 1993). Remembering via the less common observer perspective may serve a cognitive avoidance function because this perspective is associated with reduced affect (Robinson & Swanson, 1993), reduced emotional intensity and a reduced sense of reliving the remembered incident (Berntsen & Rubin, 2006). While use of the observer perspective may temporarily dampen distressing emotions, longitudinally a reduced tendency to retrieve field memories predicts greater depression severity at post-treatment (Kuyken & Moulds, 2009). Williams and Moulds' (2010) preliminary model thus suggests that the observer perspective may contribute to the maintenance of intrusive memories during depression.

As in the instance of suppression, however, the findings in this area are mixed; there is also evidence suggesting that when those with depression adopt an observer perspective it may have beneficial effects. For instance, Kross and colleagues (e.g., Kross & Ayduk, 2009; Kross, Gard, Deldin, Clifton, & Ayduk, 2012) have found that depressed participants who analyzed their feelings from a self-distanced perspective showed lower levels of depressotypic thought accessibility and negative affect compared to participants who adopted a self-immersed perspective. Additionally, analyzing negative feelings from a self-distanced perspective resulted in an adaptive shift in the way individuals interpreted their experience. Pfaltz and colleagues (2017) similarly found that a third-person (observer) perspective was associated with less recounting of negative experiences and assisted both depressed and healthy individuals to develop a clearer, more coherent understanding of their experience. It is unclear if these patterns also occur when the past experiences are recalled and processed involuntarily.

**4.7 Aim and Hypotheses**

The current study sought to systematically search for literature on intrusive memories in depression and estimate the magnitude and direction of the associations between depression and a) intrusive memory frequency, vividness, and distress, b) maladaptive memory appraisals, and c) maladaptive emotion regulation strategies used in response to intrusive memories (rumination, avoidance and the observer vantage perspective). Based on the preliminary conceptual frameworks proposed by Weβlau and Steil (2014) and Williams and Moulds (2010), we hypothesised that depression would be positively associated with all these variables. Moderator analyses were also planned to examine the influence of (1) sample type (clinically depressed versus non-clinical participants), and (2) gender (percentage of females within studies). We hypothesised that effect sizes would be significantly larger in clinically depressed samples (i.e., currently meeting diagnostic criteria), compared to non-

clinical samples (i.e., studies using self-report depression measures or participants not currently meeting diagnostic criteria), based on past meta-analyses showing that clinical severity moderated the relationship between maladaptive emotion regulation strategies and psychopathology (Aldao et al., 2010). We also hypothesised that a higher percentage of female participants would predict stronger associations between depression and intrusive memories, given that gender differences have been found in regards to the recall of emotional autobiographical memories (Davis, 1999) and the use of emotional regulation strategies, such as cognitive avoidance (Blalock & Joiner, 2000; Ottenbreit & Dobson, 2004) and rumination (Johnson & Whisman, 2013).

Given the possibility that the associations between depression and the experience of intrusive memories may reflect comorbid or sub-clinical PTSD symptoms, we also planned moderator analyses to examine the influence of study design. Specifically, we sought to examine if effect sizes differed between depression studies that screened for and excluded participants meeting PTSD symptoms and studies that did not. Additionally, we sought to undertake separate meta-analyses to compare intrusive memories between non-traumatised depressed samples and PTSD samples (with or without comorbid depression). As the diagnostic definition of PTSD includes intrusive memories, while depression does not include this diagnostic criteria (American Psychological Association, 2013), we hypothesised that intrusive memory frequency would significantly differ between: (1) depression studies that screened for PTSD symptoms and depression studies that did not screen for PTSD (moderator analysis); and (2) participants with PTSD versus depression (between group meta-analysis). Specifically, PTSD would be associated with a greater frequency of intrusive memories than depression. However, given the growing recognition that intrusive imagery is a transdiagnostic phenomenon (Brewin et al., 2010; Krans, 2011), we hypothesised that for the other intrusive memory variables there would be no significant differences between: (1)

depression studies that did and did not screen for PTSD symptoms; and (2) participants with PTSD versus depression.

## 4.8 Methodology

The study's methodology was informed by the Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) statement (Moher, Liberati, Tetzlaff, & Altman, 2009).

### 4.8.1 Protocol and Registration

A study protocol was registered with the International Prospective Register for Systematic Reviews PROSPERO [CRD42016037313].

### 4.8.2 Scope

The current study was limited to *involuntarily* recalled *autobiographical* memories of *negative* past events. A memory was defined as including mental images representing a portion of the original autobiographical memory. We excluded studies that focused on voluntarily recalled memories, positive autobiographical memories, or non-autobiographical imagery (e.g., daydreams, hallucinations, imagined future-oriented imagery).

### 4.8.3 Search Strategy

A systematic search for relevant peer-reviewed studies was conducted using the following databases: Ovid Medline, PsycINFO, Web of Science and Scopus. Study titles, abstracts and keywords were searched using the following search terms: (intrusi* or involuntary or spontaneous) and (memor* or imag*) and depress*. Scopus search results were restricted to the Medicine, Neuroscience, Psychology and Health Professions subject areas. If permitted by the database, searches were restricted to human studies and studies published in English. The above databases were searched from the first available date until the search date (11 June 2017). The reference lists of shortlisted full-text review articles and recent literature reviews on mental imagery during depression (Holmes et al., 2016; Weβlau

and Steil, 2014) were subsequently back searched by the first author to identify additional studies that had not been detected via the database search.

We also searched for unpublished data using the ProQuest 'Dissertations and Theses' and 'Conference Papers and Proceedings' databases, using the search strategy outlined above, from the first available date until 6 October 2017. Furthermore, we searched titles and keywords in the WorldCat 'Thesis/Dissertations' database, using a simplified search strategy due to the limitations of the search engine ("intrusive and depression" and separately "involuntary and depression", published in English). If a study was deemed potentially relevant based on its title and abstract, the full-text was accessed online if available, or we searched for the author's contact details to seek access to the manuscript.

#### 4.8.4 Eligibility Criteria

Studies were eligible if they met the following criteria: (a) participants were 18 years or older; (b) the study was published in English; and (c) the study had a depressed or dysphoric group (diagnosed by a validated diagnostic interview or by exceeding a specified cut-off on a self-report measure of depressive symptoms). We also included cross-sectional designs that administered a validated self-report depression measure to non-clinical participants, and we planned to subsequently perform moderator analyses to compare effect sizes across these different samples (i.e., depressed and non-clinical), if heterogeneity between studies was observed. Given that current conceptual frameworks focus on the role of intrusive memories in clinical depression, our literature search focused on depression and depressive symptoms and thus, we did not include studies that focused solely on depression as an affective state. Where a study measured both current affective state and depression symptoms over a past defined period (e.g., last two weeks, past month), we used the effect size associated with depression symptoms over a past defined period. To be eligible, studies

also had to: (d) provide sufficient detail to calculate effects sizes for one or more variables of interest.

Studies were excluded if one or more of the following criteria were met: the study (a) did not examine or isolate negative intrusive autobiographical memories specifically as per our scope; (b) focused on a disorder other than depression and did not measure depressive symptomatology; (c) used a single case design; (d) was a review article or book chapter; (e) was not published in English; (f) included participants that were less than 18 years old; (g) did not report effect sizes relating to at least one of the variables of interest or did not report sufficient details to calculate effect sizes; and/or (h) employed the trauma film paradigm. Research related to the trauma film paradigm was excluded because it focuses predominantly on PTSD (James, Lau-Zhu, Clark, Visser, Hagenaars, & Holmes, 2016) and there has been some debate regarding the extent to which recall of laboratory-based stimuli measures *autobiographical* remembering of personal past events (Burianova & Grady, 2007; Svoboda, McKinnon, & Levine, 2006). Additionally, whereas the trauma film paradigm is used experimentally as an analogue stressor, depression studies examining intrusive memories have typically assessed past memories of an autobiographical nature using naturalistic study designs (Brewin et al., 2010; Pearson, Deeprose, Wallace-Hadrill, Heyes, & Holmes, 2013). We thus wanted to be consistent with the methodologies employed by past depression studies. We also excluded unpublished studies if full-text access to the manuscript was not available and the author could not be contacted.

#### 4.8.5 Study Selection

Following database and reference list searches, and the removal of duplicate records, the titles and abstracts of the remaining references were screened independently by both authors to determine potential relevance based on the inclusion and exclusion criteria. The full-texts of shortlisted studies were then reviewed independently by the two authors and there was over 98% agreement between authors. At both the screening and full-text review

stages, discrepancies between the two authors regarding inclusion were resolved through discussion and consensus. Where a study was reported in multiple publications, the earliest publication was included unless the publications reported on different variables of relevance to the current study, in which case all publications were included. Two study authors were contacted to request additional data in order to calculate effect sizes, but only one author was able to provide the requested data. A number of authors of unpublished manuscripts could not be contacted, preventing us from reviewing the full-texts of these manuscripts.

#### 4.8.6 Quality Assessment

The methodological quality of the included studies was assessed by the first author using the Systematic Assessment of Quality in Observational Research (SAQOR) tool developed by Ross et al. (2011). Each study was assessed on 19 criteria relating to the following categories: (1) representativeness of the sample, (2) the use of a control/comparison group, (3) quality of outcome measurements, (4) control of PTSD as a key confounder, and (5) adequacy of data reporting. The SAQOR criteria relating to follow-up were not used. The second author also assessed 25% of included studies. There was complete agreement between raters in terms of the five categories outlined above and overall study quality.

#### 4.8.7 Coding and Data Extraction

Data coding and extraction was carried out by the first author (SM) using Excel (which was independently checked by LJ). The following data was extracted from each included study: first author; year of publication; country in which the study was conducted; study design (depression vs control, depression vs PTSD, correlational); recruitment source (e.g., hospitals, general community, university students); sample type (coded as "depressed" if diagnosis was based on a structured clinical interview and/or Diagnostic and Statistical Manual of Mental Disorders (DSM) criteria, and "non-clinical" if symptoms were assessed

using self-report measures); depression diagnostic method and/or measure used (diagnostic interview, self-report inventory with cut-off criteria, self-report inventory without cut-off criteria); mean sample age (years); gender (% female); total sample size; sample size per condition; whether comorbidities were excluded; and effect size data. Where a study reported two effect sizes for the same memory variable using two different measures, one overall average effect size was calculated.

### 4.8.8 Data Analytic Plan

Depressive symptom severity was the outcome of interest, with separate meta-analyses planned, as outlined in the Aims section, for each memory variable of interest. If a study reported outcomes for more than one variable of interest, that study was represented in multiple analyses. When only a small number of studies reported outcomes for a given variable we performed the meta-analysis but interpreted the overall effect size cautiously given the higher risk of bias (Hedges & Vevea, 1998).

**4.8.8.1 Calculation of effect sizes.** All analyses were conducted using Comprehensive Meta-Analysis, Version 3 (CMA; Borenstein, Hedges, Higgins, & Rothstein, 2005; Biostat Inc). The effect size estimator was the Pearson correlation coefficient (*r*) (Rosenthal & DiMatteo, 2001). If a correlation of interest was not reported in a cross-sectional study, that measured depression as a continuous variable based on self-reported symptom severity, Pearson's *r* was estimated using available statistical analyses. One study (Starr & Moulds, 2006) reported effect sizes using the non-parametric Kendall's tau rank correlation, which was converted to Pearson's *r* using conversion tables (Gilpin, 1993; Rupinski & Dunlap, 1996). For between-subject studies that compared a depressed group with a healthy control group, Cohen's *d* standardized mean difference was calculated first and subsequently converted to Pearson's *r* (Rosenthal & DiMatteo, 2001), such that a positive correlation corresponded to a higher mean in the depression group compared to the control

group, while a negative correlation corresponded to a lower mean in the depression group. If a study stated that an association or group difference was not statistically significant but did not provide sufficient statistics to calculate the precise effect size, we adopted the conservative strategy of assigning a correlation of 0 (Pigott, 1994).

To perform the meta-analyses, all correlation coefficients were transformed to the Fisher's *z* scale to correct for the *r* coefficients' problematic standard error formulation (Lipsey & Wilson, 2001). Following the analyses, summary Fisher's *z* values, and corresponding 95% confidence intervals, were converted back to correlation coefficients for presentation and interpretation (Borenstein, Hedges, Higgins, & Rothstein, 2009). Correlation effect sizes were interpreted according to Cohen's (1988) framework, whereby values of .10 were deemed small, values of .30 were deemed moderate, and values of .50 were deemed large.

To perform meta-analyses of studies comparing intrusive memories between depressed and PTSD samples (with or without comorbid depression), we calculated the standardised difference effect size Hedge's *g,* using group means, standard deviations and sample sizes. Where means and standard deviations were not reported, Cohen's *d* was estimated from available statistical analyses and subsequently converted to Hedge's *g*. Hedge's *g* was used instead of Cohen's *d* because it provides an unbiased estimate of the population effect size by correcting the Cohen's *d* small sample bias (Borenstein et al., 2009). Hedge's *g* values were interpreted according to Lipsey and Wilson's (1993) framework, with effect sizes ranging from 0 to 0.32 deemed small, values between 0.33 and 0.55 deemed moderate, and values between 0.56 and 1.20 deemed large.

If between-study heterogeneity was observed for an overall mean effect size, moderator analyses were planned to examine the impact of sample type, study design, and the percentage of females in studies. Categorical moderator analyses (sample type and study

design) were performed using an analogue to analysis of variance, with results interpreted according to the random effects model, and meta-regression analyses were used for the continuous moderator variable (percentage of females) (Borenstein et al., 2009).

**4.8.8.2 Heterogeneity.** A random effects model was selected a-priori for all main analyses as we expected significant heterogeneity between studies, due to differences in samples and the measures used. Heterogeneity was evaluated using Cochran's *Q* test and the $I^2$ index. A significant *Q* statistic indicates that effect sizes differ by more than would be expected by sampling error, thus the null hypothesis that included studies have a homogenous population effect size is rejected and between-study variability (heterogeneity) is assumed (Cochran, 1954; Huedo-Medina, Sánchez-Meca, Marín-Martínez, & Botella, 2006; Lipsey & Wilson, 2001). We also used the *Q* statistic to examine heterogeneity within subgroups when performing moderator analyses. As the *Q* statistic has poor power when a meta-analysis is based on a small number of studies and does not provide information about the extent of heterogeneity, the $I^2$ statistic was also calculated to quantify the degree of study variability arising from heterogeneity rather than sampling error (Higgins & Thompson, 2002; Higgins, Thompson, Deeks, & Altman, 2003). $I^2$ values range from 0-100% with larger values representing higher heterogeneity; heterogeneity around 50% is moderate and heterogeneity around 75% is high (Higgins et al., 2003).

**4.8.8.3 Sensitivity and publication bias.** As non-significant results may be harder to publish, we assessed if publication bias influenced our findings by visually inspecting funnel plots, which plot each study's effect size against its standard error. Funnel plot asymmetry, which may reflect the existence of missing studies due to publication bias, was quantified using Egger's test (Egger, Smith, Schneider, & Minder, 1997). If these analyses suggested the presence of publication bias, a trim and fill procedure (Duval & Tweedie, 2000) was planned to estimate a bias-adjusted effect size. We also calculated Orwin's fail-safe *N* (Orwin,

1983), which estimates how many unpublished studies with an average effect size of 0 would be needed to reduce the overall effect size to a specified level. We set this effect size criterion at $r = .10$ for depression studies and $g = 0.10$ for studies comparing intrusive memories between depressed and PTSD samples (Orwin, 1983).

## 4.9 Results

### 4.9.1 Characteristics of Included Studies

The process of selecting studies is outlined in the PRISMA flowchart (Figure 4.1). Twenty-three studies ($n$ = 22 peer-reviewed and $n$ = 1 unpublished), from 27 publications, met our inclusion criteria. Back-searching of the reference lists of included published studies did not identify any additional relevant studies. The 23 included studies provided 59 effect sizes from a total of 2,582 participants (*M*age = 30.4 years, 74.3% female). Ten studies were coded as using clinically depressed participants, 11 studies were coded as using non-clinical samples ($n$ = 10 used Beck Depression Inventory; $n$ = 1 used the DASS-21), and two studies were coded as using non-clinical samples even though they assessed symptoms with a structured clinical interview because only a small portion of participants met criteria for a current depressive episode. The key characteristics of included studies are shown in Tables 4.1 and 4.2.

[Insert Figure 4.1 and Tables 4.1 and 4.2 about here]

### 4.9.2 Quality of Included Studies

As shown in Tables 4.1 and 4.2, seven studies (30%) were rated as 'High' quality (low risk of bias). In addition to meeting other quality criteria, as per the SAQOR, high quality studies used a control (i.e., non-depressed) or comparison (PTSD) group and/or screened for PTSD symptoms in order to account for PTSD acting as a possible confound among depressed samples. The remaining 16 studies (70%) were rated as 'Moderate' quality.

### 4.9.3 Associations between Depression and Intrusive Memories

Separate, random effect model, meta-analyses were calculated for the correlation coefficient between depression and each variable of interest. As shown in Table 4.3, depression was positively, moderately, associated with intrusive memory frequency, intrusive memory distress, maladaptive memory appraisals, intrusive memory rumination, and intrusive memory avoidance. The overall mean weighted effect size for intrusive memory vividness revealed a negligible, non-significant association with depression. The meta-analyses for the variables vividness, rumination and maladaptive memory appraisals should be interpreted as approximate as they were each based on a small number of studies (Hedges & Vevea, 1998). While a meta-analysis can be performed with as few as two effect sizes (Valentine, Pigott, & Rothstein, 2010), there is a higher risk of bias when the study sample size is small (Hedges & Vevea, 1998).

[Insert Table 4.3 about here]

We could not conduct a meta-analysis with regards to the association between depression and the use of the observer vantage perspective because only one study examined this relationship; finding that currently depressed, recovered depressed and never depressed participants did not differ significantly in the vantage perspective from which they experienced their intrusive memory (Newby & Moulds, 2011). Several studies examining vantage perspective and depression could not be included in the current study as effect sizes could not be calculated from the reported statistics (Williams & Moulds, 2007b, 2008a) or the study did not isolate negative intrusive memories specifically (Watson et al., 2012).

**4.9.3.1 Heterogeneity analyses.** As displayed in Table 4.3, significant *Q*-statistics were observed for intrusive memory frequency, intrusive memory avoidance, and maladaptive memory appraisals indicating that between-study homogeneity could not be assumed for these variables (Cochran, 1954). Additionally, $I^2$ index statistics indicated that for these three variables a large amount of variability, ranging from 70% to 88%, was

attributable to between-study heterogeneity (see Table 4.3) (Higgins & Thompson, 2002; Higgins et al., 2003). While the intrusive memory rumination *Q*-statistic was not significant, the $I^2$ statistic indicated the presence of a moderate amount of between-study heterogeneity (Higgins & Thompson, 2002; Higgins et al., 2003). As shown in Table 4.3, the *Q*-statistic was not significant for intrusive memory distress or intrusive memory vividness indicating that between-study homogeneity could be assumed (Cochran, 1954). This was further indicated by the $I^2$ index statistics for these variables, which suggested that heterogeneity was negligible for both distress and vividness (Higgins & Thompson, 2002; Higgins et al., 2003).

**4.9.3.2 Moderator analyses.** As between-study heterogeneity was observed for intrusive memory frequency and intrusive memory avoidance, moderator analyses were performed. While heterogeneity was also observed for maladaptive memory appraisals and intrusive memory rumination, moderator analyses could not be conducted for these variables due to the small number of included studies in each meta-analysis ($n$ = 3 in both). Random effect moderator analyses indicated that sample type (depressed; non-clinical) did not significantly moderate intrusive memory frequency, *Q*-between = 2.72, $df = 1$, $p = .10$, or intrusive memory avoidance, *Q*-between = 2.42, $df = 1$, $p = .12$. As shown in Table 4.4, for intrusive memory frequency, effect sizes were moderate for both clinically depressed and non-clinical subgroups. For memory avoidance, there was a moderate effect for the non-clinical sub-group and a large effect size for the depressed sub-group, but these were not significantly different. The intrusive memory frequency and avoidance moderator analyses further revealed that while homogeneity could be assumed for the non-clinical sub-groups, for the clinically depressed subgroups there was significant, high heterogeneity among studies (see Q-within, Table 4.4).

Random effect categorical moderator analyses also indicated that study design (screening; no screening for comorbid PTSD symptoms) did not significantly moderate the

associations between depression and intrusive memory frequency, *Q*-between = .64, *df* = 1, *p* = .42, or intrusive memory avoidance, *Q*-between = .13, *df* = 1, *p* = .72. As shown in Table 4.4, both sub-groups revealed moderate effect sizes, as well as high and significant within-group heterogeneity.

Furthermore, random effects meta-regression analyses indicated that, as hypothesised, the strength of the association between depression and intrusive memory frequency varied significantly according to the percentage of females within a study, *Q* (1) = 5.04, *p* = .02. While the association strengthened as the percentage of females increased, *ß* = .007, *p* = .02, gender explained only 5% of total between study variance for memory frequency. The percentage of females also significantly influenced the strength of the association between depression and intrusive memory avoidance, *Q* (1) = 6.08, *p* = .01, with the association strengthening as the percentage of females increased, *ß* = .01, *p* = .01. The percentage of females explained 34% of total between study variance for memory avoidance.

**4.9.3.3 Publication bias.** Visual inspection of the funnel plot did not suggest significant asymmetry of effect sizes for intrusive memory frequency, intrusive memory distress, intrusive memory vividness, maladaptive memory appraisals, intrusive memory avoidance, and intrusive memory rumination. Additionally, non-significant Egger's tests suggested that significant publication bias was not present for intrusive memory frequency, $b_0$ = 1.49, *SE* = 1.08, *t* = 1.38, one-tailed *p* = .09, intrusive memory distress, $b_0$ = 3.35, *SE* = 1.92, *t* = 1.75, one-tailed *p* = .08, intrusive memory vividness, $b_0$ = 0.16, *SE* = 0.84, *t* = 0.19, one-tailed *p* = .43, maladaptive memory appraisals, $b_0$ = 2.0, *SE* = 6.98, *t* = 0.29, one-tailed *p* = .41, intrusive memory avoidance, $b_0$ = 3.56, *SE* = 2.74, *t* = 1.30, one-tailed *p* = .11, and intrusive memory rumination, $b_0$ = -2.34, *SE* = 5.06, *t* = .46, one-tailed *p* = .36. Publication bias was also assessed using Orwin's fail-safe *N* tests (Orwin, 1983), which indicated that to reduce our overall summary correlations to *r* = .10, the number of additional unpublished

studies with effect sizes of 0 needed were: 9 (maladaptive appraisals), 11 (rumination), 13 (distress), 38 (avoidance), and 59 (frequency).

### 4.9.4 Intrusive Memories during Depression versus PTSD

In terms of memory frequency, a random effects model revealed a medium, significant effect size, $d$ = -0.49; $k$ = 3; 95% CI [-0.78, -0.20], suggesting that more frequent intrusive memories are experienced during PTSD when compared to depression. Given the small number of included studies, the effect size should be considered approximate (Hedges & Vevea, 1998). As the $Q$-statistic was not significant, $Q$ = 0.16, $df$ = 2, $p$ = .92, and the $I^2$ statistic was 0, between-study homogeneity could be assumed (Cochran, 1954; Higgins & Thompson, 2002; Higgins et al., 2003). In terms of publication bias, visual inspection of the funnel plot and Egger's test, b0 = -0.86, $SE$ = 1.38, $t$ = 0.62, one-tailed $p$ = .32, did not reveal significant asymmetry or significant publication bias for memory frequency. However, Orwin's fail-safe $N$ test indicated that only 12 unpublished studies would need to exist to reduce the overall frequency summary effect size to $g$ = 0.10.

We were unable to conduct meta-analyses to compare the remaining variables between samples with depression versus PTSD, as less than three studies analysed these variables or reported adequate statistics to enable us to calculate the standardised mean difference effect size. However, of the three studies that compared intrusive memory distress between depressed and traumatised samples, Parry and O'Kearney (2014) found that those with PTSD reported more distress than those with depression. By contrast, Reynolds and Brewin (1999) reported that distress did not differ significantly between the two groups. Similarly, Birrer et al. (2007) found that intrusion distress did not differ significantly between participants with PTSD, depressed participants with trauma and depressed participants without trauma. In relation to vividness, Parry and O'Kearney (2014) found that memory vividness did not differ significantly between participants with PTSD and depression.

Similarly, Birrer et al. (2007) reported that memory vividness did not differ significantly between those with PTSD, depressed participants with trauma and depressed participants without trauma. Two studies also reported comparisons of intrusive memory avoidance, with both studies finding that avoidance did not differ significantly between those with PTSD versus depression (Parry & O'Kearney, 2014; Reynolds & Brewin, 1999). None of the included studies compared rumination, vantage perspective or intrusive memory appraisals between depressed and PTSD participants.

## 4.10 Discussion

This study conducted a systematic literature search and employed meta-analytic techniques to determine the magnitude and direction of the associations between depression and (1) intrusive memory frequency, vividness, and distress, (2) maladaptive intrusive memory appraisals, and (3) maladaptive emotion regulation strategies used in response to intrusive memories. A secondary aim was to determine if sample type characteristics and study design characteristics influenced the strength of these associations. Third, we aimed to compare intrusive memories between depressed samples and PTSD samples (with or without comorbid depression).

### 4.10.1 Associations between Depression and Intrusive Memories

As hypothesised, intrusive memory frequency was positively, moderately associated with depression. This finding is consistent with recent literature reviews regarding the frequency of negative mental imagery during depression (Holmes et al., 2016; Weβlau & Steil, 2014) and past meta-analyses showing that depression is associated with the voluntary (Matt, Vázquez, & Campbell, 1992) and implicit (Gaddy & Ingram, 2014) recall of mood-congruent information. The current results indicate that depression is also associated with the *involuntary* retrieval of mood-congruent (i.e. negative) autobiographical memories. Furthermore, as predicted, distress in response to intrusive memories was positively,

moderately associated with depression. It is unclear if intrusive memory distress arises due to the content of the memories, their involuntary nature, or some other variable, such as associated interpretations made about what the experience of intrusions means for psychological functioning. Williams and Moulds' (2010) model proposes that the level of distress may be influenced by maladaptive memory-related appraisals, such that more negative beliefs about the experience of intrusive memories coupled with beliefs about needing to control memories, result in higher distress. As the studies included in the current meta-analyses were cross-sectional, a causal relationship cannot be inferred between depression and intrusive memory frequency or intrusive memory distress. However, intrusive memory frequency has been shown to be predictive of higher depressive symptomatology at follow-up (Brewin et al., 1999; Newby & Moulds, 2011), and the results indicate that intrusive memories warrant clinical attention. There is a need for prospective datasets to clarify possible causal relationships as well as examine the influence of third variables, such as memory appraisals, on the relationships between depression and intrusion frequency and intrusion-related distress.

Depression was also positively, moderately associated with maladaptive memory appraisals, intrusive memory rumination and intrusive memory avoidance. These findings highlight that key processes implicated in the aetiology and maintenance of depression, such as negative information processing, avoidance and emotion dysregulation (Aldao et al., 2010; Trew, 2011) are relevant not only to verbal cognitions, but also to autobiographical memories. Our results are also broadly consistent with preliminary models of intrusive memories in depression, which propose that maladaptive appraisals and avoidant coping strategies play a key role in maintaining depressive symptomatology (Weβlau & Steil, 2014; Williams & Moulds, 2010). We were unable to model these hypothesised directional relationships among variables (e.g., between appraisals and the use of maladaptive emotion

regulation strategies) as the meta-analytic methodology requires variables to be examined independently. Future research should address this using multi-variate structural models.

Contrary to our hypothesis, the effect size for the relationship between depression and intrusive memory vividness was negligible and non-significant. This result is inconsistent with Weβlau and Steil's (2014) literature review, but is broadly consistent with Holmes et al.'s (2016) literature review which outlined that during depression reduced vividness appears to be observed more often when generating future-imagery, rather than recalling memories, and more often when recalling positive, rather than negative, memories. Finally, a paucity of research examining the relationship between depression and the vantage perspective of intrusive memories prevented us from conducting a meta-analysis to examine this relationship.

### 4.10.2 Moderating Effects of Sample Type and Gender

Contrary to our hypotheses, sample type did not moderate the relationships between depression and intrusive memory frequency or memory avoidance - with both clinically depressed and non-clinical sub-groups producing moderate effect sizes. This suggests that clinical severity does not significantly influence the strength of the association between depressive symptomatology and intrusive memories. This finding may suggest that the nature of these memories, which intrude into awareness and compel the individual to recollect aversive past events, may elicit avoidance efforts across the clinical spectrum.

As hypothesised, the percentage of females within studies did significantly moderate the overall associations between depression and intrusive memory frequency and avoidance. For both variables, as the percentage of females increased, the overall association increased. However, while the percentage of females did not explain much of the between study variance for intrusive memory frequency, it explained over a third of the variance for intrusive memory avoidance. These moderator results are broadly consistent with findings

that females, when compared to males, demonstrate superior accessibility for emotional autobiographical memories (Davis, 1999) and are more likely to report a history of depression (Kessler, McGonagle, Swartz, Blazer, & Nelson, 1993). Concerning the avoidance result specifically, it is in line with findings that cognitive avoidance is moderately associated with depressive symptomatology for females (Ottenbreit & Dobson, 2004) and predictive of depression symptoms for females (Blalock & Joiner, 2000). Within the context of these past findings, our results are also consistent with Williams and Moulds' (2010) model of intrusive memories, which predicts that increased attempts to cognitively avoid memories may prevent their emotional processing and thus contribute to the maintenance of memories and depressive symptomatology.

#### 4.10.3 Intrusive Memories during Depression versus PTSD

Finally, an exploratory meta-analysis revealed that, as hypothesised, participants with PTSD reported significantly more frequent intrusive memories when compared to participants with depression. This is consistent with current diagnostic characterisations of these disorders – with intrusive memories considered the hallmark feature of PTSD (American Psychological Association, 2013). Meta-analyses could not be conducted to compare the remaining variables due to an insufficient number of studies. Our inability to examine these remaining variables highlights that there is currently a paucity of literature comparing the experience of autobiographical intrusive memories during depression and PTSD, despite growing recognition that intrusions are a transdiagnostic phenomenon (Brewin et al., 2010; Krans, 2011). Further research is needed in this area because cognitive models accounting for the maintenance of intrusions in PTSD (e.g., Ehlers & Clark, 2000; Ehlers & Steils, 1995) may have utility in improving the current understanding and treatment of intrusive memories in depression.

#### 4.10.4 Clinical Implications

Greater knowledge of intrusive memories in depression has the potential to guide clinical interventions. First, as depression is associated with intrusion-related distress, clinical assessment of the experience of any such memories by depressed clients appears warranted. Regarding treatment, to alleviate intrusion distress and aid emotional-processing of the memories, imagery-focused interventions such as intrusive memory re-scripting and imaginal exposure to memories have been shown to be effective with depressed samples (Brewin et al., 2009; Kandris & Moulds, 2008; Wheatley et al., 2007). While interventions, such as memory re-scripting, target the distressing content, our findings suggest that targeting the processes (e.g., rumination and avoidance) at play during depression may be an efficient way of responding to the distress associated with aversive private experiences - whether they are thoughts or memories, whether brought into awareness voluntarily or involuntarily.

Interventions such as Mindfulness-Based Cognitive Therapy target processes such as rumination and are effective in preventing depressive relapse (Segal, Williams, & Teasdale, 2002). Indeed, a recent systematic review and meta-analysis of the psychological mechanisms underlying the effectiveness of mindfulness-based interventions concluded that changes in cognitive and emotional reactivity and repetitive negative thinking (e.g., rumination) mediated improvements in psychological functioning, including depressive symptoms (Gu, Strauss, Bond, & Cavanagh, 2015). MBCT has also been shown to improve the specificity of autobiographical memory, suggesting that process based interventions can influence autobiographical content (Williams, Teasdale, Segal, & Soulsby, 2000). Therapeutic work to target maladaptive processes, such as cognitive avoidance, may be particularly important for female clients given our gender related moderator finding and past research relating to the impact of cognitive avoidance on depressive symptoms for females. Further research needs to investigate if process level interventions can influence the distress

associated with intrusive memories recalled during depression or influence what emotion regulation strategies depressed individuals use to cope with intrusive memories.

Our findings additionally highlight that treatments targeting intrusive memories in depression should also address intrusion-related appraisals. Experimental tools, such as computerized cognitive bias modification (CBM), may be effective in manipulating appraisals about depressive intrusive memories (Lang, Moulds, & Holmes, 2009). However, early CBM paradigms targeting depressive intrusive memories used non-clinical samples and induced intrusive memories with a depressing film (Lang et al., 2009), while more recent trials with dysphoric participants experiencing intrusive memories have shown that CBM is no more effective than a control intervention (Newby, Lang, Werner-Seidler, Holmes, & Moulds, 2014). While further research is needed to examine the relationship between depression and intrusive memory appraisals, as our effect size was approximate, future examinations of the efficacy of appraisal-focused interventions appear warranted.

#### 4.10.5 Theoretical Implications

Theoretically, our results firstly lend support to Williams and Moulds' (2010) model of intrusive memories in depression. The model proposes causal relationships between depression, responses to memories and memory maintenance, which we cannot infer from our results. However, our reported positive associations between depression and intrusive memory frequency, distress, memory appraisals, memory avoidance and memory rumination are consistent with the model's proposed relationships between these maladaptive cognitive processes, memory recurrence and symptom maintenance. Similarly, the observed associations between depression and maladaptive cognitive responses to memories are consistent with models accounting for the experience of intrusive memories in PTSD (i.e., Ehlers & Steil, 1995). While we found that intrusive memories were experienced more frequently by those with PTSD versus depression, the overlap in processes suggests that

models informing intrusive memory treatment during PTSD may have relevance to depression models and interventions.

#### 4.10.6 Limitations

Several limitations need to be considered when interpreting the results of the current study. First, as noted above, the cross-sectional nature of included studies does not permit us to draw conclusions about causality or model hypothesised relationships between intrusive memory variables. Second, the precision of several effect sizes was limited due to the small number of studies comprising the meta-analyses. While several additional studies examined variables of interest they could not be included because they measured intrusive memories more broadly (i.e., included thoughts and/or imagined future images) and did not isolate negative intrusive memories in a way that enabled us to calculate effect sizes. In light of past observations that the literature occasionally lacks a clear definition of mental images (Birrer et al., 2007; Weβlau & Steil, 2014), we sought to focus exclusively on intrusive memories relating to *negative autobiographical memories*. Third, we were unable to compare most variables between samples with depression versus PTSD, indicating that more research is needed to understand how intrusive memories differ between these two, and possibly other, disorders. Such research would inform our understanding of diagnostic boundaries, shared phenomenology, and perhaps examine the efficacy of transdiagnostic interventions for intrusive memories. Fourth, there was heterogeneity among the studies reporting memory frequency, memory avoidance and memory appraisals effect sizes. While the majority of studies used the same instruments (Impact of Event Scale - Intrusion and Avoidance subscales, Horowitz, Wilner, Alvarez, 1979; Response to Intrusion Questionnaire - Negative Appraisal scale, Clohessy & Ehlers, 1999) to measure these variables, homogeneity may have been impacted by sample differences other than diagnostic status or gender. While sample type (depressed; non-clinical) did not moderate the frequency and avoidance effect sizes, for

both of these variables the clinically depressed subgroups exhibited significant, high heterogeneity. This subgroup heterogeneity may reflect between study differences in diagnostic procedures, recruitment sources, the presence of comorbid mental health conditions (e.g., anxiety disorders) or other study characteristics. Fifth, for practical reasons, we only included articles that were published in English. Finally, we only investigated the relationships between depression and the memory characteristics proposed to maintain intrusive memories (Williams & Moulds, 2010). Therefore, we did not include every memory characteristic (e.g., reliving or dissociation).

#### 4.10.7 Future Research

In addition to the research gaps noted above, further research is needed to examine if the association between intrusive memories and depression is isolated to a particular valance. That is, although the current study focused specifically on *negative* intrusive memories, as per past findings regarding negative memory biases during depression (Matt et al., 1992; Gaddy & Ingram, 2014), it is possible that involuntarily recalled memories of positive past events may similarly trigger distress and maladaptive emotion regulation strategies during depression. Indeed, one of the limitations of the included literature was a lack of clarity about the definition of a 'negative memory'. For example, it was often unclear if studies made a distinction between trauma-related and non-trauma related intrusive memories in depression. Memory content was not included in our analyses as many of the studies investigating content reported outcomes in a descriptive, categorical manner.

In light of emerging research that depression is associated with deficits in voluntarily recalling positive imagery (Holmes et al., 2016; Weβlau & Steil, 2014), further research is also needed to understand if depression is associated with the absence of involuntarily recalled positive memories. Furthermore, as individuals with depression, as well as healthy controls, report a decrease in negative affect and an increase in positive affect when

voluntarily recalling and analysing positive experiences, particularly when using the observer perspective (Pfaltz et al., 2017), further research could examine how analysing involuntary positive memories, while adopting a self-distant perspective, influences affect and depressive symptomatology. It is also unclear how intrusive memories compare to other imagery-based cognitions such as future-oriented mental images of suicide, which have been reported in depression (Holmes et al., 2016). Therefore, further research could clarify if the potential maintenance role played by intrusive memories during depression is specific to memories, or if the documented distress and use of maladaptive emotion regulation strategies are representative of a more general cognitive approach towards imagery deemed aversive (i.e., not only past memories but also imagined images or future events).

Further research is also needed to examine possible differences in the use of emotion regulation strategies in response to intrusive memories during, as well as following recovery from, depression. In particular, in addition to comparing depressed and never-depressed samples, research is needed to compare intrusive memories between currently depressed and recovered-depressed samples given findings that memory appraisals and associated emotion regulation strategies may differ at different stages of depression (Williams & Moulds, 2010).

#### 4.10.8 Conclusion

Overall, the current meta-analytic investigation found that depression is positively associated with the frequency of intrusive remembering. However, consistent with current diagnostic definitions, those with PTSD experienced intrusive memories more frequently than depressed participants. Additionally, depression was positively associated with the subjective distress experienced in response to intrusive memories, the use of maladaptive emotion regulation strategies in response to intrusive memories, and the attribution of maladaptive appraisals about what an intrusion means for psychological functioning. These results suggest that the experience of, and responses to, intrusive memories during depression

should receive greater clinical attention, in addition to the verbal cognitions typically targeted in treatment. While specific memory interventions may be an appropriate therapeutic approach, targeting the use of maladaptive emotion regulation strategies more broadly may allow clinicians to influence how depressed clients respond to aversive private stimuli - including negative autobiographical intrusive memories.

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**refers to studies included in the current study*

Table 4.1

*Characteristics of Studies Included in the Depression Meta-Analyses*

| Study | Country | Sample type* (recruitment) | Assessment of depression status and/or symptoms | *N* | Female (%) | Mean age, years (across samples) | Non-depress. control group? | PTSD screened / excluded? | Quality assess |
|---|---|---|---|---|---|---|---|---|---|
| Boelen et al. (2008) | Netherlands | Non-clinical (bereaved) | BDI (no cut-off stated) | 131 | 83.2 | 58.7 | No | No | Moderate |
| Brewin et al. (1999) | UK | Depressed (hospital patients) | SCID for DSM-III-R | 62 | 63 | 42.2 | No | Yes | Moderate |
| Brewin et al. (1998b) | UK | Depressed (cancer outpatients, 43% with current MDD) | HADs ≥8 on Depression subscale & SCID for DSM-III-R | 28 | 73.8 | 54 | Yes | Yes | High |
| Bywaters et al. (2004) | UK | Non-clinical (students) | BDI ≧9 | 40 | 85 | 21.3 | Yes | No | Moderate |
| del Palacio-Gonzalez et al. (2017) | Canada | Non-clinical (students) | BDI-II (no cut-off stated) | 91 | 83.5 | 20.13 | No | No | Moderate |
| Gibbs et al. (2004) | USA | Non-clinical (students) | BDI (no cut-off stated) | 89 | 55 | 21.2 | No | No | Moderate |
| Hauer et al. (2006) | Netherlands | Non-clinical (students) | BDI-I (no cut-off stated) | 172 | 69.7 | 19.5 | No | No | Moderate |
| Kremers et al. (2004) | Netherlands | Depressed (out-patients with BPD) | SCID-I for DSM-IV & BDI | 83 | 93 | 30.7 | Yes | No | Moderate |

Table 4.1 *(continued)*

| Study | Country | Sample type* (recruitment) | Assessment of depression status and/or symptoms | *N* | Female (%) | Mean age, years (across samples) | Healthy control group? | PTSD excluded? | Quality assess |
|---|---|---|---|---|---|---|---|---|---|
| Lang et al. (2012) | UK | Depressed (health service & community) | SCID for DSM-IV, BDI-II & HRSD | 26 | 77 | 28.5 | No | No | Moderate |
| Moulds et al. (2012) | Australia | Non-clinical (students & community) | DASS-21 ≧14 | 183 | 69.4 | 26.9 | No | No | Moderate |
| Newby et al. (2010; 2011) | Australia | Depressed (community) | SCID-I for DSM-IV & BDI-II (no cut-off stated) | 85 | 58.8 | 24.3 | Yes | Yes | High |
| Parker (1997) | UK | Depressed (psychiatric services) | Consultant Psychiatrist diagnosis & BDI ≧15 | 38 | 100 | 37.7 | Yes | Yes | High |
| Parry et al. (2014), O'Kearney et al (2014) | Australia | Depressed (community) | SCID for DSM-IV-TR, CES-D >16 | 87 | 57.5 | 35.7 | Yes | Yes | High |
| Smets et al. (2012) | Belgium | Non-clinical (students) | BDI-II (no cut-off stated) | 453 | 85.4 | 18.4 | No | No | Moderate |
| Spenceley et al. (1997) | UK | Depressed (mental health outpatient clinics) | DSM-IV criteria & BDI ≧15 | 62 | 100 | 38.1 | Yes | No | Moderate |
| Starr et al. (2006) | Australia | Non-clinical (students) | BDI-II (no cut-off stated) | 84 | 73.8 | 19.4 | No | Yes | Moderate |
| Van den Broeck et al. (2016) | Belgium | Non-clinical (psychiatric BPD patients, 33% with current MDD) | SCID-I for DSM-IV & BDI-II | 54 | 85 | 29.5 | No | No | Moderate |

Table 4.1 *(continued)*

| Study | Country | Sample type* (recruitment) | Assessment of depression status and/or symptoms | *N* | Female (%) | Mean age, years (across samples) | Healthy control group? | PTSD excluded? | Quality assess |
|---|---|---|---|---|---|---|---|---|---|
| Williams et al. (2007a) | Australia | Non-clinical (students) | BDI-II ≧12 | 97 | 57.5 | 19.3 | Yes | Yes | High |
| Williams et al. (2007b), (2007c), (2008b) | Australia | Non-clinical (students, 13% with current MDD) | SCID for DSM-III-R if BDI ≧12 | 147 | 69.4 | 19.7 | No | Yes | Moderate |
| Williams et al. (2007d) | Australia | Non-clinical (students) | Screening qns based on DSM-IV & BDI-II ≧12 | 118 | 58.5 | 19.2 | No | Yes | Moderate |
| Yoshizumi et al. (2007) | Japan | Non-clinical (students) | BDI-II (no cut-off stated) | 282 | 60.5 | unclear | No | No | Moderate |

*Note.* *Non-clinical = where depression was assessed based on self-reported questionnaires; Clinically depressed = where symptoms were assessed with a clinical interview according to DSM criteria; BDI- Beck Depression Inventory; DASS = Depression Anxiety Stress Scales; DSM = Diagnostic and Statistical Manual; SHADS = Hospital Anxiety and Depression Scale; HRSD – Hamilton Rating Scale for Depression; PHQ-9 = Patient Health Questionnaire; MDD = Major Depressive Disorder; SCID = Structured Clinical Interview; BPD = Borderline Personality Disorder; *N* = total size of sample analysed.

Table 4.2

*Characteristics of Studies Included in the Depression versus Posttraumatic Stress Disorder Meta-Analyses*

| Study | Country | Recruitment | Sample type | Criteria for depressive / dysphoric group status | *N* | Female (%) | Mean age, year (across samples) | Trauma excluded in Dep group? | Quality assessment |
|---|---|---|---|---|---|---|---|---|---|
| Birrer et al. (2007) | Switzerland | Clinical & Community | Depressed | DID ≥ 15 & BDI ≥11 | 65 | 89 | Dysp = 46<br>PTSD = 39 | Yes | High |
| Parry et al. (2014), O'Kearney et al. (2014) | Australia | Community | Depressed | SCID for DSM-IV-TR, CES-D >16 | 87 | 57.5 | 35.7 | Yes | High |
| Reynolds et al. (1999) | UK | Clinical | Depressed | SCID for DSMIII-R | 105 | 61.9 | 41.7 | Yes | High |

*Note.* BDI = Beck Depression Inventory; CES-D = Centre for Epidemiologic Studies Depression Scale; DID = Diagnostic Inventory for Depression; DSM = Diagnostic and Statistical Manual; SCID = Structured Clinical Interview; *N* = total size of sample analysed.

Table 4.3

*Random Weighted Mean Effect Sizes and Heterogeneity Statistics Associated with Intrusive Memory Characteristics*

| Variable | *k* | *N* | Range of raw *rs* | Mean *r* | 95% CI | *Z*-value | *Q*-between | $I^2$ | FSN |
|---|---|---|---|---|---|---|---|---|---|
| Frequency | 20 | 2,212 | .07 - .76 | .40 | [.33, .47] | 10.13*** | 63.46** | 70.06 | 59 |
| Distress | 6 | 547 | .18 - .43 | .31 | [.23, .38] | 7.36*** | 5.09 | 1.72 | 13 |
| Vividness | 4 | 431 | .00 - .07 | .03 | [-.07, .12] | 0.62 | 0.45 | 0.00 | - |
| Rumination | 3 | 473 | .31 - .49 | .42 | [.30, .53] | 6.35*** | 4.19 | 52.31 | 11 |
| Avoidance | 12 | 909 | .17 - .81 | .42 | [.29, .54] | 5.80*** | 59.13** | 81.40 | 38 |
| Maladaptive appraisals | 3 | 257 | .19 - .64 | .40 | [.02, .68] | 2.07* | 16.72*** | 88.04 | 9 |

*Note.* k = number of studies; *N* = total sample for meta-analysis; *r* = Pearson *r* correlation; 95% CI = 95% confidence intervals; Q-between = Q statistic for homogeneity; $I^2$ = proportion of total variance attributable to between-study variance; FSN = Orwin's Fail-Safe *N*.
*$p$ <.05. **$p$ < .01. ***$p$ < .001.

Table 4.4

*Moderation Analysis with Categorical Variables for Selected Effect Sizes*

| Variable | Clinically Depressed Sample | | | | | | Non-Clinical Sample | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *k* | *N* | *r* | 95%CI | *Q* | $I^2$ | *k* | *N* | *r* | 95%CI | *Q* | $I^2$ |
| Frequency | 8 | 389 | .48 | .36, .58 | 40.89** | 82.88 | 12 | 1823 | .36 | .27, .44 | 15.59 | 29.46 |
| Avoidance | 7 | 363 | .50 | .35, .63 | 42.90** | 86.02 | 5 | 546 | .31 | .11, .49 | 3.94 | 0.00 |
| | Control for PTSD | | | | | | Not Control for PTSD | | | | | |
| | *k* | *N* | *r* | 95%CI | *Q* | $I^2$ | *k* | *N* | *r* | 95%CI | *Q* | $I^2$ |
| Frequency | 8 | 557 | .44 | .32, .54 | 30.45** | 77.01 | 12 | 1655 | .38 | .29, .47 | 31.72* | 65.32 |
| Avoidance | 7 | 460 | .45 | .26, .60 | 34.49** | 82.61 | 5 | 449 | .40 | .17, .58 | 24.16** | 83.45 |

*Note:* *k* = number of studies; *N* = number of participants in the sub-group; *r* = Mean random effects Pearson *r* correlation; 95% CI = 95% confidence intervals; Q = Q-within; $I^2$ = proportion of total variance attributable to between-study variance; PTSD = Posttraumatic stress disorder.
*$p < .01$. **$p < .001$.

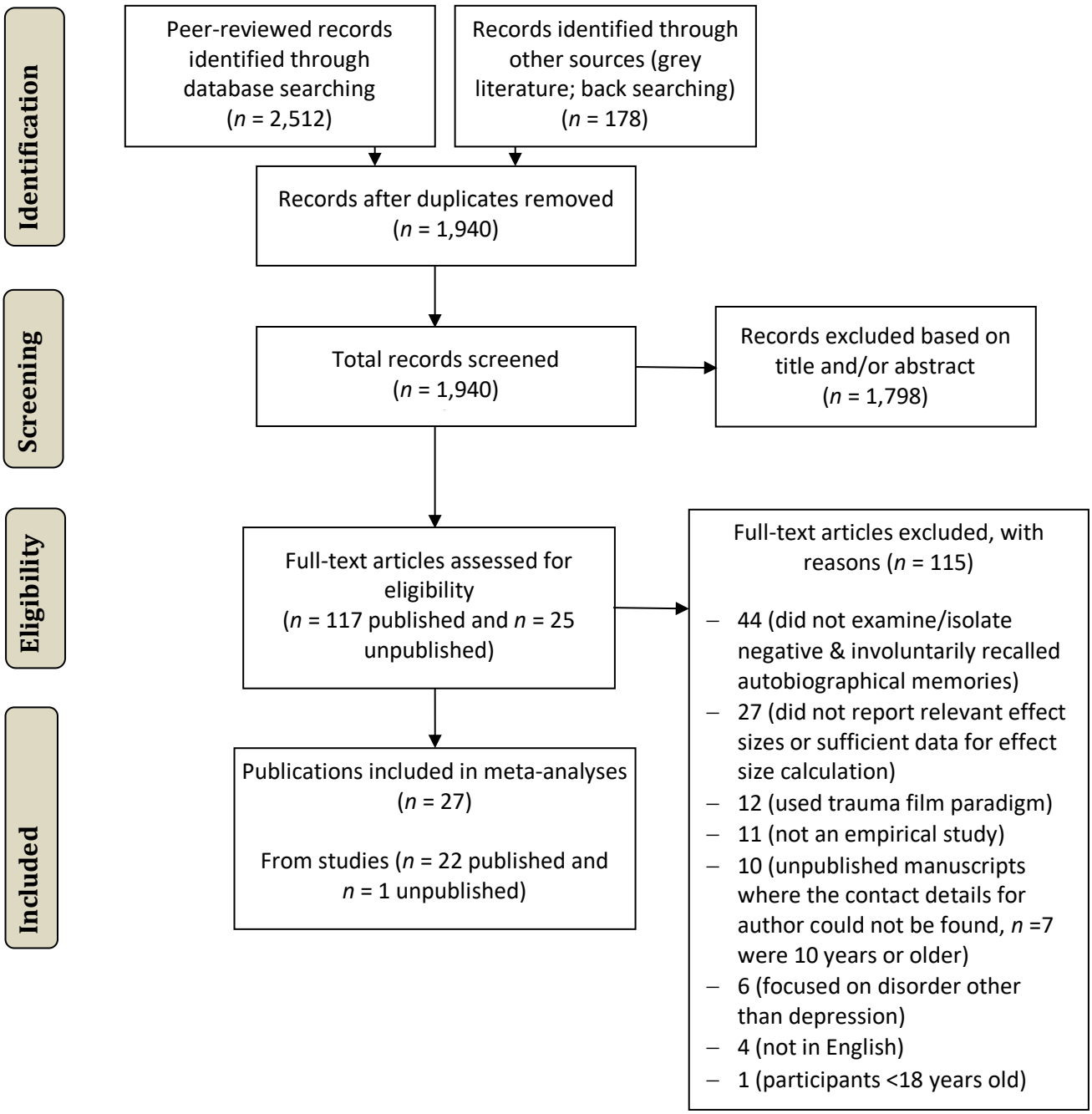


*Figure 4.1.* Study selection flow chart.

# CHAPTER 5

## Summary of Study 1 and Rationale for Study 2

Study 1 (Paper 1) examined the relationship between depression and the features of intrusive negative autobiographical memories using meta-analytic techniques (20 studies; *N* = 2,356). Results from this study indicated that depression is positively, moderately associated with intrusive memory frequency, memory distress, use of maladaptive emotion regulation strategies in response to memories, and the attribution of negative appraisals about what an intrusive memory means for psychological functioning. Paper 1 also revealed that all but one of the studies included in the meta-analyses were conducted in Europe, Australia or the United States, and no study undertook cross-cultural comparisons of memory variables. This marked cultural asymmetry reflects the fact that the vast majority of psychological research is conducted with Western samples (Henrich, Heine, & Norenzayan, 2010).

It is important to consider whether there are cultural differences and/or similarities in the experience of intrusive memories during depression because, as outlined in the National Institute for Health and Care Excellence (NICE) guidelines on the treatment of depression, clinicians need to consider cultural differences when treatment planning. Furthermore, a growing body of cross-cultural literature has documented that culture influences the content and structure of voluntary autobiographical memory (e.g., Humphries & Jobson, 2012; Jobson & O'Kearney, 2006; Wang, 2001; 2004; Wang & Conway, 2004). Culture has also been shown to influence the appraisal of emotional experiences and the use of emotion regulation strategies, such as those used to regulate distress related to intrusive memories (e.g., Bagozzi, Wong, & Yi, 1999; De Vaus et al., 2018; Grossmann & Kross, 2010).

Therefore, the aim of Study 2 (Papers 2 and 3) was to conduct a cross-cultural analysis of intrusive memories recalled by those with and without depression. More

specifically, Paper 2 aimed to extend the findings of Paper 1 and investigate potential cross-cultural differences with regard to the intrusive memory characteristics examined in the meta-analysis (i.e., frequency, distress, vividness, observer perspective) and the characteristics and thematic categories of intrusive memories investigated in previous research (e.g., Newby & Moulds, 2011). Paper 2 also sought to investigate whether the memory content differences (i.e., autonomous orientation, egocentricity) reported by previous cross-cultural research focusing on voluntary memory, also extended to involuntarily recalled intrusive memories. Paper 3 similarly sought extend the findings from the meta-analysis by examining whether cognitive responses to intrusive memories (appraisals, cognitive avoidance, and brooding rumination) differed culturally in those with and without depression.

# CHAPTER 6

## Cross-Cultural Exploration of the Characteristics, Content and Themes of Intrusive Autobiographical Memories recalled during Depression (Paper 2)

## 6.1 Declaration for Thesis Chapter Six

**Declaration of the Candidate:** In the case of Chapter Six, the nature and extent of my contribution to the work was the following:

| Nature of Contribution | Extent of Contribution |
|---|---|
| Formulation of research design, data collection, data analysis and writing manuscript. | 75% |

The following co-authors contributed to the work:

| Name | Nature of Contribution |
|---|---|
| Laura Jobson | Consultation in formulation of research design, discussion of ideas expressed in manuscript and critical review of manuscript. |

The undersigned hereby certify that the above declaration correctly reflects the nature and extent of the candidate and co-authors' contributions to this work.

**Candidate's Signature:**

**Main Supervisor's Signature:**

*Original Article*

**Cross-Cultural Exploration of the Characteristics, Content and Themes of Intrusive Autobiographical Memories recalled during Depression.**

**Authors:**

Stella Mihailova[1] and Laura Jobson[1]

1. Monash Institute of Cognitive & Clinical Neurosciences and School of Psychological Sciences, Monash University, VIC

This chapter constitutes a manuscript submitted to *Memory* and is formatted in accordance with requirements set by the journal. References have been changed to APA citation format to be consistent with the remainder of the thesis.

**Mihailova, S.,** & Jobson, L. (Under Review). Cross-Cultural Exploration of the Characteristics, Content and Themes of Intrusive Autobiographical Memories recalled during Depression. *Memory.*

## 6.2 Abstract

The recall of intrusive memories is highly prevalent during depression. While past research has examined memory themes and characteristics (e.g., frequency), possible cultural differences in these variables have not been investigated. Furthermore, cross-cultural research has documented content differences in voluntary autobiographical remembering, but such content analyses have not been conducted in regard to intrusive memories. This study, therefore, investigated the characteristics, content and themes of intrusive memories using a 2 (group: European Australian, East Asian) x 2 (depression: depressed, control) cross-sectional design. European Australian ($n$ = 46) and East Asian ($n$ = 45) participants living in Australia reported two memories in real-time using an online memory diary and rated the characteristics of their memories. East Asian participants reported more frequent and distressing memories, compared to European Australians, while the European Australian group reported more specific memories than the East Asian group. Most of the characteristics, themes and content variables, however, did not differ between cultural groups. Additionally, depressed participants, regardless of cultural group, reported more frequent, distressing and numbing memories, compared to healthy controls. These findings suggest that while depressive symptomatology impacts the experience of intrusive memories, memory content and characteristics are largely similar across the two cultural groups.

*Keywords:* Intrusive memories, autobiographical memory, culture, depression

## 6.3 Introduction

Depression is associated with memory distortions, including the involuntary recall of negative past events (also known as 'intrusive memories') (Holmes, Blackwell, Burnett Heyes, Renner, & Raes, 2016). A recent meta-analysis found that 76% of those with clinical depression report experiencing intrusive negative memories (Payne, Kralj, Young, & Meiser-Stedman, 2019). Given the prevalence of intrusive memories in depression, researchers have investigated whether thematic category and characteristics (e.g., frequency and vividness) differ between those with and without depression (Newby & Moulds, 2011). A significant gap in this literature, however, is that possible cross-cultural differences in these characteristics and themes are yet to be examined, despite accumulating cross-cultural research documenting that culture influences autobiographical remembering (Jobson et al., 2018; Jobson, Moradi, Rahimi-Movaghar, Conway, & Dalgleish, 2014; Ross & Wang, 2010; Wang & Brockmeier, 2002; Wang, 2016). Therefore, the aim of the current study was to integrate findings from clinical and cross-cultural research streams by examining cultural differences (East Asian and European Australian) in the characteristics, content and themes of intrusive memories recalled by those with and without depression.

Several memory characteristics differentiate the experience of intrusive remembering in those with and without depression. Examining a range of characteristics, Newby and Moulds (2011) found that those with depression experienced their intrusive memories as more distressing than healthy controls. Indeed, a meta-analysis indicated that intrusive memory distress and frequency were moderately associated with depression (Mihailova & Jobson, 2018). Other intrusive memory characteristics, however, including the sense of reliving the event, memory vividness, memory perspective (first-person versus third-person), and the specificity of involuntary memories tend not to differentiate between those with and without depression (Kvavilashvili & Schlagman, 2011; Mihailova & Jobson, 2018; Newby &

Moulds, 2011; Watson, Berntsen, Kuyken, & Watkins, 2013). Similarly, when considering the thematic category of intrusive memories, Newby and Moulds found that over 70% of both control and depressed participants reported memories relating to negative interpersonal events (e.g., relationship breakdowns). The predominance of negative interpersonal themes has also been observed in other studies (Reynolds & Brewin, 1999; Williams & Moulds, 2007, 2010). Memories not related to interpersonal concerns typically relate to the physical wellbeing of the individual or family members (e.g., death, injury, assault, illness) (Newby & Moulds, 2011).

One significant limitation of this clinical research is that the possible influence of culture on autobiographical remembering has not been considered. Indeed, studies examining intrusive memory characteristics and depression have predominately been conducted in Europe, Australia or the United States, and have included samples that have been treated as culturally homogenous (Mihailova & Jobson, 2018). Yet, cross-cultural non-clinical research has repeatedly demonstrated cultural differences in the content and structure of voluntary autobiographical memory (Jobson & O'Kearney, 2006; Wang, 2001; 2004; Wang & Conway, 2004, see Ross & Wang, 2010 and Wang, 2016, for reviews). Specifically, those from Western cultural backgrounds tend to provide lengthier, more specific, more personal-themed and autonomously-focused memories, compared to those from Asians cultures, who instead tend to recall briefer memories centering on social interactions and significant others, more often from the third-person perspective (Cohen & Gunz, 2002; Jobson & O'Kearney, 2006; Martin & Jones, 2012; Sutin & Robins, 2007; Wang, 2016; Wang & Conway, 2004). Given that participants narrate their memories, there is some debate about the extent to which such cultural differences reflect variation in memory representations themselves, as opposed to differences in the way that memories are communicated due to differing cultural norms around verbal expression (Wang, 2001). However, methodologies seeking to minimise the

influence of linguistic factors have found that memory content differs culturally, suggesting that cultural variation is not driven by language alone (Wang, 2001). Furthermore, while norms of expression are likely to influence memory content during retrieval, observed cross-cultural differences also reflect the influence of culture on memory during encoding (Wang, 2001).

These differences reflect the dynamic relationship between culture and autobiographical remembering. Western, individualistic cultures perceive the individual as an autonomous actor who is uniquely defined through differentiation from others, and inwardly focused on private psychological experiences (Markus & Kitayama, 2010; Nisbett & Masuda, 2007). By contrast, interdependent cultures, such as those in East Asia, are purported to perceive the individual as defined through their relationships and social obligations, and be outwardly focused in the interest of maintaining group harmony (Markus & Kitayama, 2010; Nisbett, Peng, Choi, & Norenzayan, 2001). Autobiographical memory can reinforce these cultural differences by either emphasising one's distinction from others or maintaining an identity anchored in interrelatedness (Wang & Brockmeier, 2002). The Self-Memory System (SMS), a theoretical model of autobiographical memory, outlines that culturally influenced conceptions of the self can modulate remembering (Conway & Jobson, 2012; Conway & Pleydell-Pearce, 2000). Namely, voluntary memory retrieval relies on an iterative search of hierarchically-organised autobiographical information, with the search parameters constrained by the individual's current goals and sense of self. Voluntary memory is thus a process of reconstruction, with culture acting as a filter during the search process (Conway & Jobson, 2012). Involuntary memory, by contrast, is proposed to occur via a bottom up, cue-driven process (Conway & Pleydell-Pearce, 2000). Thus, there may be less of a role for current goals and the conceptual self to influence involuntary remembering during retrieval.

Despite this, some cultural differences in involuntary memories may be observed as a result of cultural variation in encoding processes, such as attention and perception (Ross & Wang, 2007). This may be particularly pertinent in the instance of memory specificity. Those from Western backgrounds attend to focal objects and perceive events as containing several discrete segments, compared to those from Asian backgrounds who instead attend to broader contextual details and perceive events as interconnected and containing fewer specific segments (Masuda & Nisbett, 2001; Wang, 2009). Therefore, those from Asian cultures may attend to and encode autobiographical information in more general terms, compared to those from Western cultures who may encode information in more granular detail (Wang, 2016). These differences may consequently influence the specificity of memories recalled via either retrieval route. In sum, empirical research is yet to investigate whether involuntary memories retrieved by members of East Asian versus Western cultures differ in a similar way to that documented for voluntarily retrieved memories.

Despite well documented cultural differences in autobiographical memory content in non-clinical samples, emerging clinical research has documented culturally similar memory disruptions in patients with emotional disorders (Dritschel, Kao, Astell, Neufeind, & Lai, 2011; Humphries & Jobson, 2012; Jobson et al., 2014, 2018). For example, it is well-established that reduced memory specificity is a cognitive marker of depression and posttraumatic stress disorder (PTSD) (see Williams et al., 2007). Despite Asian cultures placing less emphasis on memory specificity, research has identified that impairments in recall specificity extend to Taiwanese patients with depression (Dritschel et al., 2011) and Chinese trauma survivors (Humphries & Jobson, 2012). Other memory content variables, such as the degree of egocentricity and autonomy expressed in the memory, also appear to be culturally similar when memories are of a traumatic nature and in the case of PTSD (Jobson et al., 2014; Jobson & O'Kearney, 2006). However, psychopathology may exert a differing

influence on some memory content depending on culture. For instance, in independent cultures (where autonomy is valued) those with PTSD reported memories with less autonomous-themed content than their non-PTSD counterparts. In contrast, in interdependent cultures (where autonomy is downplayed) those with PTSD reported more autonomous content, compared to their non-PTSD counterparts (Jobson, 2011). That is, psychopathology is associated with memory content that contradicts prevailing norms and expectations within that cultural context (Jobson, 2009). However, as with the cultural differences in remembering outlined earlier, these patterns relate to voluntarily recalled memories. Thus, to date, it is unclear how culture and depression may interact with regard to intrusive memories.

The aim of this study was, therefore, to investigate whether the content, characteristics and themes of intrusive memories recalled by those with and without depression differed culturally (East Asian and European Australian). We firstly predicted that there would be cross-cultural differences in intrusive memory content; European Australians would recall longer and more specific, autonomously-oriented, personal-themed, egocentric, and first-person perspective memories, compared to East Asian participants (*Hypothesis 1*). Second, based on the theoretical notion (Jobson, 2009) and clinical research (e.g., Jobson, 2011) indicating that psychopathology is associated with memory content that contradicts prevailing cultural norms and expectations, we predicted that there would be an interaction between depression and cultural group for intrusive memory content. Specifically, for the European Australian group (where autonomy is valued) those with depression would provide memories with less autonomous-themed content (i.e., shorter, less specific, autonomously-oriented, personal-themed, egocentric memories) than controls. In contrast, for the East Asian group (where autonomy is downplayed) those with depression would provide more autonomous-themed content than controls (*Hypothesis 2*).

Based on past intrusive memory research we expected that those with depression would report more distressing and frequent memories than healthy controls (*Hypothesis 3*). An absence of relevant cross-cultural clinical research prevented us from making specific predictions about the interaction between culture and depression for these memory characteristics. However, given research indicating culturally similar disruptions in some memory characteristics of those with psychopathology (e.g., Jobson et al., 2014), the differences between those with and without depression may be similarly observed in both East Asian and European Australian participants. While previous involuntary memory research suggests that other memory characteristics (sense of reliving, numbness, perspective, vividness, and specificity) may not differ between those with and without depression, we still included these variables as exploratory analyses as this was the first clinical intrusive memory study to investigate these characteristics cross-culturally. Finally, following Newby and Moulds (2011), memory themes were examined qualitatively. We hypothesised that negative interpersonal themes would dominate across all four groups (*Hypothesis 4*).

## 6.4 Methods

### 6.4.1 Participants

Potential participants ($N = 353$) from the general community were screened via an online questionnaire. Cultural eligibility was based on the approach commonly used in cross-cultural clinical research (e.g., Dritschel et al., 2011; Grossman & Kross, 2010; Jobson, Moradi, Rahimi-Movaghar, Conway, & Dalgleish, 2014); participants were members of an independent (European Australian) or interdependent (East Asian) culture. The European Australian group had to be born in Australia, with all four grandparents also born in Australia and/or Western Europe. The East Asian group had to be born in East Asia, with all four grandparents also born in East Asia and participants had to have lived in Australia for less than 5 years. Inclusion criteria also included a) being aged 18-60 years; b) having no history

of substance dependence, traumatic brain injury, neurological illness or psychosis; c) being without active PTSD symptoms (as indexed by scoring 33 or below on the PTSD Checklist for DSM-5, Blevins, Weathers, Davis, Witte, & Domino, 2015); and d) for those without depression (as indexed by scoring less than 16 on the Center for Epidemiologic Studies Depression Scale- Revised; Eaton, Muntaner, Smith, Tien, & Ybarra, 2004) having no prior history of depression.

Eligible participants attended a laboratory-based assessment where they were administered the mood module of the Structured Clinical Interview for the Diagnostic and Statistical Manual of Mental Disorders–Fifth Edition, Research version (SCID-5-RV; First, Williams, Karg, & Spitzer, 2016), in order to determine allocation to the currently-depressed or never-depressed control groups. Participants were also assessed for current and lifetime diagnoses of manic and hypomanic episodes, PTSD, acute stress disorder, and psychotic symptoms - and were excluded if they met any of the above diagnoses. The SCID-5 was administered and scored by the first author. All clinical interviews were audio-recorded. The second author, who is a clinical psychologist and blind to previous diagnosis and cultural group, scored 25% of the SCID interviews. Inter-rater reliability was excellent, with complete agreement.

### 6.4.2 Measures

**Beck Depression Inventory-II (BDI-II; Beck, Steer, & Brown, 1996)**

The BDI-II was used to assess the presence and intensity of depressive symptoms over the previous two weeks. The BDI-II has good psychometric properties (Beck et al., 1996; Steer, Ball, Ranieri, & Beck, 1997; Wang & Gorenstein, 2013) and has been validated cross-culturally (Byrne, Stewart, & Lee, 2004; Kapci, Uslu, Turkcapar, & Karaoglan, 2008; Kojima, Furukawa, Takahashi, Kawai, Nagaya, & Tokudome, 2002). Internal consistency in the current study was high (East Asian: $\alpha = .94$ European Australian: $\alpha = .97$).

**Independent and Interdependent Self Scale (IISS; Lu & Gilmour, 2007)**

The IISS assessed culturally relevant self-construal. The IISS consists of two subscales (independent and interdependent), each containing 21 questions rated on 7-point scales (1= *strongly disagree* to 7=*strongly agree*). In the current study, each participant was given a self-construal ratio, which was calculated by dividing their interdependent score by their independent score. Higher ratio scores indicated stronger endorsement of interdependence relative to independence. The IISS has been shown to have good reliability and construct validity in cross-cultural samples (Lu & Gilmour, 2007; Marquez & Ellwanger, 2014). In the current study internal consistency was good; independent sub-scale European Australian α= .84, East Asian α= .88; interdependent subscale European Australian α= .82; East Asian α= .94.

**Online Memory Diary**

Following Newby and Moulds' (2011) protocol, participants were provided with a verbal definition of 'spontaneous negative memories' during the assessment session and were instructed to report two intrusive memories via an online memory diary, within a maximum of 14 days (Ball & Brewin, 2012, Bisby et al., 2010; Kamboj et al., 2014). An online diary was adopted as reliance on cognitive heuristics may bias retrospective autobiographical memory recall (Shiffman, Stone, & Hufford, 2008). The diary included items from the Intrusive Memory Interview and Impact of Events Scale (see below). The diary also included items assessing responses to intrusions, interpretation of intrusions and rumination. These findings are reported elsewhere (Mihailova & Jobson, in press).

*Intrusive Memory Interview (IMI; following Hackmann, Ehlers, Speckens, & Clark, 2004; Newby & Moulds, 2011).* The IMI is a structured interview originally used to assess various characteristics of trauma-related intrusions in PTSD (Hackmann et al., 2004). The IMI has subsequently been adapted for the study of intrusive memories in the context of

depression (e.g., Williams & Moulds, 2010; Newby & Moulds, 2012). Participants were instructed to firstly describe (write) their intrusive memory and subsequently rate several memory characteristics. Following the approach of Newby and Moulds (2012), participants were asked to estimate the frequency of their memory during the past week; rate the pleasantness/unpleasantness of their memory using a 3-point scale (*1=very unpleasant; 3= neutral; 5= very pleasant*), and rate the distress, vividness, reliving, and numbness associated with their memory on 6-point scales ranging from 0 (*not at all*) to 100 (*very much*) (Hackmann et a., 2004; Newby & Moulds, 2012; Williams & Moulds, 2007, 2008). Participants were also asked to rate the perspective of their memory on 7-point scale ranging from -3 (*entirely first person - looking out through my eyes*) to +3 (*entirely third person - observing myself from an external point of view*) (Newby & Moulds, 2011; Coles, Turk, & Heimberg, 2002; Martin & Jones, 2012). As per Newby and Moulds (2011), for participants who endorsed ratings of -3 and -2 (field) or +3 and +2 (observer), responses were coded as a dichotomous variable in order to compare frequencies of observer versus first-person vantage perspectives.

*Impact of Event Scale (IES; Horowitz et al., 1979).* In the current study the IES was used to also assess the frequency of intrusions (7-items). The measure is commonly used in research investigating intrusive memories during depression (e.g., Kuyken & Brewin, 1994; Newby & Moulds, 2011). Participants completed the IES for each memory, with modified instructions advising participants to anchor their responses specifically to their intrusive memory (Williams & Moulds, 2010). Participants rated responses from *0* (*not at all*) to 5 (*often*). The IES has been used cross-culturally (Jobson & O'Kearney, 2006) and has good psychometric properties (Sundin & Horowitz, 2002; Zilberg, Weiss, & Horowitz, 1982). Internal consistency was European Australian $\alpha = .88$, East Asian $\alpha = .87$.

### 6.4.3 Procedure

Following informed consent, the SCID-5 was administered. Participants then completed the BDI-II, IISS and were instructed on how to complete the online intrusive memory diary. Once two memories were reported, participants were reimbursed AUD$25 for their time.

### 6.4.4 Memory Coding

The first author coded memories. Twenty-five percent of the memories were co-rated by a second coder, who was blind to the hypotheses and participant group. Discrepancies were resolved through consensus. Interrater reliability was assessed using intraclass kappa for categorical variables (theme, k= .78 specificity, k= .92) and Pearson coefficients for continuous variables (autonomous orientation, $r$ = .71, and other-self ratio, $r$ = .99).

**Thematic memory category**

Memories were allocated into one of five content categories according to coding schemes used in previous intrusive memory studies: interpersonal event (e.g., relationship problems); death or illness of another person; personal abuse or assault; personal illness or injury; or other (e.g., financial problems) (Brewin, Hunter, Carroll, & Tata, 1996; Williams & Moulds, 2007). Memories relating to more than one category were coded according to their primary focus (Newby & Moulds, 2011).

**Cultural content characteristics**

Memory content was coded based on coding schemes developed by previous cross-cultural autobiographical memory studies (e.g., Han, Leichtman, & Wang, 1998; Wang, 2004; Wang & Conway, 2004).

*Memory length*

The number of words were counted for each memory. The length of the two memories was totalled and then divided by two, such that each participant had a single length score.

*Theme*

Memories were coded as either: (a) personal themed, if the memory focused on personal experiences that were not particularly related to others (e.g., academic or work performance, frustration, fears); or (b) relational themed, if the memory centered on collective activities of a social group (e.g., family, university, workplace, arguing with neighbours, and intimate relationships) (Jobson & O'Kearney, 2006, 2008; Ross & Wang, 2010; Wang & Conway, 2004). For each participant a personal theme ratio was calculated, whereby, the total number of personal-themed memories was divided by 2 (i.e., the total number of memories reported), with scores ranging from 0-1 and higher scores indicating the retrieval of a greater proportion of personal-themed memories.

*Specificity*

Memories were coded as either: (a) specific, if they referred to an event that occurred at a particular place and point in time; or (b) general, if they referred to events that occurred regularly or on several occasions (Han et al., 1998; Jobson & O'Kearney, 2006; Wang, 2001, 2004; Wang & Conway, 2004; Wang & Ross, 2005). For each participant the total number of specific memories was calculated.

*Autonomous orientation*

The tendency to assert one's autonomy and self-determination was assessed by counting references to individual: (1) needs, desires or preferences; (2) dislikes or avoidance; (3) judgments or opinions about others, objects, or events; (4) assertions of control over one's actions and resisting pressure from others; (5) achievements and skills; and (6) the number of instances that involved only the individual (Jobson, 2011; Jobson & O'Kearney, 2006, 2008; Wang, 2001, 2004; Wang & Conway, 2004; Wang & Ross, 2005). The frequencies across the six instances were then combined into a separate autonomous orientation score for each memory. Total scores for the two memories were combined so that each participant had a

total autonomous orientation score, which was then divided by two so that each participant had a single average autonomous orientation score.

*Other-self ratio*

This variable indexed a participant's egocentricity by counting the number of times that a participant's memory referred to other people (such as third person pronouns, titles and names), and themselves (such as first-person pronouns), respectively (Han et al., 1998; Jobson & O'Kearney, 2006; Wang, 2001, 2004; Wang & Conway, 2004). A ratio was then calculated based on the frequency of other-self mentions. The total scores for the two memories were converted to an average score, so that each participant had a single total other-self ratio.

### 6.4.5 Data Analytic Plan

One participant (depressed Australian) reported only one memory, so their scores were based on this single memory. Outliers with z-scores above 3.29 were windsorized (Tabachnick & Fidell, 2013). Dependent variables were examined using a series of 2 (culture; Australian vs. Easy Asian) x 2 (depression; depressed vs. controls) analysis of variances (ANOVAs).

## 6.5 Results

### 6.5.1 Participant Characteristics

Group characteristics and dependent variable means are outlined in Table 6.1. As shown in Table 6.1, the four groups did not differ significantly on any of the demographic features. There was a significant cultural main effect for interdependent/independent self-orientation; as expected, the interdependent/independent self-orientation was significantly higher in the East Asian group than the Australian group, $F(1, 87) = 6.02$, $p = .02$, $\eta_p^2 = .07$. The depression main effect, $F(1, 87) = 1.23$, $p = .27$, $\eta_p^2 = .01$, and culture x depression interaction, $F(1, 87) = .74$, $p = .39$, $\eta_p^2 < .01$, were both non-significant. With regards to

BDI-II scores, there was a significant interaction, $F$ (1, 87)= 7.59, $p$< .01, $\eta_p^2$= .08. As expected, the two depressed groups reported significantly greater depression symptomatology than controls; East Asian, $t$(27.65)= 9.63, $p$< .001, $d$= 3.07, European Australian, $t$(36.45)= 12.12, $p$< .001, $d$= 3.57. Control groups did not differ significantly, $t$(46)= .61, $p$=.54, $d$= .18. However, depressed European Australians reported significantly more depressive symptoms than depressed East Asian participants, $t$(41)= 2.71, $p$= .01, $d$= 0.83.

### 6.5.2 Cultural Content Characteristics

There was little support for Hypothesis 1. The culture main effect was significant for memory specificity; the Australian group reported a significantly greater proportion of specific memories than the East Asian group, $F$(1, 86)= 4.61, $p$= .04, $\eta_p^2$= .05. In contrast to Hypothesis 1, the cultural main effects were non-significant for memory length, $F$(1, 87)= .12, $p$= .73, $\eta_p^2$= .001, personal-theme, $F$(1, 86)= .23, $p$= .63, $\eta_p^2$= .003, autonomous orientation, $F$(1, 87)= 3.53, $p$= .06, $\eta_p^2$= .04, and other-self ratio, $F$(1, 87)= .48, $p$= .49, $\eta_p^2$= .005. For each of the cultural content characteristics the depression main effects and interactions were all non-significant; all $F$s <1; $\eta_p^2 s \leq .01$ (with the exception of the interaction for other-self ratio, $F$(1, 87)= 1.60, $p$= .21, $\eta_p^2$= .02).

### 6.5.3 Memory Characteristics

**Frequency**

For self-reported weekly frequency, there was a significant culture main, $F$(1, 87)= 11.11, $p$= .001, $\eta_p^2$= .11, with the East Asian group reporting significantly more frequent memories than the European Australian group. There was also a depression main effect, $F$(1, 87)= 13.45, $p$< .001, $\eta_p^2$= .13; as predicted, depressed participants reported more frequent memories compared to controls (Hypothesis 2). The interaction was non-significant, $F$(1, 87)= 2.72, $p$= .11, $\eta_p^2$= .03. A depression main effect was also observed in memory

frequency as measured by the IES-Intrusion subscale, $F(1, 87)= 23.32$, $p< .001$, $\eta_p^2= .21$. The culture main effect, $F(1, 87)= 2.86$, $p= .10$, $\eta_p^2= .03$, and interaction $F(1, 87)= 2.40$, $p=.13$, $\eta_p^2= .03$, were both non-significant for the IES-Intrusion subscale.

**Distress and Memory Negativity**

There was a significant culture main effect, $F(1, 87)= 9.11$, $p= .003$, $\eta_p^2= .01$; with the East Asian group reporting significantly greater memory distress than Australians. As predicted, there was also a significant depression main effect, $F(1, 87)= 5.94$, $p= .02$, $\eta_p^2= .06$. In support of Hypothesis 2, the depressed group reported significantly greater distress than controls. The interaction was not significant, $F(1, 87)= .50$, $p= .48$, $\eta_p^2= .01$. These differences in memory distress were observed even though groups did not differ significantly with regards to the negativity of their memories: culture main effect, $F(1, 87)= 1.02$, $p= .32$, $\eta_p^2= .01$, depression main effect, $F(1, 87)= .74$, $p= .39$, $\eta_p^2= .01$, and interaction, $F(1, 87)= .97$, $p= .33$, $\eta_p^2= .01$.

**Vividness**

Both main effects and the interaction were non-significant in regards to vividness; culture main effect, $F(1, 87)= 2.42$, $p= .12$, $\eta_p^2= .03$; depression main effect, $F(1, 87)= .99$, $p= .38$, $\eta_p^2= .01$; interaction: $F(1, 87)= .78$, $p= .38$, $\eta_p^2= .01$,

**Numbness**

There was a significant depression main effect, $F(1, 87)= 4.21$, $p= .043$, $\eta_p^2= .05$; depressed participants reported significantly greater numbness in response to memories than controls. The culture main effect, $F(1, 87)= 1.12$, $p= .29$, $\eta_p^2= .01$, and culture x depression interaction, $F(1, 87)= .07$, $p= .80$, $\eta_p^2= .001$, were not significant.

**Reliving**

The depression main effect was approaching significance, $F(1, 87)= 3.74$, $p= .056$, $\eta_p^2= .04$; depressed participants reported greater reliving than controls. The culture main effect, $F(1, 87)= 2.61$, $p= .11$, $\eta_p^2= .03$, and culture x depression interaction, $F(1, 87)= .02$, $p= .88$, $\eta_p^2< .001$, were not significant.

**Vantage perspective**

Mean responses on the vantage perspective scale did not differ significantly between the groups: depression main effect, $F(1, 87)= .26$, $p= .61$, $\eta_p^2= .003$, culture main effect, $F(1, 87)= 1.26$, $p= .26$, $\eta_p^2= .01$, and interaction, $F(1, 87)= .59$, $p= .44$, $\eta_p^2= .007$. When vantage perspective was considered as a dichotomous variable, there were similarly no significant differences across the four groups, $\chi^2(3, 62)= 1.31$, $p= .73$.

### 6.5.4 Thematic Memory Category

As shown in Table 1, and as predicted, the majority of the memories related to interpersonal stressors, across all four groups (e.g., arguments or relationship disappointments) (Hypothesis 3).

## 6.6 Discussion

The current study examined whether the characteristics, content and themes of intrusive memories recalled by those with and without depression differed culturally (European Australian versus East Asian). First, we found that, contrary to Hypothesis 1, memory content did not culturally differ between the two control groups, with the exception of memory specificity. That is, never depressed European Australians and East Asians did not differ significantly in terms of memory length, perspective, autonomous-orientation, personal theme, or egocentricity. Second, as predicted, those with depression, regardless of cultural group, reported more distressing and frequent intrusive memories than healthy controls. The depressed groups also endorsed a higher sense of numbness in response to memories. Finally,

in support of Hypothesis 3, memory theme was predominately related to negative interpersonal concerns. This pattern was observed across all four groups, suggesting that clinically depressed clients reporting intrusive memories may benefit from socially-oriented problem solving interventions.

Our memory content results are contrary to well-established findings demonstrating that those from Western backgrounds report detailed memories that emphasise their autonomy, personal perspectives and individual roles, while those from Asian cultures recall briefer memories focused on their social obligations and engagement with others (Wang, 2016; Wang & Brockmeier, 2002). These cultural differences have been observed in studies using sample sizes similar to that employed in the current study, thus our results were surprising. These discrepancies may reflect key methodological differences between our study and previous research. For example, while Cohen and Gunz (2002) reported that Asians recall more third-person perspective memories, compared to Westerners, this difference was specific to situations where participants were at the centre of attention. As the memories reported in our study were not limited to such situations, there may have been less of a need for East Asian participants to self-distance via the third-person perspective. Furthermore, memories reported in our study differed from past research in terms of the route of retrieval. The current study focused on involuntary memory, while prior cross-cultural studies have focused on cued, voluntarily retrieved memories.

Retrieval route may influence the degree to which culture shapes remembering. The SMS model recognises that remembering can be either voluntary (i.e., an intentional search of hierarchically-organised memory representations) or involuntary/intrusive (i.e., bottom-up, cue-activated retrieval of event-specific knowledge) (Conway, 2005; Conway & Pleydell-Pearce, 2000). The SMS posits that there is a dynamic, reciprocal relationship between autobiographical remembering and the self, which is situated within an individual's broader

cultural context (Conway & Jobson, 2012). Within the context of the SMS, voluntary memory is strongly guided by the conceptual self and the individual's current goals. Thus, cultural beliefs about the self (i.e., independence versus interdependence) are reflected in the recall of voluntary autobiographical memories (Conway & Jobson, 2012). In contrast, as involuntary memory is proposed to occur via a cue-driven process (Conway & Pleydell-Pearce, 2000), the conceptual self may have less influence on the direct retrieval pathway, and thus the content of intrusive memories may be less culturally influenced.

However, we did find that, as predicted, European Australians reported significantly more specific memories compared to East Asians. While we hypothesised that this pattern would be observed for control groups only, European Australians, regardless of depression status, recalled more specific intrusive memories. Furthermore, in line with previous involuntary memory research (Kvavilashvili & Schlagman, 2011), those with and without depression did not differ in memory specificity. Our specificity findings differ from past clinical research documenting cultural differences among control groups only, and pan-cultural impairments in memory specificity among depressed groups (Dritschel et al., 2011). However, this prior research examined voluntarily recalled memories. In the context of this past research, as well as the SMS model, one interpretation of our results is that while culture may have minimal influence over the content of intrusive memories, culture may influence the degree of specificity during encoding (Wang, 2016). Indeed, studies have documented cultural differences in holistic (emphasised by Asian cultures) versus analytical (emphasised by European Western cultures) perceptual processing, resulting in European Americans perceiving and encoding information in more granular detail (Wang, 2016). Thus, those from East Asian cultures may perceive and encode event specific information in more general detail, in accordance with interdependent cultural norms relating to minimising focus on oneself. In terms of psychopathology, according to the SMS model, during depression the

voluntary retrieval process can be disrupted through several maladaptive mechanisms, including rumination and cognitive avoidance, which terminate the search at a general memory representation, thus resulting in reduced specificity (Williams, 2006; Williams et al., 2007). Our finding that specificity did not differ between depressed and control groups is thus consistent with this framework, as intrusive memories are hypothesised to begin as specific event representations, whose reconstruction should not be disrupted by such depression-related mechanisms.

When examining memory characteristics associated with intrusive memories in depression, consistent with Hypothesis 2 and prior research, we found that, regardless of culture, depressed participants reported more frequent (Mihailova & Jobson, 2018) and more distressing memories (Newby & Moulds, 2011), compared to controls. Interestingly, depressed participants also endorsed a higher sense of numbness in response to memories, compared to controls, suggesting that those with depression attempted to distance themselves from the distress elicited by intrusive memories. Such avoidance efforts may prevent the emotional processing of the memory and contribute to the maintenance of intrusions (Williams & Moulds, 2010). Exploratory analyses also indicated that, comparing those with and without depression, sense of reliving, memory vividness, specificity and perspective did not differ between the two groups, which is consistent with past studies and meta-analyses (Kvavilashvili & Schlagman, 2011; Mihailova & Jobson, 2018; Newby & Moulds, 2011). Furthermore, cross-cultural exploratory analyses revealed that the control groups did not differ with regard to memory vividness, numbness, reliving, or perspective, suggesting that intrusive memories are largely experienced in similar ways across the two cultures, by those without depression. However, cultural differences were observed with regard to memory distress, with East Asian participants, regardless of depression status, reporting greater memory distress than European Australian participants. This is broadly consistent with cross-

cultural literature showing that, compared to those from Western cultural backgrounds, those from Asian cultures tend to report higher distress across a range of emotional distress measures (Chang, 2002).

We acknowledge several limitations. First, given our cross-sectional methodology we cannot draw causal inferences with regard to the influence of culture or depression on intrusive remembering. Second, responses by the East Asian group may have been impacted by the fact that the study was completed in Australia (i.e., an independent cultural context) and questionnaire administration was in English, potentially leading to a language priming effect (Chen & Bond, 2007; Kemmelmeier & Cheng, 2004). While we sought to limit the potential influence of acculturation by requiring East Asian participants to have lived in Australia for less than five years, future research with a cross-country sample would be beneficial. Third, while we sought to capture memories in real-time, we cannot be certain the degree to which participants followed these instructions. Therefore, future studies should include a self-reported compliance rating. Despite these limitations, our results suggest that culture may have minimal influence on the characteristics and content of negative intrusive memories. Intrusive memories, therefore, may not function to reinforce culturally-valued self-construal in the same way as voluntary memories. Future cross-cultural research comparing intrusive and voluntary autobiographical memories in depression is needed. Furthermore, in terms of clinical implications, our results highlight that the assessment and treatment of intrusive memories is warranted cross-culturally given that depressed participants, regardless of cultural group, reported more frequent, distressing and numbing memories, compared to healthy controls.

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Table 6.1.

*Group Demographic Characteristics and Intrusive Memory Dependent Variable Means (SD)*

| | Australian | | East Asian | | Statistics |
|---|---|---|---|---|---|
| | Currently depressed ($n$ = 23) | Never depressed ($n$ =23) | Currently depressed ($n$ = 20) | Never depressed ($n$ = 25) | |
| Age (years) | 23.39 (6.25) | 22.00 (5.12) | 24.20 (3.72) | 25.64 (5.07) | $F(3, 87) = 2.08$ |
| Gender (female), *n* | 16 (70%) | 17 (74%) | 17 (85%) | 20 (80%) | $\chi^2(3, N=91) = 1.69$ |
| Months in Australia | 280.70 (75.01) | 259.70 (61.35) | 17.60 (19.56) | 15.76 (14.22) | $F(3, 87) = 194.69$** |
| Marital Status; single, *n* | 18 (78%) | 17 (74%) | 14 (70%) | 18 (72%) | $\chi^2(3, N = 91) = .43$ |
| Education (completed minimum high school or equivalent), *n* | 21 (91%) | 20 (87%) | 20 (100%) | 25 (100%) | $\chi^2(3, N= 91) = 5.59$ |
| Depression symptoms (BDI-II) | 32.39 (9.32) | 4.78 (5.71) | 25.10 (8.13) | 5.68 (4.38) | - |
| Independent self-construal (IISS) | 107.39 (11.40) | 105.35 (12.77) | 109.50 (12.92) | 105.60 (13.84) | - |
| Interdependent self-construal (IISS) | 96.04 (12.01) | 102.00 (11.88) | 110.55 (19.87) | 107.80 (14.95) | - |
| *Thematic memory category (%)* | | | | | - |
| Interpersonal event | 69.55 | 50 | 55 | 54 | - |
| Death/illness involving other | 10.85 | 8.7 | 0 | 6 | - |
| Personal assault/abuse | 0 | 4.3 | 10 | 4 | - |
| Personal illness/injury | 2.15 | 4.3 | 2.5 | 0 | - |
| Other | 15.2 | 32.6 | 32.5 | 36 | - |
| *Memory characteristics* | | | | | |
| Memory Negativity | 4.70 (.70) | 4.39 (.89) | 4.70 (.92) | 4.72 (.61) | - |
| Frequency | 1.65 (.68) | 1.22 (1.13) | 2.73 (1.09) | 1.58 (1.12) | - |
| IES-Intrusion frequency | 12.85 (8.15) | 8.26 (6.63) | 17.38 (7.56) | 8.46 (3.68) | - |

Table 6.1 *(continued)*

| | Australian | | East Asian | | Statistics |
|---|---|---|---|---|---|
| | Currently depressed ($n$ = 23) | Never depressed ($n$ =23) | Currently depressed ($n$ = 20) | Never depressed ($n$ = 25) | |
| Distress | 62.17 (20.22) | 54.35 (25.01) | 79.00 (20.75) | 64.80 (19.60) | - |
| Vividness | 67.39 (19.36) | 66.96 (14.90) | 77.00 (15.93) | 69.60 (22.82) | - |
| Reliving | 50.87 (27.12) | 40.00 (22.16) | 58.50 (30.83) | 49.20 (18.69) | - |
| Numbness | 40.43 (28.04) | 29.13 (21.51) | 34.00 (20.88) | 25.20 (21.82) | - |
| Vantage perspective | -1.39 (1.52) | -1.00 (1.56) | -1.50 (1.35) | -1.58 (1.38) | - |
| *Cultural content characteristics* | | | | | |
| Word length | 118.76 (53.24) | 115.02 (38.36) | 118.85 (47.89) | 121.86 (47.79) | - |
| Autonomous orientation | .70 (.85) | .70 (.85) | 1.05 (.94) | 1.06 (.98) | - |
| Other-self ratio | .73 (.51) | .65 (.52) | .66 (.50) | .91 (.86) | - |
| Specificity | .93 (.18) | .98 (.10) | .83 (.29) | .86 (.34) | - |
| Personal-themed | .23 (.25) | .35 (.35) | .33 (.37) | .32 (.38) | - |

*Note.* Data are means (SD) for all variables, except for gender, education, marital status and lifetime trauma. Dashes represent statistical analyses reported in text. BDI-II = Beck Depression Inventory - II; IES = Impact of Event Scale; IISS = Independent and Interdependent Self Scale.
$^{**}p < .01$.

# CHAPTER 7

## The Impact of Depression and Culture on Responses to Intrusive Autobiographical Memories: Cognitive appraisals, cognitive avoidance, and brooding rumination (Paper 3)

## 7.1 Declaration for Thesis Chapter Seven

**Declaration of the Candidate:** In the case of Chapter Seven, the nature and extent of my contribution to the work was the following:

| Nature of Contribution | Extent of Contribution |
|---|---|
| Conceptualisation, literature search and analysis and writing the manuscript. | 75% |

The following co-authors contributed to the work:

| Name | Nature of Contribution |
|---|---|
| Laura Jobson | Discussion of ideas expressed in the manuscript and critical review of manuscript. |

The undersigned hereby certify that the above declaration correctly reflects the nature and extent of the candidate and co-authors' contributions to this work.

**Candidate's Signature:**

**Main Supervisor's Signature:**

*Original Article*

**The impact of depression and culture on responses to intrusive autobiographical memories: Cognitive appraisals, cognitive avoidance, and brooding rumination.**

**Authors:**

Stella Mihailova[1] and Laura Jobson[1]

1. School of Psychological Sciences, Turner Institute for Brain and Mental Health, Monash University, Melbourne, Victoria, Australia

This chapter constitutes a manuscript accepted for publication in *British Journal of Clinical Psychology* and is formatted in accordance with requirements set by the journal, which included a structured abstract. References have been changed to APA citation format to be consistent with the remainder of the thesis.

**Mihailova, S.,** & Jobson, L. (in press). The impact of depression and culture on responses to intrusive autobiographical memories: Cognitive appraisals, cognitive avoidance, and brooding rumination. *British Journal of Clinical Psychology*. doi:10.1111/bjc.12232

## 7.2 Abstract

**Objectives.** Those with depression ascribe more negative appraisals to intrusive autobiographical memories and use maladaptive strategies to regulate intrusive memory distress. However, it is unknown whether these patterns extend to East Asian samples. This study investigated the influence of culture and depression on intrusive remembering.

**Design.** The study used a 2 (group: European Australian, East Asian) x 2 (depression: depressed, control) cross-sectional design, with an online intrusive memory diary.

**Methods.** European Australian ($n$ = 46) and East Asian ($n$ = 45) participants living in Australia, with and without depression, reported two intrusive memories in real-time and completed self-report measures indexing their appraisals of the memories, and their use of cognitive avoidance and brooding-rumination in response to the memories.

**Results.** East Asian participants reported significantly greater negative, control and responsibility appraisals than European Australian participants. Regardless of cultural group, depressed participants endorsed greater maladaptive memory appraisals and brooding compared to controls. Additionally, among East Asian participants, those with depression cognitively avoided memories significantly more than controls. When comparing the two depressed groups, East Asians reported significantly greater brooding and avoidance in response to intrusive memories than Australians.

**Conclusions.** The findings suggest that depression may be associated with some similar maladaptive responses to intrusive autobiographical memories across cultural groups. Clinical interventions targeting unhelpful responses may, therefore, be beneficial for those with depression, regardless of cultural background.

### 7.3 Practitioner Points

- Across both European Australian and East Asian cultures, depressed participants endorsed higher maladaptive intrusive memory appraisals and brooded more in response to memories.
- Clinical interventions targeting appraisals and emotion regulation in response to intrusive memories may be beneficial for those with depression across both cultural groups.
- Language and acculturation may have impacted findings, as measures were administered in English and in Australia.
- Replication using a cross-country design and larger sample would be beneficial to confirm findings.

## 7.4 Introduction

Depression is associated with the involuntary recall of negative autobiographical memories (also known as 'intrusive memories') (Holmes, Blackwell, Burnett Heyes, Renner, & Raes, 2016). Negative memory-related appraisals and appraisals relating to the need to control intrusive memories, alongside the use of maladaptive emotion regulation strategies (e.g., rumination, cognitive avoidance) to manage memory-related distress, are associated with depression (Newby & Moulds, 2010; Mihailova & Jobson, 2018; Weßlau & Steil, 2014; Williams & Moulds, 2010). Despite significant advances in this area, past intrusive memory studies have primarily relied on samples from Western cultural groups (Mihailova & Jobson, 2018). Yet, several research streams suggest that culture may influence the experience of intrusive remembering (de Vaus, Hornsey, Kuppens, & Bastian, 2018; Varnum, Grossmann, Kitayama, & Nisbett, 2010).

Cross-cultural theorists have differentiated between Western independent cultures and East Asian interdependent cultures. Cultures with an independent orientation perceive the individual as an autonomous actor, differentiated from others, and inwardly focused on private psychological experiences. By contrast, cultures that value interdependence emphasize social obligations and prioritize group harmony over personal goals (Markus & Kitayama, 2010). These cultural differences influence voluntary autobiographical remembering (Ross & Wang, 2010), appraisals of emotion (Mesquita & Walker, 2003), and the use of emotion regulation strategies (Boiger, Mesquita, Uchida, & Feldman Barrett, 2013; Chang, Tsai, & Sanna, 2010). Thus, it is timely to investigate whether cultural differences are evident in the responses to intrusive memories in depression.

Those from Western cultures have a strong desire to minimize negative appraisals, especially those pertaining to the self. Members of Western independent cultures tend to exhibit a positivity bias (i.e., appraise emotional events as more pleasant, emphasize the maintenance of a positive self-view, assume personal control and responsibility for positive events, engage in greater

self-enhancement, and prioritise positive emotions), when compared to those from East Asian cultures (Kitayama, Markus, Matsumoto, & Norasakkunkit, 1997; Kuppens, Realo, & Diener, 2008; Mesquita & Karasawa, 2002). In contrast, in East Asian cultures there is greater tolerance and acceptance of negative emotional states (de Vaus et al., 2018), greater assumption of responsibility for negative past events (Anderson, 1999; Bjorck, Cuthbertson, Thurman, & Lee, 2001; Fry & Grover, 1982) and self-criticism is normative as it allows vigilance of social transgressions that could disrupt group harmony (Heine & Lehman, 1999; Heine, Lehman, Markus, & Kitayama, 1999; Kuppens et al., 2008; Mesquita & Karasawa, 2002). Members of interdependent cultures also tend to engage in higher avoidant coping and brooding-rumination than those from independent cultures (Bjorck et al., 2001; Cook & Hayes, 2010; Grossmann & Kross, 2010; Kwon, Yoon, Joormann, & Kwon, 2013). This pattern aligns with cultural models, whereby interdependent cultures encourage reflection on negative experiences in order to moderate one's behaviour in accordance with social norms (Markus & Kitayama, 2010; Wei, Su, Carrera, Lin, & Yi, 2013).

Theoretical frameworks (Hwang, Myers, Abe-Kim, & Ting, 2008; Jobson, 2009; Wong, Tran, Kim, Van Horn Kerne, & Calfa, 2010) specify that cultural beliefs and norms influence emotional disorders. That is, when individuals think or behave in ways that are incongruent with the prevailing cultural norms (e.g., engaging in self-promotion in an East Asian context or brooding on negative past experiences in a Western context), the individual may experience emotional distress. Thus, intrusive memory appraisals, and memory-related brooding and cognitive avoidance may more likely be associated with emotional disorders for those from Western cultures, and be less detrimental for those from East Asian cultures (where appraisals of personal control are less emphasised and reflection on negative experiences accord with social norms). In support of this, researchers have shown that in East Asian cultures negative appraisals, control appraisals, avoidance and rumination are not necessarily associated with poor mental health (e.g., Bernardi & Jobson, in press; Cheng, Cheung, Chio, & Chan, 2013; Grossmann & Kross, 2010).

This study, therefore, aimed to firstly examine cross-cultural differences in intrusive memory responses of those from an East Asian versus a European Australian cultural background (Australia is an example of a Western independent culture, Church et al., 2012, 2013). Based on past cross-cultural non-clinical research, we hypothesized that East Asian participants would report greater negative, control and responsibility memory appraisals and greater cognitive avoidance and brooding-rumination, compared to European Australians (*Hypothesis 1*). The second aim was to examine whether such cultural differences interact with depression. Based on findings that the relationship between depression and the use of maladaptive emotion regulation strategies is attenuated among those from interdependent cultures, compared with those from independent cultures (Grossmann & Kross, 2010), we predicted that engaging in cognitive avoidance and brooding-rumination would be associated with depression in those from a European Australian background. We also extended this prediction to maladaptive memory-related appraisals. Thus, we hypothesized that European Australians with depression would report these appraisals and emotion regulation strategies to a significantly greater extent than European Australians without depression. Furthermore, we expected that these appraisals and emotion regulation strategies would be less likely to differentiate between those from East Asian cultures with and without depression. Indeed, the East Asian depressed and control groups may not differ significantly, as such appraisals and emotion regulation strategies are more congruent with interdependent norms, such as self-scrutiny (*Hypothesis 2*).

## 7.5 Method

### 7.5.1 Participants

Potential participants ($N = 353$) were screened using an on-line questionnaire to assess eligibility. Adopting the approach of previous cross-cultural clinical research (e.g., Dritschel et al., 2011; Grossman & Kross, 2010; Jobson, Moradi, Rahimi-Movaghar, Conway, & Dalgleish, 2014), participants identified as either European Australian (with all four grandparents being of European

Australian descent) or East Asian (with all four grandparents being of East Asian descent and living in Australia for less than 5 years). Eligibility criteria also included being aged between 18-60 years and no history of substance dependence, bipolar disorder, traumatic brain injury, neurological illness, psychosis, or PTSD (as indexed by scoring 33 or above on the PTSD Checklist for DSM-5, Blevins, Weathers, Davis, Witte, & Domino, 2015). Additionally, those who were not currently depressed (as indexed by scoring less than 16 on the Center for Epidemiologic Studies Depression Scale Revised; Eaton, Smith, Ybarra, Muntaner, & Tien, 2004), but reported a prior history of depression were deemed ineligible. The final sample consisted of 91 participants. East Asian participants identified as Chinese ($n$ = 37)[1], Taiwanese ($n$ = 5), South Korean ($n$ = 2) and Japanese ($n$ = 1) and had lived in Australia for an average of 16.58 months ($SD$ = 16.62).

Participants were allocated to the currently depressed or never-depressed control groups based on the Structured Clinical Interview for the Diagnostic and Statistical Manual of Mental Disorders–Fifth Edition, Research version (SCID-5; First, Williams, Karg, & Spitzer, 2014). Participants were administered the mood module to assess the presence of current and lifetime diagnoses of a Major Depressive Episode, Manic Episode or Hypomanic Episode. The psychotic screening module and the trauma module were also administered in order to exclude participants with PTSD, acute stress disorder and psychotic symptoms (Starr & Moulds, 2006; Newby & Moulds, 2011). The SCID-5 was administered and scored by the first author. The second author, who is a clinical psychologist and was blind to cultural group and previous diagnosis, co-rated 25% of the interviews. There was complete agreement between raters.

### 7.5.2 Procedure

Ethical approval for this study was provided by the Monash University Human Research Ethics Committee. The study was advertised online and via posters displayed in the general

[1] Given the majority of participants were Chinese, we also conducted the analyses with just the Chinese participants and a similar pattern of findings emerged.

community. Those interested contacted the researchers and were emailed a link to the screening questionnaire. Eligible participants were invited to a laboratory-based assessment, where they provided informed consent and demographic details and completed the SCID-5, Beck Depression Inventory-II (BDI-II; Beck, Steer, & Brown, 1996), and Independent and Interdependent Self Scale (IISS; Lu & Gilmour, 2007). During the assessment, participants were provided with a verbal definition of an intrusive negative memory, as per past studies (Starr & Moulds, 2006; Williams & Moulds, 2010) and were instructed to complete a memory diary entry as soon as they experienced an intrusive memory about an unpleasant, negative or stressful event. Following the assessment, participants were emailed a hyperlink to the memory diary and a summary of how to complete a diary entry. Participants were reimbursed $25.

### 7.5.3 Measures

**BDI-II (Beck et al., 1996).** The BDI-II was used to assess depression symptoms. The BDI-II has good psychometric properties (Beck et al., 1996) and has been validated in non-Western samples (Byrne, Stewart, & Lee, 2004; Kojima et al., 2002). Internal consistency in the current study was European Australian α= .97, East Asian α= .94.

**IIISS (Lu & Gilmour, 2007).** The IISS was used to assess interdependent (21-items) and independent (21-items) self-construals. Participants rated items on a 7-point scale (1 = *strongly disagree* to 7= *strongly agree*). Each participant was given a self-construal score; interdependent total divided by their independent total, with higher scores indicating greater endorsement of interdependence relative to independence. The IISS has satisfactory reliability and validity with East Asian and Western adults (Lu & Gilmour, 2007). Internal consistency for the current study was European Australian α= .84, East Asian α= .88 for the independent subscale, and European Australian α= .82, East Asian α= .94 for the interdependent subscale.

**Memory Diary.** An online memory diary (developed using Qualtrics) was used to capture two memories in real-time (Ball & Brewin, 2012; Bisby, King, Brewin, Burgess, & Curran, 2010;

Kamboj et al., 2014), as retrospective autobiographical memory recall can be biased due to reliance on cognitive heuristics (Shiffman, Stone, & Hufford, 2008). Participants first described their memory then completed the below questionnaires with responses anchored to each reported memory (Williams & Moulds, 2010). Participants also rated how negative the memories were from 1(*totally pleasant/positive)* to 5 (*totally unpleasant/negative*) and how distressing the memories were from 0 (*not at all distressing*) to 100 (*extremely distressing*). Participants were instructed to report two separate memories, within a maximum of 14 days[2].

***Response to Intrusion Questionnaire (RIQ; Clohessy & Ehlers, 1999).*** The RIQ has been used to examine cognitive responses to intrusive memories during depression (e.g., Starr & Moulds, 2006; Williams & Moulds, 2008). In the current study, the 6-item negative appraisals subscale was used, with items rated on 7-point scales (1 = *totally disagree* to *7 = totally agree*). Previous studies have reported good internal consistency, $\alpha$= .75-.89 (Clohessy & Ehlers, 1999) and the RIQ has been used in cross-cultural clinical studies with East Asian participants (Bernardi & Jobson, in press). Internal consistency in the current study was European Australian α= .93, East Asian α= .89.

***Interpretation of Intrusions Inventory (III; Obsessive Compulsive Cognitions Working Group [OCCWG], 2001, 2005).*** The III is a 31-item self-report measure developed to assess appraisals about intrusive cognitions. We used the control and responsibility subscales. Responsibility item 14 was excluded as the remembered event being reported by participants had already occurred, and control item 29 was excluded as it has been shown to have a bimodal distribution (Ferguson, Jarry, & Jackson, 2006). These exclusions resulted in 9 responsibility items and 10 control items. Items referring to an "intrusive thought" were reworded to "spontaneous

[2] The first author read through all memory content and assessed relevance of that reported by participants based on the definition of autobiographical memory (i.e., a memory of a specific personal event, anchored to a particular time and place; Dritschel, Kao, Astell, Neufeind, & Lai, 2011). Two participants reported non-memory content for one of their memories (a dream and a worry - neither of which had actually occurred). Both participants were asked to continue the study until two intrusive negative memories were reported. Both participants were able to report a second memory as requested.

memory" as per past intrusive memory studies (Williams & Moulds, 2008). Appraisal strength was rated on a 6-point scale ranging from 0 (*I did not believe this idea at all)* to 100 (*I was completely convinced this idea was true*). Mean scores were subsequently converted to a 10-point scale for data analysis (OCCWG, 2005). These two subscales have high internal consistency, *α*= .79-.96 (OCCWG, 2001, 2005) and the III has been used in cross-cultural clinical research (e.g., Cagin & Dag, 2009). Internal consistency for the current study was European Australian α= .91, East Asian α= .91 for the control subscale, and European Australian α= .90, East Asian α= .88 for the responsibility subscale.

***Rumination Response Scale-Revised, Brooding subscale (RRS-revised; Treynor, Gonzalez, & Nolen-Hoeksema, 2003).*** The RRS-revised contains a 5-item brooding subscale. In the current study, items were reworded to past tense and rated on a 7-point scale (1 = *not at all* to 7 = *very much*). Participants were instructed to anchor their ratings to their intrusive memory. The brooding subscale has previously been validated in East Asian samples (Lee & Kim, 2014; Lei et al., 2017). Internal consistency in the current study was European Australian α = .75, East Asian α = .80.

***Impact of Event Scale (IES; Horowitz et al., 1979).*** Following the approach of previous studies (Newby & Moulds, 2011; Williams & Moulds, 2007), we used the 8-item avoidance subscale of the IES that is anchored to the subjective experience of a specific life event and is commonly used in research investigating intrusive memories in depression (e.g., Kuyken & Brewin, 1994). Participants rated responses as either *0=not at all, 1=rarely, 3=sometimes* or *5=often.* The IES has been used cross-culturally (Jobson & O'Kearney, 2006). In this study internal consistency for the subscale was European Australian α = 80, East Asian α = .86.

### 7.5.4 Data Analysis Strategy

Self-reported responses for the two memories were transformed into averages, such that each participant had a single total score for all dependent variables. One participant (Australian

depressed group) only provided one memory and thus, average scores were not calculated for this participant. There was no other missing data. To test our hypotheses, a series of 2 (Group: European Australian, East Asian) x 2 (Depression: depressed, control) analysis of variances (ANOVAs) were performed to examine differences in the appraisal and emotion regulation variables.

## 7.6 Results

### 7.6.1 Group Characteristics

Group characteristics and dependent variable means are outlined in Table 7.1. As shown in Table 7.1, the groups did not differ significantly in age, gender, education, marital status, and lifetime trauma exposure. The East Asian groups did not differ significantly in time lived in Australia, $t(43)= .37$, $p= .72$. As expected, the East Asian group ($M= 1.03$, $SD= .21$) had a significantly greater interdependent/independent self-orientation than the Australian group ($M= .94$, $SD= .15$), $F(1, 87)= 6.02$, $p= .02$ (depression main effect and the culture x depression interaction were both non-significant).

A series of 2 (Group: European Australian, East Asian) x 2 (Depression: depressed, control) ANOVAs with memory negativity, memory distress and BDI-II scores as the dependent variables were conducted. In terms of memory negativity, the culture main effect, $F(1, 87)= 1.02$, $p= .32$, $\eta_p^2= .01$, depression main effect, $F(1, 87)= .74$, $p= .39$, $\eta_p^2= .01$, and interaction, $F(1, 87)= .97$, $p= .33$, $\eta_p^2= .01$, were all non-significant; indicating that the groups were comparable in reporting negative memories. While we have focused on distress in Mihailova and Jobson (2019), it is worth noting that the culture main effect, $F(1, 87)= 9.11$, $p< .01$, $\eta_p^2= .01$, and depression main effect, $F(1, 87)= 5.94$, $p= .02$, $\eta_p^2= .06$, were significant (interaction, $F(1, 87)= .50$, $p= .48$, $\eta_p^2= .01$)[3]. For BDI-II scores there was a significant interaction, $F(1, 87)= 7.59$, $p< .01$, $\eta_p^2= .08$. As expected, the two depressed groups reported significantly greater depression symptomatology than

[3] When we controlled for distress in the hypothesis-related analyses a similar pattern of results emerged, with the exception of the cultural main effect no longer being significant for negative appraisals.

controls; East Asian, $t(27.65)= 9.63$, $p< .001$, $d= 3.07$, European Australian, $t(36.45)= 12.12$, $p< .001$, $d= 3.57$. While the control groups did not differ significantly, $t(46)= .61$, $p=.54$, $d= .18$, the European Australian depressed group reported significantly greater depression symptomatology than the East Asian depressed group, $t(41)= 2.71$, $p= .01$, $d= 0.83$[4].

### 7.6.2 Memory Appraisals

Consistent with Hypothesis 1, there was a significant culture main effect for negative appraisals, $F(1, 87)= 4.06$, $p= .047$, $\eta_p^2= .05$, control appraisals, $F(1, 87)= 6.9$, $p = .01$, $\eta_p^2= .07$, and responsibility appraisals, $F(1, 87)= 19.59$, $p< .001$, $\eta_p^2= .18$; the East Asian group reported significantly greater negative, control and responsibility appraisals than the European Australian group. There was also a significant depression main effect for negative appraisals, $F(1, 87)= 60.84$, $p< .001$, $\eta_p^2= .41$, control appraisals, $F(1, 87)= 18.19$, $p< .001$, $\eta_p^2= .17$, and responsibility appraisals, $F(1, 87)= 9.18$, $p< .003$, $\eta_p^2= .10$; depressed participants reported significantly greater negative, control and responsibility appraisals than controls. Contrary to Hypothesis 2, the interactions were non-significant; negative appraisals, $F(1, 87)= .004$, $p= .95$, $\eta_p^2< .001$, control appraisals, $F(1, 87)= 3.51$, $p= .06$, $\eta_p^2= .04$, responsibility appraisals, $F(1, 87)= 3.31$, $p= .07$ , $\eta_p^2 = .04$.

### 7.6.3 Emotion Regulation

The culture x depression interaction for brooding-rumination was significant, $F(1, 87)= 5.19$, $p= .03$, $\eta_p^2= .06$. Follow-up analyses showed that, consistent with Hypothesis 2, the European Australian depressed group brooded significantly more than the European Australian control group, $F(1, 87)= 5.81$, $p= .02$, $\eta_p^2= .06$. The East Asian depressed group also brooded significantly more than the East Asian control group, $F(1, 87)= 30.94$, $p< .001$, $\eta_p^2= .26$. Further, in partial support of

[4] For any analyses reported that just compared the two depressed groups, we also conducted the analyses including BDI-II scores as a covariate. In each instance a similar pattern of findings emerged.

Hypothesis 1, the East Asian depressed group brooded significantly more than the European Australian depressed group, $F(1, 87)= 16.03$, $p < .001$, $\eta_p^2= .16$. However, the control groups did not differ significantly, $F(1, 87)= .01$, $p= .92$, $\eta_p^2= .001$.

The culture x depression interaction for cognitive avoidance was also significant, $F(1, 87)= 6.96$, $p= .01$, $\eta_p^2= .07$. Follow up analyses indicated that, contrary to Hypothesis 2, the two European Australian groups did not differ significantly, $F(1, 87)= .52$, $p= .47$, $\eta_p^2< .01$. However, the East Asian depressed group reported significantly greater avoidance than the East Asian control group, $F(1, 87)= 19.42$, $p< .001$, $\eta_p^2= .18$. Furthermore, the East Asian depressed group engaged in greater efforts to avoid intrusive memories than the European Australian depressed group, $F(1, 87)= 9.72$, $p< .01$, $\eta_p^2= .10$. The control groups did not differ significantly, $F(1, 87)= .29$, $p= .59$, $\eta_p^2= .003$.

**7.7 Discussion**

This study investigated whether culture (East Asian and European Australian) and depression were associated with responses to intrusive negative autobiographical memories. First, in terms of memory appraisals, we found cross-cultural differences. East Asian participants, regardless of depression status, negatively appraised their intrusive memories, appraised that they needed to control the occurrence of the memory, and appraised that they had responsibility to nullify the memory's possible negative impact, more than European Australian participants. These findings align with previous research suggesting that Western cultures have a strong desire to minimize negative self-related information and personal control and responsibility for negative events, when compared to East Asians who instead tend to have greater tolerance of negative self-information and responsibility for negative experiences (Bjorck et al., 2001; Fry & Grover, 1982; Kitayama et al., 1997). Despite these cultural differences we found that, regardless of cultural group, those with depression reported significantly greater negative, control and responsibility appraisals than controls, which is consistent with the negative interpretation biases observed during

depression (Everaert, Podina, & Koster, 2017). Furthermore, these memory appraisals differentiated between Asian participants with and without depression in a similar pattern to that observed in the European Australian group.

Second, in terms of emotion regulation strategies, there was limited support for Hypothesis 1. While the East Asian depressed group brooded more in response to intrusive memories and engaged in greater cognitive avoidance, compared to the European Australian depressed group, the two control groups did not differ significantly. This finding is interesting especially in light of the East Asian group reporting lower depressive symptomatology than the European Australian group. It is possible that the East Asian participants under-reported symptoms on the BDI-II, as East Asian cultures have been found to somaticize depressive symptoms and minimise distress, when compared to those in Western cultures (Chang, Jetten, Cruwys, & Haslam, 2017; Okazaki, & Kallivayalil, 2002). However, this finding needs to be further explored in future research. Finally, the lack of cultural differences in brooding and avoidance between the two control groups may reflect that controls experienced less memory-related distress compared to the depressed groups and thus, emotion regulation was not warranted for these participants.

In terms of Hypothesis 2, as expected, among the European Australian group those with depression brooded significantly more in response to memories than the control group. However, contrary to Hypothesis 2, the two European Australian groups did not differ significantly on the use of cognitive avoidance. This is contrary to past research (Newby & Moulds, 2011; Spenceley & Jerrom, 1997). We are uncertain why this finding was not observed and thus further research is needed. We also found that the East Asian depressed group brooded and engaged in cognitive avoidance significantly more than the East Asian controls, with moderate to large effect sizes observed. Thus, despite cross-cultural research suggesting that East Asian cultures exhibit greater acceptance and use of these emotion regulation strategies, and that such emotion regulation strategies may be less maladaptive as they align with cultural norms, in our East Asian sample these

practices still appeared maladaptive and associated with depression. These findings suggest that there are some cultural similarities in intrusive autobiographical remembering in depression. While our results are contrary to past cross-cultural research with non-clinical samples, they are consistent with accumulating clinical research indicating that psychopathology is associated with similar distortions in voluntary autobiographical remembering across cultures. For instance, pan-culturally, those with depression, when compared to healthy controls, have been found to retrieve significantly fewer specific autobiographical memories (Dritschel, Kao, Astell, Neufeind, & Lai, 2011) and exhibit a negativity bias in the structure of their autobiographical life stories (Jobson et al., 2018). Furthermore, pan-cultural autobiographical memory distortions have been found in individuals with high trauma exposure (Humphries & Jobson, 2012) and PTSD (Jobson et al., 2014). Thus, cultural similarities in the distortions evident in voluntary autobiographical remembering in depression may extend to intrusive memories. Theoretically, these findings suggest that models of intrusive memories in depression (Williams & Moulds, 2010), which were largely developed based on research with Western samples, may also have utility when working with those from East Asian cultures. Clinically, our results suggest that interventions that target appraisals, cognitive avoidance and brooding-rumination in response to memories, may be beneficial for East Asian clients with depression.

Several limitations are acknowledged. First, the study was cross-sectional, therefore, causal inferences cannot be drawn from our findings. Second, the sample size was modest and comprised predominately of females. This potentially limits the generalizability of the findings and highlights that the study would benefit from replication with a larger sample size. Third, such replication would also enable future studies to examine if the subscales used in the current study measured the same constructs across cultural groups, particularly since questionnaires were administered in English, which may have resulted in a language priming effect for East Asian participants (Ross, Xun, & Wilson, 2002). Testing for measurement invariance was not possible in the current study

due to our sample size. However, the measures used in the current study had been previously used and validated in cross-cultural research and internal consistency was good for all measures for both cultural groups. Fourth, although all East Asian participants had lived in Australia for less than five years, acculturation may have influenced our findings as the study was conducted in an independent cultural context (Australia). Fifth, we used nationality (i.e., European Australian-born versus East Asian-born) as an index of cultural orientation. Whilst this approach is consistent with previous cross-cultural clinical studies (Dritschel et al., 2011; Grossman & Kross, 2010; Jobson et al., 2014) and the East Asian group reported greater interdependence relative to independence, than the European Australian group, our results would benefit from replication using a cross-country sample. Furthermore, our East Asian group was comprised of several Asian ethnicities. While our analyses with only the Chinese participants found a similar pattern of results to that reported, future research would benefit from examining single cultural groups. Sixth, following previous studies that have employed an online intrusion diary paradigm, we did not require participants to rate their compliance with instructions. Future studies would benefit from including a measure of length of time between participants experiencing an intrusive memory and filling out a memory diary entry. Despite these limitations, the findings suggest that depression may be associated with some similar maladaptive responses to intrusive autobiographical memories across cultural groups.

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Table 7.1

*Group Demographic Characteristics and Intrusive Memory Dependent Variable Means (SD)*

| | Australian | | East Asian | | Statistics |
|---|---|---|---|---|---|
| | Currently depressed ($n$ = 23) | Never depressed ($n$ =23) | Currently depressed ($n$ = 20) | Never depressed ($n$ = 25) | |
| Age (years) | 23.39 (6.25) | 22.00 (5.12) | 24.20 (3.72) | 25.64 (5.07) | $F(3, 87)= 2.08$ |
| Gender (female), $n$ | 16 (70%) | 17 (74%) | 17 (85%) | 20 (80%) | $\chi^2(3, N=91)= 1.69$ |
| Months in Australia | 280.70 (75.01) | 259.70 (61.35) | 17.60 (19.56) | 15.76 (14.22) | $F(3, 87)= 194.69$** |
| Marital Status; single, $n$ | 18 (78%) | 17 (74%) | 14 (70%) | 18 (72%) | $\chi^2 (3, N = 91) = .43$ |
| Education (completed minimum high school or equivalent), $n$ | 21 (91%) | 20 (87%) | 20 (100%) | 25 (100%) | $\chi^2 (3, N= 91)= 5.59$ |
| Exposed to ≥ one lifetime trauma, $n$ | 13 (57%) | 11 (48%) | 12 (60%) | 7 (28%) | $\chi^2 (3, N= 91)= 5.87$ |
| Memory Negativity | 4.70 (.70) | 4.39 (.89) | 4.70 (.92) | 4.72 (.61) | - |
| Memory Distress | 62.17 (20.22) | 54.35 (25.01) | 79.00 (20.75) | 64.80 (19.60) | - |
| Depression Symptoms (BDI-II) | 32.39 (9.32) | 4.78 (5.71) | 25.10 (8.13) | 5.68 (4.38) | - |
| Negative appraisals (RIQ) | 21.17 (8.18) | 10.09 (6.19) | 23.93 (6.42) | 13.02 (5.80) | - |
| Control appraisals (III) | 22.74 (16.76) | 14.13 (20.09) | 38.95 (17.92) | 16.84 (13.46) | - |
| Responsibility appraisals (III) | 16.61 (12.39) | 12.70 (16.60) | 36.80 (19.39) | 21.12 (12.87) | - |
| Brooding (RRS) | 17.85 (5.17) | 14.00 (6.11) | 24.48 (5.58) | 15.44 (4.80) | - |
| Avoidance (IES) | 12.09 (7.59) | 10.43 (7.04) | 19.50 (9.58) | 9.22 (6.94) | - |

*Note.* Data are means (SD) for all variables, except for gender, education, marital status and lifetime trauma. Dashes represent statistical analyses reported in text. BDI-II = Beck Depression Inventory - II; RIQ = Response to Intrusion Questionnaire; III = Interpretation of Intrusions Inventory; RRS = Rumination Response Scale-Revised; IES = Impact of Event Scale.
**$p < .01$.

# CHAPTER 8

# General Discussion

## 8.1 Overall Aims

Clinical research has documented the pervasiveness of frequent and distressing intrusive memories in depression (Payne et al., 2019) and the role such memories play in the maintenance of depressive symptomatology (Brewin et al., 1998, 1999; Holmes et al., 2009). Several processes contribute to the recurrence of intrusive memories during depression, including ascribing maladaptive appraisals to the memories, attempting to cognitively avoid the memory, and ruminating in response to the memory (Williams & Moulds, 2010a). Alongside clinical research investigating intrusive memories, cross-cultural studies have demonstrated cultural variability in voluntary autobiographical remembering, the appraisal of emotional experiences and the use of cognitive responses, such as avoidance and rumination. However, to date, no study has considered whether such cultural differences extend to intrusive memories during depression. Therefore, the overall aim of the current thesis was to investigate whether the experience of intrusive memories differed between those from a European Australian versus East Asian cultural background, with and without depression. By examining potential differences in the perceptual qualities, narrative content and cognitive responses to memories, the current research project sought to initiate an exploration regarding whether culturally-informed modifications to memory interventions are warranted for those with depression.

The first specific aim of the thesis was to employ meta-analytic techniques to clarify whether depression was associated with intrusive memories (Study 1). In particular, the meta-analyses examined relationships between depression and memory characteristics, as well as several cognitive processes from Williams and Moulds' (2010a) model of intrusive memories in depression. Findings from these meta-analyses were consistent with Williams and Moulds' model, as

depression was positively associated with intrusive memory distress, maladaptive memory appraisals, memory avoidance and memory rumination. Study 1 highlighted a significant cultural gap in the intrusive memory literature. Specifically, the studies included in the meta-analyses were: (1) conducted predominantly in Western cultural contexts, and (2) when the samples were more culturally diverse, studies did not conduct cross-cultural analyses. The second specific aim was to use the results from Study 1 to design and conduct a cross-sectional, cross-cultural study (Study 2). Findings from Study 2 were reported in two separate papers; Paper 2 focused on memory content, characteristics and thematic categories, and Paper 3 focused on maladaptive memory appraisals, cognitive avoidance, and brooding-rumination.

This concluding chapter will provide an integrated overview of findings before considering clinical and theoretical implications arising from the results. Additionally, methodological strengths and limitations, as well as future research recommendations, will be considered.

**8.2 Overview of Findings**

A primary goal of this thesis was to examine the cross-cultural applicability of previous clinical findings relating to the experience of intrusive memories during depression. In particular, Williams and Moulds' (2010a) model was used to guide the research. While this model posits that maladaptive memory appraisals and avoidant cognitive responses contribute to the persistence of memories, this framework does not explicitly consider potential cultural variability in these processes. Overall, findings from the current thesis indicated that several memory characteristics (e.g., frequency, distress) and cognitive responses (e.g., appraisals) were higher in those with depression, regardless of cultural group, compared to controls. This suggests that processes purported to be maladaptive in previous clinical studies may be maladaptive cross-culturally.

Another overarching aim of this thesis was to investigate whether the well-established cultural differences in the content of voluntarily retrieved memories (in non-clinical samples) extended to intrusive memories in those with depression. Cross-cultural studies have consistently

found that those from Western, independent cultures recall longer, more specific, autonomously focused, egocentric memories than those from East Asian interdependent cultures, who instead report memories emphasizing social responsibilities and interactions (Ross & Wang, 2010). Overall, findings from the current thesis suggested that for both depressed and never-depressed samples the narrative content of intrusive memories did not differ significantly between cultural groups, with the exception of memory specificity.

### 8.2.1 Intrusive memory characteristics

Results relating to memory characteristics were largely congruent with previous clinical research (e.g., Newby & Moulds, 2011). Across the two studies, we found that, regardless of cultural background, depression was associated with more frequent, distressing and numbing intrusive memories. These findings suggest that intrusive memories warrant clinical attention when experienced by either East Asians or European Australians with depression. The remaining memory characteristics (vantage perspective, vividness, sense of reliving) were not associated with depression in either cultural group. The vantage perspective finding was surprising given that Williams and Moulds' (2010a) model suggests that the observer perspective may be used as an avoidance mechanism by those with depression. However, our results are consistent with Newby and Moulds (2011) who similarly found that vantage perspective did not differ significantly between depressed and never-depressed groups. Further research is needed to clarify the role of the observer perspective in intrusive remembering given that, as noted in Paper 1, only a small number of studies have considered this in the context of depression.

### 8.2.2 Cognitive responses to intrusive memories

Our meta-analyses indicated that depression was moderately positively associated with attempts to cognitively avoid intrusive memories; brooding in response to memories; and negative memory appraisals (Paper 1). Consistent with this, Paper 3 found that cross-culturally those with depression brooded significantly more in response to intrusions, attributed significantly more

negative, control and responsibility appraisals to memories, compared to healthy controls. These findings suggest that, regardless of cultural background, certain cognitive responses to intrusive memories are associated with depressive symptomatology. Theoretical frameworks proposing that those with depression ascribe maladaptive appraisals to intrusive memories and ruminate (brood) as a way of coping with memory distress (Williams & Moulds, 2010a) may thus be applicable cross-culturally.

We also observed some cultural differences in cognitive responses to memories. East Asian participants (across both depressed and control groups) endorsed stronger negative, control and responsibility appraisals compared to European Australians. This is consistent with broader cross-cultural literature documenting that those in East Asian cultures are more self-critical (Heine & Lehman, 1999), engage in more efforts to control their reactions to events (Bjorck et al., 2001; Cook & Hayes, 2010; Sheu & Sedlacek, 2004) and assume greater responsibility for negative past events (Anderson, 1999; Bjorck et al., 2001; Fry & Grover, 1982; Tweed et al., 2004), compared to those from Western cultures. The use of brooding in response to memories also differed culturally, but only between the two depressed groups. Namely, depressed participants from East Asian backgrounds brooded more in response to memories than depressed European Australians. Therefore, although intrusive memory brooding appears to be associated with depression in both cultures, the intensity of brooding responses may vary culturally. One interpretation of this pattern is that higher memory-related brooding by East Asians reflects the tendency for those from interdependent cultures to engage in more brooding generally (Chang et al., 2010; Eshun, Chang, & Owusu, 1998; Grossmann & Kross, 2010; Kwon et al., 2013). This interpretation is complicated, however, by the fact that there were no significant cultural differences in the use of brooding among the two control groups. This was unexpected given that past cross-cultural studies have documented higher brooding by interdependent, compared to independent, non-clinical samples (Grossman & Kross, 2010; Jose et al., 2014; Kwon et al., 2013). This discrepancy may point to the possibility that

among healthy controls intrusive memories were not distressing enough to elicit culturally-moderated brooding responses. Future cross-cultural studies examining responses to intrusive memories would be helpful in clarifying this.

Cross-cultural differences were also observed in attempts to cognitively avoid intrusive memories. Like brooding, depressed participants from East Asian backgrounds reported higher avoidance, compared to depressed Australians. This is consistent with broader cross-cultural literature documenting that those from interdependent cultures report greater use of cognitive avoidance strategies in response to stressful events, compared to those from independent cultures (Bjorck et al., 2001; Cook & Hayes, 2010; O'Connor & Shimizu, 2002). Interestingly, cognitive avoidance was not significantly different between the two control groups. As noted above, we need further research to clarify whether intrusive memories are not sufficiently distressing to elicit culturally specific responses in controls. Cognitive avoidance was also not significantly different between Australians with and without depression. This was unexpected given that, as documented in our meta-analysis (Paper 1), past studies with Western samples have found that intrusive memory avoidance is positively associated with depression. It is unclear why our results differed from past studies given that we employed the same measure of avoidance typically used in intrusive memory research (Impact of Event Scale - Avoidance subscale) (e.g., Kuyken & Brewin, 1994; Newby & Moulds, 2011). One methodological difference between the current and past research was our use of an online memory diary, compared to retrospective memory recall used previously (e.g., Newby & Moulds, 2011; Reynolds & Brewin, 1999; Williams & Moulds, 2007a). Future studies comparing immediate versus retrospective recall could test whether this methodological difference influences the use of avoidance among culturally diverse samples and European Australians, with and without depression.

### 8.2.3 Intrusive memory content and theme

In contrast to past cross-cultural studies examining the content of voluntary memories (Wang, 2016), we found that intrusive memory content did not differ significantly between the two cultural groups (Paper 2). The one exception was memory specificity, with European Australians reporting more specific memories than East Asian participants. Overall, these content results were surprising given that cultural differences in autobiographical memory content are well-established, with content found to reflect the cultural orientation dominant in the individual's context (for a review, see Wang, 2016). As previous research has examined voluntarily retrieved memories, our results suggest that the involuntary recall of intrusive memories may potentially account for the absence of cultural differences. Potential theoretical explanations for this discrepancy between the two retrieval routes are considered further below.

While specificity differed culturally, it did not differ between those with and without depression - consistent with previous involuntary memory research (Kvavilashvili & Schlagman, 2011). In the context of past findings that reduced memory specificity of *voluntary* memories is a marker of depression (Sumner et al., 2010), this result may imply that unlike voluntary memories, intrusive memory specificity is not associated with depression. In addition to specificity being similar across diagnostic groups, we also found that across both depressed and control groups negative interpersonal events were the dominant thematic category of memories. We were unable to compare themes quantitatively across the groups, thus it is unclear if thematic content was significantly different between those with and without depression. However, for those with depression the thematic focus on relationship stressors is consistent with findings that interpersonal disruptions and losses are key precipitants for the onset of depressive episodes (Beck & Bredemeier, 2016; Eberhart & Hammen, 2006; Vrshek-Schallhorn et al., 2015).

**8.3 Theoretical Implications**

The current research program contributes to an area of research still in its infancy - namely, cross-cultural research examining autobiographical remembering during depression. While

theoretical models of depression recognize the role of memory in maintaining depression symptoms (Teasdale, 1988) and autobiographical memory disturbances during depression are now well-established (Dalgleish & Werner-Seidler, 2014), the influence of culture remains overlooked despite its recognized role in influencing autobiographical remembering (Wang, 2016). This section will outline how the above outlined findings contribute to theoretical frameworks relating to: intrusive memories; cultural distinctions between independent and interdependent self-orientations; and, autobiographical memory.

### 8.3.1 Model of intrusive memories in depression

The findings outlined above suggest that several processes hypothesized to be maladaptive by Williams and Moulds' (2010a) model of intrusive memories during depression may be applicable cross-culturally. Specifically, negative and control appraisals appear to be associated with depressive psychopathology in both European Australian and East Asian cultures. This suggests that, irrespective of whether it is culturally normative to appraise experiences self-critically or seek to control internal responses to negative events (i.e., as valued in interdependent cultures) (Heine & Lehman, 1999; Kitayama et al., 1997; Tweed et al., 2004; Weisz et al., 1984), negative and control appraisals of intrusive memories are maladaptive. Additionally, while Williams and Moulds' model does not include responsibility appraisals, the current research also examined this appraisal type given that those in interdependent cultures assume greater responsibility for negative past events, compared to those in independent cultures (Anderson, 1999; Bjorck et al., 2001; Fry & Grover, 1982; Tweed et al., 2004). When ignoring diagnosis, we observed a similar cultural pattern with regard to responsibility appraisals of intrusive memories; with such appraisals being higher among East Asians compared to European Australians. However, in the context of depression, responsibility appraisals did not differ significantly between the two cultural groups. This suggests that, like negative and control appraisals, responsibility appraisals of intrusive memories are maladaptive cross-culturally. Therefore, Williams and Moulds' model may benefit from broadening

the types of appraisals deemed maladaptive. Indeed, there may be other types of memory appraisals that were not considered in the current thesis. For example, cross-cultural differences have been documented in several types of trauma-related appraisals (e.g., permanent change, norm-self compatibility, secondary control) (Bernardi & Jobson, 2019) and it would be useful for future intrusive memory depression research to consider other appraisal types.

In addition to appraisals, our findings have implications for the proposed use of emotion regulation strategies in response to intrusive memories (Williams & Moulds, 2010a). Our results suggest that the proposed role of rumination (i.e., brooding) in maintaining intrusive memories in depression (Williams & Moulds, 2010a) may be relevant cross-culturally. However, our cross-sectional design does not permit us to infer that brooding leads to intrusive memory persistence, only that it is a maladaptive strategy in the context of intrusive memories. Prospective, cross-cultural research is needed to elucidate if the tendency to brood in response to memories predicts memory and depression maintenance for different cultural groups.

Unlike the brooding results, the cognitive avoidance findings presented a mixed picture and thus the theoretical implications are less clear. As hypothesized by Williams and Moulds (2010a) those with depression attempted to avoid memories more than controls, but this was only observed among East Asian participants. While it was surprising that depressed European Australians did not cognitively avoid memories more than their control counterparts, it is unclear if this finding is inconsistent with prior research. While Newby and Moulds (2011) found that those with depression reported higher intrusive memory avoidance, compared to controls, their sample was culturally diverse (i.e., 36% of depressed and 70% of control participants were Asian). As Newby and Moulds did not perform cross-cultural analyses it is not known to what extent the cultural heterogeneity of the sample influenced avoidance results. Therefore, further research is needed to clarify the influence of culture on intrusive memory avoidance. If our avoidance results were replicated by future studies it would suggest that, unlike memory brooding which appears to be maladaptive

cross-culturally, the relationship between depression and cognitive avoidance of memories may be culturally specific.

In addition to avoidance and rumination, Williams and Moulds (2010a) proposed that recalling intrusive memories via the observer vantage perspective may also serve an avoidance function, by distancing the depressed individual from the distressing, emotional components of the memory (Kenny & Bryant, 2007; McIsaac & Eich, 2004). Indeed, depressed and previously depressed individuals tend to voluntarily recall autobiographical memories from the observer, rather than field, perspective (Bergouignan et al., 2008; Kuyken & Howell, 2006; Lemogne et al., 2006). Yet, our finding of no significant vantage differences between those with and without depression suggests that the observer perspective may not be a typical cognitive response to intrusive memories. Intrusive memories and voluntary memories may, therefore, differ in terms of the association between perspective and depressive psychopathology. If this finding was replicated it may warrant the removal of vantage perspective from Williams and Moulds' model. Possible theoretical reasons for why use of the observer vantage may differ when those with depression recall memories voluntarily versus involuntarily (intrusive) are considered below, within the framework of the SMS model of autobiographical memory.

### 8.3.2 Cross-cultural models

While findings from the current thesis suggest that several cognitive responses to intrusive memories are similarly maladaptive for both cultural groups, we also observed cross-cultural differences in memory appraisals, brooding and cognitive avoidance. This has implications for cross-cultural models as the results are consistent with the proposed distinctions between independent and interdependent cultures. Firstly, the findings that East Asian participants, regardless of diagnosis, reported higher negative, control and responsibility appraisals, compared to European Australians align with theoretical proposals that cultures differ in the way they appraise emotional experiences, with such appraisals potentially being adaptive in interdependent cultures

(Mesquita & Walker, 2003). Appraising memories more negatively accords with the tendency for those from East Asian interdependent cultures to be more self-critical, compared to those from Western cultures (Heine & Lehman, 1999; Kitayama, Markus, Matsumoto, & Norasakkunkit, 1997). Self-criticism functions to ensure that the individual remains modest and vigilant about potential social transgressions that could undermine their place in the social unit (Heine & Hamamura, 2007; Kitayama et al., 1997; Mesquita & Walker, 2003). By contrast, independent cultural norms encourage self-enhancement and the individual seeks to attain and express positive internal attributes in the interest of strengthening their sense of autonomy and uniqueness (Kitayama et al., 1997). Furthermore, our findings that East Asian participants endorsed stronger appraisals about needing to control intrusive memories and appraised that they had more responsibility to nullify the memory's possible negative impacts may be culturally normative as such cognitive suppression efforts may function to prevent memory-related distress from interfering with interactions with others (Tweed et al., 2004).

The observed cultural variability in the use of emotion regulation strategies in response to memories also has implications for cross-cultural models. As outlined earlier, depressed participants from East Asia endorsed greater memory avoidance and brooding, compared to depressed European Australians. Therefore, while brooding and avoidance appear to be maladaptive for those from East Asia, the differences observed between the two depressed groups suggest that there may be a cultural function to these responses. In interdependent cultures such as East Asia cognitive responses such as brooding may be culturally normative. Brooding about personal negative experiences may encourage the interdependently oriented individual to scrutinize themselves for faults that could disrupt one's place in the social group (Jose et al., 2014; Sakamoto, Kambara, & Tanno, 2001). Brooding may thus function as a problem-solving strategy that motivates the individual to address perceived personal faults in order to remain socially integrated (Jose et al., 2014; Sakamoto et al., 2001). Similarly, attempts to cognitively avoid intrusive memories by those

from East Asia may be motivated by a focus on maintaining in-group harmony, rather than being driven by a desire to avoid internal distress. Indeed, in East Asian cultures attempts to modulate one's internal response to stress is purported to be culturally adaptive because by seeking to control the self, rather than the external environment, the individual can continue to fit in with their social surroundings (Tweed et al., 2004). Nevertheless, despite these cultural differences in norms, higher brooding and avoidance of memories appears maladaptive.

The absence of significant group differences in intrusive memory content also has implications for cross-cultural theories of memory. When voluntarily remembering, those from Western backgrounds typically report longer, more egocentric memories that emphasize autonomy and individuality, compared to those from East Asia (Wang, 2016). These content differences in voluntary autobiographical memory have been interpreted as indicating that memory content can function to affirm one's dominant self-construal (Ross & Wang, 2007). For example, recalling detailed and self-focused memories that emphasize one's autonomy would likely be adaptive in an independent cultural context, where self-distinction and uniqueness are valued. The discrepancy between past studies examining voluntarily retrieved memories and the current thesis examining intrusive memories, suggests that the route of retrieval may be a factor determining whether culture influences the narrative content of memories. Potential explanations for the influence of retrieval route on culturally specific memory content will be considered below, in the context of the SMS model.

As noted earlier, the exception to the non-significant content results was memory specificity, with European Australians reporting significantly more specific memories than East Asians. This observed difference is consistent with theoretical distinctions between independent and interdependent cultures, as more specific memories among those from European Australian backgrounds accord with independent norms emphasizing the importance of autonomy and distinctiveness (Wang, 2001). That is, specific memories focus attention on the individual and may

reinforce the self as separate from others - features that are purported to be adaptive in independent cultures (Dritschel et al., 2011; Markus & Kitayama, 2010; Wang & Ross, 2007). By contrast, memories that lack specificity may function to de-emphasize the importance of the individual and instead draw attention to more general social interactions, thus affirming one's interdependent sense of self (Wang & Ross, 2007). Overall, results from this thesis imply that responses to intrusive memories should be interpreted through a cultural, as well as psychopathological, lens as both factors appear to influence cognitive responses.

### 8.3.3 Model of autobiographical memory

As noted earlier, the current thesis did not find the expected cross-cultural differences in the content and vantage perspective of *involuntarily* retrieved memories. One potential interpretation of these findings is that the influence of culture on memory content is dependent on the route of retrieval. The SMS model of autobiographical memory provides a framework for understanding the retrieval of both voluntary and involuntary memories, and explicitly acknowledges the influence of culture on remembering (Conway & Pleydell-Pearce, 2000; Conway & Jobson, 2012). The model recognizes that remembering occurs within a sociocultural context and that the encoding, organization and retrieval of autobiographical information is influenced by the individual's conceptualization of self (Conway & Jobson, 2012). This conceptual self represents one's understanding of "the self, other people, and typical interactions with the surrounding world" (Conway, 2005, p. 597) and is thus either independent or interdependently oriented (Jobson, 2009). The conceptual self operates in conjunction with the working self, which is a control mechanism that modulates remembering to ensure that memories support the individual's current goals (Conway, 2001, 2005). While the working self is purported to incorporate both autonomy and relatedness focused goals, different cultures tend to prioritize one goal orientation over the other (Conway & Jobson, 2012). Therefore, the culturally influenced conceptual self focuses the working self on either autonomy or relatedness goals, and the working self in turn modulates access to, and

elaboration of, autobiographical knowledge to ensure it is goal consistent (Conway & Jobson, 2012; Jobson, 2009). Within the context of past research documenting cross-cultural differences in voluntary remembering, our non-significant results may imply that the two retrieval routes offer differing opportunities for culture to exert an influence on remembering via the conceptual and working selves.

The SMS model proposes that voluntary memory retrieval is generative (i.e., an intentional and iterative search of hierarchically organised memory representations, guided by one's current goals) (Conway & Pleydell-Pearce, 2000). Involuntarily memories, by contrast, arise via a bottom-up direct retrieval route when information about a particular event is activated in response to an internal or external cue (Conway, 2001, 2005). For everyday memories that are retrieved voluntarily, an independent conceptual self-orientation would be likely to activate autonomy focused goals, which would influence the encoding, storage and elaboration of memories in a manner emphasizing autonomy (Jobson, 2009; Wang, 2016). A similar process would operate for those with an interdependent self-orientation, with memories instead emphasizing culturally normative relatedness goals (Jobson, 2009; Wang, 2016). For involuntarily retrieved intrusive memories, by contrast, content may not reflect the individual's dominant cultural orientation.

It is unclear why involuntary memory retrieval may impede the influence of cultural orientation on content. One potential explanation is that when memories arise via the involuntary retrieval route "the working self and its goals operate only *after* memory construction has taken place" (Conway & Pleydell-Pearce, 2000, p. 275). For involuntary memories to enter consciousness the event-specific information triggered by a cue must subsequently activate its associated general event and lifetime period information and this pattern of activation must then become linked to an active goal of the working self (Conway & Pleydell-Pearce, 2000). Therefore, while the working self prioritizes culturally normative goals (i.e., autonomy or relatedness; Conway & Jobson, 2012), for intrusive memories the content of the autobiographical representation has been formed before

the working self can influence its content. This is in contrast to the direct (voluntary) retrieval route where the working self mediates memory reconstruction by constraining access to autobiographical content based on its current active goals, including culturally influenced autonomy versus relatedness goals (Conway et al., 2004; Conway & Pleydell-Pearce, 2000; Conway & Jobson, 2012). Given that, to our knowledge, this is the first cross-cultural study to examine intrusive memory content, further empirical research is needed to compare intrusive and voluntary memories and clarify the mechanisms leading to different culturally oriented content.

Finally, the observed cross-cultural difference in memory specificity implies that culture influences whether intrusive memories will be narrowly focused on specific events or have a broader, more general focus. The precise mechanism by which culture exerts an influence on intrusive memory specificity is unclear. With regard to voluntary memory, Ross and Wang (2007) suggested that cultural variation may be driven by differences across multiple memory processes, such as attention, appraisal, encoding and retrieval. Culture may similarly influence several processes that collectively account for the formation of a specific, versus general, intrusive memory. For example, more specific intrusive memories by European Australians, compared to East Asians, may reflect differences in the amount of information attended to and encoded during an event. In support of this possibility are the findings that Americans exhibit preferential recall for focal objects suggesting a narrow attentional focus, while those from Asian backgrounds attend to the broader context of a scene, resulting in better recall for contextual information (Masuda & Nisbett, 2001). Furthermore, European Americans perceive a greater number of discrete events within a fictional narrative and immediately recall more event episodes compared to Asian Americans, who instead tend to segment the narrative into fewer specific events due to perceiving things as being interconnected (Wang, 2009). These findings suggest that those from Asian cultures may attend to and encode less specific information, compared to their American counterparts who instead perceive and encode information in more granular detail (Wang, 2009, 2016). For those from East

Asian cultures, a bias towards perceiving and encoding information in broader, more general terms would align with cultural models given that specific memories suggest a heightened self-focus which may be socially disadvantageous and incongruous with interdependent cultural norms (Ross & Wang, 2010; Wang, Hou, Koh, Song, & Yang, 2018).

Applying these perceptual and attentional cultural differences to the SMS model suggests that those from interdependent cultures may encode less specific episodic representations (i.e., event-specific perceptual information; Conway et al., 2004). These representations are the basic unit of involuntary memories and are formed throughout the day by the culturally influenced working self (Conway et al., 2004; Conway & Jobson, 2012; Conway & Pleydell-Pearce, 2000). The working self may also influence intrusive memory specificity during retrieval. That is, during involuntary retrieval the episodic representations activate autobiographical information at the two superordinate levels (general event and lifetime period) but for remembering to occur this pattern of activation must be linked to the goals of the working self (Conway & Pleydell-Pearce, 2000). Therefore, in addition to potential cultural specificity differences during encoding, a specific memory may not be congruent with a working self prioritizing relatedness goals, and thus may not enter awareness.

**8.4 Clinical Implications**

Despite the high prevalence of intrusive memories during depression, intrusions are not typically targeted in standard clinical practice (Payne et al., 2019). This likely relates to the fact that current theoretical frameworks regarding the mechanisms underpinning depression and current clinical approaches to the assessment, formulation and treatment of depression continue to focus predominantly on verbal cognitive processes and neglect imagery-based processes such as autobiographical memory (Holmes et al., 2009; Holmes et al., 2016). Yet reviews have highlighted that depression is characterized by several imagery abnormalities and mental imagery can elicit stronger emotional responses, compared to verbally processed information (Holmes et al., 2016;

Holmes & Mathews, 2010). Findings from the current thesis suggest that intrusive memories can elicit distress in those with depression and warrant clinical attention cross-culturally.

There are several potential avenues for treating intrusive memories in those with depression. Firstly, memory-specific interventions have been proposed either as stand-alone treatments for those with depression or as an adjunct to traditional, and more broadly focused, cognitive-behavioural treatments (Brewin et al., 2009). One such memory intervention is imagery re-scripting, which requires the client to develop an alternative, positive storyline for the remembered event and vividly, mentally and verbally, rehearse the substituted memory content in the present tense (Brewin et al., 2009; Wheatley & Hackmann, 2011). Researchers have proposed that the mechanism of change underpinning rescripting is the alteration to the unhelpful meaning ascribed to the remembered event (Arntz, 2012; Wheatley & Hackmann, 2011). By creating an alternative memory narrative, researchers hypothesize that rescripting either changes the original memory by reconsolidating it with the new meaning (Arntz, 2012) or creates a parallel memory representation that competes with the original distressing memory (Holmes & Mathews, 2010; Wheatley & Hackmann, 2011). Meta-analyses have found that imagery rescripting for aversive memories is effective in reducing symptoms associated with a range of psychological disorders, including primary and comorbid depression (Morina, Lancee, & Arntz, 2017). However, research with depressed cohorts is in its infancy. A pilot study with 10 participants with recurrent depression found that imagery rescripting for intrusive negative memories was an effective stand-alone treatment for depression, particularly when memories were frequent (Brewin et al., 2009; Wheatley et al., 2007).

Findings from the current thesis have potential implications for the administration of imagery rescripting treatments. Results from Paper 3 imply that memory content rescripting may not need to be culturally specific. For example, had we found that depressed East Asian participants exhibited higher autonomous content, relative to controls, this would have signalled a departure

from interdependent cultural norms and suggested that rescripting may benefit from increasing content relating to connecting with others. As we did not find significant differences in culturally relevant content variables between those with and without depression, our results imply that rescripting instructions could be similar for both cultural groups. That is, per standard rescripting practice, clients would be instructed to develop idiosyncratic revisions of their memory content, regardless of their cultural background, rather than being instructed to modify memory content to align with cultural norms. While rescripting interventions may not need to be culturally-specific, it would be beneficial to conduct further treatment studies with culturally diverse samples to confirm the cross-cultural applicability of intrusive memory rescripting for depressed clients.

While imagery rescripting focuses on altering memory content, findings from the current thesis suggest that targeting the cognitive responses triggered by intrusive memories may also be beneficial cross-culturally. More specifically, results from Paper 3 indicated that cross-culturally, those with depression responded to intrusive memories by brooding and endorsing three different types of unhelpful beliefs about memories: that they are psychologically threatening; that they need to be controlled; and that the individual is responsible for preventing harm that may result from intrusive remembering. Several psychotherapeutic approaches focus, not on changing cognitive and emotional content, but on helping clients to change the process by which they relate to internal experiences (Hayes & Hofmann, 2017), such as memories, appraisals about memories, and thoughts that arise in response to brooding about negative past experiences. These approaches include Acceptance and Commitment Therapy (ACT; Hayes, Strosahl, & Wilson, 1999), Mindfulness-Based Cognitive Therapy (MBCT; Segal, Williams, & Teasdale, 2004) and Dialectical Behaviour Therapy (DBT; Linehan, 1993). Although there is variation across these treatments, they all incorporate mindfulness and acceptance techniques to alter a client's relationship with their subjective distress (Hall, Hong, Zane, & Meyer, 2011). Treatments incorporating mindfulness and acceptance techniques have largely been trialed in Western contexts (Klainin-Yobas, Cho, &

Creedy, 2012; Woidneck, Pratt, Gundy, Nelson, & Twohig, 2012), but these therapeutic approaches may also be suited to East Asian clients given their origins in Eastern philosophies (Hall et al., 2011). However, culturally nuanced modifications to mindfulness and acceptance interventions may be needed to ensure that treatment is congruent with a client's cultural frame of reference (Hall et al., 2011). Meta-analyses indicate that treatments that are adapted to the client's cultural orientation are more effective that treatments that are not culturally tailored (Huey & Tilley, 2018).

Mindfulness and acceptance encourage clients to observe, acknowledge and allow unpleasant experiences to arise without trying to avoid or change them (Hall et al., 2011). Such practices have been proposed to reduce depression-related cognitive responses such as rumination and self-judgement (Creswell, 2017) - similar responses to those observed in relation to intrusive memories. However, while observing one's thoughts and feelings might be congruent with a Western emphasis on the self, such a self-focused style of mindfulness and acceptance might not be compatible with interdependent cultural norms. Hall and colleagues (2011) suggest that for East Asian clients, mindfulness practices should guide the client's attention outwards (e.g., on external sounds), rather than inwards towards their individual experience, in accordance with the interdependent emphasis on remaining attuned to the social context. Similarly, with regard to acceptance, Hall and colleagues highlight that a Western perspective of acceptance entails observing and allowing internal experiences to arise, even if negative, as efforts to control them are seen as maladaptive. In a Western context, efforts to control one's subjective distress might be counter to independent cultural norms that promote self-expression as an affirmation of one's autonomy (Hall et al., 2011). In East Asian cultures, however, controlling one's internal responses to events enables the individual to remain in harmony with their social unit (Tweed et al., 2004; Weisz et al., 1984). Furthermore, while Western conceptions of acceptance advocate that the client adopt a non-judgmental stance towards their internal experiences, judgement in the form of self-criticism is purported to be interpersonally adaptive in interdependent cultures such as East Asia.

Self-criticism encourages the individual to consider how they could change in order to maintain interpersonal cohesion (Heine & Hamamura, 2007; Kitayama et al., 1997).

Applying these cultural considerations to the experience of intrusive memories during depression, it may be beneficial to have East Asian clients mindfully attend outwards to their surroundings when memories arise, and associated distress is experienced. This is in contrast to a more internally-focused mindfulness practice where the client would be encouraged to notice the occurrence of intrusive memories and notice that they might be getting caught up in judging (appraising) memories and/or brooding about memories. Furthermore, a culturally nuanced application of acceptance techniques might be warranted given that East Asian clients might hold different beliefs about the value of negative memory appraisals or brooding. For example, those from East Asian cultures may fear that noticing and allowing intrusive memories to arise in a non-judgemental manner may mean that they do not critically reflect on the involuntarily remembered negative experience and adjust future behaviour in accordance with cultural expectations. Therefore, for depressed clients from East Asian cultures clinicians may need to provide an interpersonal rationale for accepting, rather than controlling, internal responses to memories. While such culturally driven modifications to interventions may be beneficial, modifications should be matched to the needs of the individual client, given the heterogeneity observed within cultural groups (Leong & Kalibatseva, 2011). That is, clinicians should not assume that a client from an East Asian background necessarily holds an interdependent social orientation, particularly clients who may have immigrated and acculturated to a more independent context (Leong & Kalibatseva, 2011). Therefore, when working with clients from diverse backgrounds, treatment for intrusive memories should aim to be congruent with the client's culturally informed beliefs, and adjustments to interventions should reflect the client's actual, rather than assumed, cultural orientation.

**8.5 Strengths**

First, the current research contributes to a growing body of culturally focused clinical research, thereby, contributing to efforts to redress the documented cultural asymmetry in psychological research (Bernal & Scharró-del-Río, 2001; Ferrari et al., 2013; Henrich, Heine, & Norenzayan, 2010). Second, Studies 1 and 2 have several methodological strengths. The meta-analysis (Study 1) adopted a strict definition of a 'negative intrusive memory', which ensured that we did not include studies that focused on other types of mental imagery, such as voluntarily recalled memories, positive autobiographical memories, or imagined future-oriented imagery, such as daydreams. While this restricted the number of studies that could be included in the qualitative analysis, it ensured that we had confidence that effect sizes related specifically to intrusive memories. The adoption of strict eligibility criteria was also a strength of Study 2. In particular, we excluded anyone with potential PTSD symptomatology. This was assessed using several methods: (1) self-reported history of PTSD; (2) validated self-reported questionnaire assessing current PTSD symptoms; and (3) a clinical interview assessing current and lifetime trauma history and symptomatology. Given the central feature that intrusive memories play in PTSD, this recruitment strategy ensured that findings could not be attributed to potential trauma comorbidities. An additional strength relating to sampling was the inclusion of a never-depressed control group. Furthermore, the clinical group was defined not just through self-reported depression symptoms but also through a structured clinical interview.

A third strength was the use of an online memory diary to collect intrusive memories (Study 2). This is in contrast to previous intrusive memory research with depressed samples, which relied on retrospective self-reports about the experience of memories (e.g., Newby & Moulds, 2011). Empirical studies indicate that retrospective recall of experiences and retrospective ratings of the features associated with the experiences (e.g., frequency and intensity) are often biased and unreliable (Schwarz, 2007). We sought to limit such recall biases by instructing participants to complete a diary entry, either on their phone or computer, as soon as they experienced a memory.

Such an approach is consistent with broader (not depression specific) intrusive memory research, which has adopted both online or mobile phone-based methodologies to collect memories (e.g., Ball & Brewin, 2012, Kamboj et al., 2014).

## 8.6 Limitations

As limitations have previously been discussed in each of the individual papers, this section will only briefly review limitations across the two studies.

**8.6.1 Sample size.** With regard to the meta-analysis (Study 1), for several of the memory characteristic variables, analyses were based on a small number of effect sizes. Furthermore, for some variables, such as observer vantage perspective, a meta-analysis could not be performed due to a lack of relevant studies. This highlights that the study of intrusive memories in the context of depression is still in its infancy and further research is needed to draw confident conclusions about the relationship between intrusions and depression.

The sample size for Study 2 was also modest, although comparable to past clinical cross-cultural research (e.g., Jobson et al., 2018). As recognised by a recent review of the factors affecting recruitment in clinical research, recruiting participants with depressive symptoms is notoriously difficult (Hughes-Morley, Young, Waheed, Small, & Bower, 2015). Given that symptoms such as lack of energy and motivation are characteristic of depression, attending research clinics to participate in studies is likely to be arduous for many potential participants, particularly those from cultures where mental health is stigmatized (Clement et al., 2015; Ng, 1997). Nevertheless, sample size may have resulted in some analyses, such as memory appraisals, being underpowered, thus potentially leading to non-significant interactions. However, in Paper 3, the observation of no to small effects for the appraisal interaction terms, together with medium sized interactive effects for cognitive avoidance and brooding (Cohen, 1969), leads us to infer some confidence in our findings.

**8.6.2 Cultural grouping.** Country of birth was used as a proxy for a participant's cultural orientation in Study 2. That is, Australian born participants were considered to be culturally

independent, while East Asian participants were deemed to be culturally interdependent. While this approach is consistent with prior cross-cultural clinical research (e.g., Dritschel et al., 2011; Grossman &; Kross, 2010; Jobson et al., 2014, 2018) and expected group differences in cultural orientation were confirmed using the IISS, this approach has its limitations. For example, the measurement of cultural orientation at the individual level using self-report scales can be problematic as it assumes that cultural beliefs and attitudes can be consciously accessed and explicitly reported (Markus & Kitayama, 2010; Oyserman, Coon, & Kemmelmeier, 2002). Furthermore, the two cultural groups are likely to differ on a range of cultural constructs in addition to independence/interdependence orientations. It would, therefore, be useful for future research to also assess other specific cultural constructs, such as holistic/analytical cognitive orientations (Nisbett et al., 2001) and perform moderator analyses to determine more specifically how cultural processes influence responses to memories.

**8.6.3 Group differences and heterogeneity.** The findings of Study 2 may have been influenced by the cultural heterogeneity of the East Asian group, which was comprised of several cultural ethnicities. The majority of East Asian participants were from China. This may have affected results given that, compared to other Asian ethnicities, those from Chinese backgrounds score higher on measures of collectivism and lower on individualism (Oyserman et al., 2002). While it may have been preferable to have culturally homogenous groups or multiple Asian ethnicities of equal size, our sampling approach was necessary for practical reasons and follows that used in previous cross-cultural research (e.g., Wang, 2009). To our knowledge, this is the first cross-cultural study to examine the experience of intrusive memories, therefore, we elected not to make recruitment too culturally restrictive given that there were several other exclusion criteria. When we compared the European Australian group to Chinese participants only (Paper 3) the pattern of results remained similar, suggesting that group heterogeneity did not unduly influence

findings. Indeed, the diversity of our East Asian group may be seen as a strength in terms of the potentially generalizability of our findings.

**8.6.4 Clinical comorbidities.** While participants completed a clinical interview that assessed depressive, trauma, and psychotic symptoms, the presence of comorbid anxiety conditions was not assessed due to time constraints. Given the high comorbidity between depression and anxiety (Hirschfeld, 2001) results may have been influenced by the presence of clinically significant anxiety symptoms. A previous clinical study examining intrusive memories in depression found that around 60% of currently-depressed participants and 20% of never-depressed control participants also met criteria for an additional anxiety or eating disorder (Newby & Moulds, 2011). However, given that these previous investigations did not exclude participants on the basis on comorbid anxiety conditions, the benefit of also assessing anxiety in the current study would mainly have been to qualitatively describe participant characteristics. Furthermore, given that depression and anxiety co-occur so frequently, recruiting participants with depression only may limit the study's ecological validity.

**8.6.5 Language and measurement invariance.** Study 2 was conducted in an individualistic cultural context (Australia), with measures administered in English. This methodology may have impacted the responses of the East Asian participants due to: (1) acculturation strengthening their independent self-orientation; (2) understanding and interpretation of questionnaire items due to English being a second language; and (3) language priming effects which may have elicited stronger independent self-construals than would be activated if measure administration was in their native language (Chen & Bond, 2007; Harzing, 2005). The findings would, therefore, benefit from replication using valid translated diagnostic and self-report measures, administered to participants in their country of birth.

## 8.7 Future Research

In addition to the future research noted above, clinically, it would be beneficial to conduct intervention studies to examine if targeting cognitive responses to memories (e.g., appraisals and brooding) results in reduced memory frequency, distress and depressive symptomatology, especially in culturally and linguistically diverse samples. While clinical techniques to address negative appraisals of intrusive memories have been trialled for those with depression in a sample of predominantly Asian and Caucasian participants, intervention effectiveness was not examined cross-culturally (Newby et al., 2014). Furthermore, the effectiveness of interventions for other types of maladaptive appraisals, such as control and responsibility, is yet to be investigated. More broadly, while appraisals and brooding could be targeted with more general interventions such as Cognitive Behaviour Therapy for depression (i.e., rather than intrusive memory specific interventions), the effectiveness of such treatments has similarly been based on studies with Western samples (Bernal & Scharró-del-Río, 2001). There is emerging clinical literature examining the trans-cultural effectiveness of targeting trauma related appraisals for those with PTSD (Bernardi, Dahiya, & Jobson, 2019), however, similar research for depression lags behind.

In terms of future research to address outstanding theoretical questions, as discussed earlier, several of our findings conflicted with prior cross-cultural research focusing on voluntary memory. Given our cross-sectional methodology and focus on intrusive memories only, it was difficult to discern if our results differed from past cross-cultural studies due to differences in the route of memory retrieval or some other factor. To clarify this, it would be beneficial to compare the content of voluntary and intrusive memories directly, in a cross-cultural sample including those with and without depression. Finally, as our cross-sectional methodology prevents causal inferences being drawn, prospective research would be beneficial to examine: (1) if the propensity to engage in certain culturally normative cognitive responses (i.e., appraisals, brooding and avoidance) predisposes those from interdependent cultures to develop depression once intrusive memories arise; and (2) if intrusive memory appraisals and brooding predict depression maintenance cross-

culturally. Ideally, such future investigations would adopt a cross-country methodology to address the language and acculturations limitations noted earlier.

**8.8 Conclusion**

This thesis has contributed to existing clinical and cross-cultural literature by exploring the experience of intrusive autobiographical remembering in those with and without depression, from an East Asian and European Australian backgrounds. Such a cross-cultural analysis was timely given that intrusive memories are highly prevalent during depression, and yet current theoretical models of depression do not consider the potential influence of culture on memory. The overall findings from the thesis highlight that depression is positively associated with frequent, distressing and numbing intrusive memories. Depression was also found to be associated with several unhelpful cognitive responses to memories. These cognitive responses, namely memory appraisals and brooding, were found to be maladaptive cross-culturally, suggesting that they warrant clinical attention for depressed clients from both cultural groups. Given these findings, theoretical frameworks accounting for the persistence of intrusive memories during depression may have cross-cultural relevance. Results also indicated that intrusive memory content and themes did not vary culturally, or between those with and without depression. This implies that interventions may not need to target culturally-specific memory content features, such as a memory's focus on self versus others, or the degree of autonomous orientation expressed while remembering. Further research is needed to examine if unhelpful cognitive responses to intrusive memories contribute to memory and depression maintenance across cultures, and whether targeting such responses is effective in reducing depressive symptomatology cross-culturally.

## 8.9 References

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