



Published in final edited form as:

*Dev Psychopathol.* 2013 May ; 25(2): 321–332. doi:10.1017/S0954579412001083.

## Autobiographical Memory Specificity in Child Sexual Abuse Victims

**Christin M. Ogle,**  
Duke University

**Stephanie D. Block,**  
University of Massachusetts, Lowell

**LaTonya S. Harris,**  
University of North Carolina, Chapel Hill

**Gail S. Goodman,**  
University of California, Davis

**Annarheen Pineda,**  
University of Denver

**Susan Timmer,**  
University of California, Davis

**Anthony Urquiza,** and  
University of California, Davis

**Karen J. Saywitz**  
University of California, Los Angeles

### Abstract

The present study examined the specificity of autobiographical memory in adolescents and adults with versus without child sexual abuse (CSA) histories. Eighty-five participants, approximately half of whom per age group had experienced CSA, were tested on the Autobiographical Memory Interview. Individual difference measures, including for trauma-related psychopathology, were also administered. Findings revealed developmental differences in the relation between autobiographical memory specificity and CSA. Even with depression statistically controlled, reduced memory specificity in CSA victims relative to controls was observed among adolescents but not among adults. A higher number of Posttraumatic Stress Disorder criteria met predicted more specific childhood memories in participants who reported CSA as their most traumatic life event. These findings contribute to the scientific understanding of childhood trauma and autobiographical memory functioning and underscore the importance of considering the role of age and degree of traumatization within the study of autobiographical memory.

---

Scientific investigations of the possible effects of child maltreatment on autobiographical memory reveal deficits as well as advantages. Evidence of a detrimental effect is drawn from research in which adult survivors of child abuse self-report or exhibit deficits in episodic autobiographical memory (autobiographical memories involving mental travel back in time; e.g., Edwards, Fivush, Anda, Felitti, & Nordenberg, 2001) and semantic

autobiographical memory (autobiographical memory for facts such as past addresses; e.g., Hunter & Andrews, 2002; Meesters, Merckelbach, Muris, & Wessel, 2000; Stokes, Dritschel, & Bekerian, 2008) concerning childhood experiences. In contrast, research has also shown that both adult and child victims of child maltreatment can have accurate and detailed memories for events related to their abuse experiences. For example, Alexander et al. (2005) examined adults' memories of child sexual abuse (CSA) 12 to 21 years after the abuse ended. Victims who reported CSA as their most traumatic life event and those with greater symptoms of Posttraumatic Stress Disorder (PTSD) had particularly accurate memories of their abuse (see also Ghetti et al., 2006). Similar findings have been reported with children (Eisen et al., 2007). Collectively, these studies suggest that adults and children with histories of CSA can have particularly accurate retention of traumatic childhood events and that child abuse does not necessarily lead to memory loss or extreme error. Moreover, basic memory processes in maltreatment victims do not appear to differ from those of nonmaltreated controls (e.g., Howe, 1997; Howe, Cicchetti, & Toth, 2006).

In addition to memory accuracy, an important index of memory functioning is the ability to generate or retrieve specific autobiographical memories of events that occurred at a particular time and place. Difficulty in retrieving specific autobiographical memories has been associated with childhood trauma, the persistence of depressed mood, decreased executive control, and impaired problem solving. The present study examined the relation between childhood trauma and autobiographical memory specificity in adolescents and adults with versus without CSA histories. In this paper, the predominant theories concerning reduced memory specificity in trauma victims are first reviewed, followed by a discussion of some of the discrepant findings in the extant literature. Evidence regarding the role of trauma-related psychopathology (i.e., PTSD) in reduced memory specificity is also considered, as are methodological issues. Then our study is described.

## Trauma and Autobiographical Memory Specificity Theory

Early research on autobiographical memory specificity suggested that a history of childhood trauma is associated with *overgeneral memory*, that is, a tendency to report memories characterized by generic descriptions, for example, descriptions of extended events that lack spatial and temporal details. Kuyken and Brewin (1995) found that, compared to individuals without child abuse histories, psychiatric patients with CSA histories were more likely to report general memories without reference to time or place when asked to retrieve memories for specific, singular events in response to emotional cue-words. Based on these findings and similar studies with suicidal patients (Williams & Broadbent, 1986), Williams (1996) proposed a theory of overgeneral autobiographical memory development, in which the mechanism underlying reduced specificity in trauma victims is *functional avoidance*. According to this model, when victims of early childhood trauma search their memories for specific events, the memory search is truncated at a general retrieval level to avoid or attenuate the negative affect associated with painful, specific memories of adverse childhood events (e.g., sexual abuse). Functional avoidance at the storage phase of memory functioning may also limit the opportunity to process and rehearse traumatic events (Goodman, Quas, & Ogle, 2010), further promoting overgeneral memory in trauma victims. Overgeneral memory can therefore be viewed as a functional emotion regulation strategy engaged to disrupt retrieval of distressing details of a traumatic experience.

Of importance, a categorical or overgeneral retrieval style is typical of normally developing children in which the ability to report more specific memories increases with age (Nelson & Fivush, 2004) due to developmental advances in, for example, language skills, knowledge base, strategy use, and storage capacity (Howe & Courage, 1997). However, for individuals exposed to early trauma, Williams (1996) proposed that functional avoidance prevents them

from advancing beyond the general retrieval level that is characteristic of young children and instead leads victims to develop and maintain a broadened, overgeneral autobiographical memory retrieval style into adolescence and adulthood. That is, the retrieval style that leads to reduced memory specificity for trauma-related information will generalize to autobiographical memory functioning overall irrespective of the content. Support for this proposal was recently reported by Brennen and colleagues (2010) who found that adolescents exposed to war trauma during early childhood retrieved a significantly greater number of general memories in response to negative, positive, and neutral cues compared to nontrauma-exposed adolescents.

Reduced autobiographical memory specificity has been linked not only to trauma but also to a wide range of clinical disorders including major depression and obsessive-compulsive disorder (e.g., Rubin, Feldman, & Beckham, 2004; Wessel, Merckelbach, & Dekkers, 2002). To account for findings from these diverse clinical populations, Williams and colleagues (2007) proposed a revised theory of overgeneral memory that delineates several potential mechanisms underlying reduced specificity. According to the CaR-FA-X model, one contribution to overgeneral memory is the combination of “capture” and “rumination” processes (or CaR). “Capture” occurs when conceptual, abstract information about the self interferes with access to specific episodic memories. This process in combination with rumination, or repetitive thinking about self-related information, is proposed to lead to overgeneral memory by disrupting the retrieval of event-specific autobiographical knowledge. Support for the role of capture and rumination processes in overgeneral memory is drawn from research with depressed patients who exhibit less specific memories following rumination instructions (e.g., “Think about why you feel the way you do”) compared to distraction instructions (“Think about the face of the Mona Lisa”; Watkins & Teasdale, 2001; Watkins, Teasdale, & Williams, 2000). The second mechanism underlying reduced memory specificity within the CaR-FA-X model is functional avoidance (or FA), the mechanism proposed originally by Williams (1996). Finally, the third mechanism is “impaired executive control” (or X), which is associated with reduced processing resources and failure to inhibit irrelevant information, both of which interfere with retrieval of specific autobiographical memory.

In regard to traumatized individuals, the CaR-FA-X model specifies that trauma-related intrusions, and effortful attempts to avoid and control such intrusions and their accompanying aversive affect, lead to diminished executive resources to devote to retrieval of specific memory traces, thereby resulting in overgeneral autobiographical memories. However, several researchers have argued that impaired executive control plays a relatively smaller role in reduced autobiographical memory specificity in trauma victims compared to individuals with psychopathology (i.e., major depressive disorder) given that posttraumatic stress is not generally related to reduced executive functioning (Dalgleish et al., 2007; Dalgleish, Rolfe, Golden, Dunn, & Barnard, 2008). Research by Dalgleish et al. (2008, Study 2) supports the view that functional avoidance is the principal mechanism underlying reduced memory specificity in trauma-exposed individuals.

Although evidence regarding the mechanisms that promote reduced autobiographical memory specificity in trauma victims is still accumulating, Williams and colleagues' (1996, 2007) theories remain the predominant frameworks invoked to understand the phenomenon of overgeneral memory. To date, however, empirical support for these theories relies primarily on research using a single type of test, the Autobiographical Memory Test (AMT, Williams & Broadbent, 1986). In the standard AMT, emotional (i.e., positive, negative) and neutral cue-words are presented one at a time, and participants are instructed to describe the first specific autobiographical memory that comes to mind for each word. Recollections of episodic events that occur within a particular context over the course of a single day are

coded as specific memories. In contrast, recollections of events that lasted longer than a single day are coded as general extended memories, and descriptions of categories of events that share a common theme (e.g., “when I go to the garden”) are coded as general categorical memories.

Given that the majority of studies concerning memory specificity in CSA victims have used the AMT, researchers have questioned the extent to which the identified pattern of trauma-related specificity deficits is attributable to the memory task itself (e.g., Ogle et al., 2009). There is at least some evidence in the broader trauma and memory literature that findings concerning reduced autobiographical memory specificity in trauma victims from studies using the AMT may not generalize to other retrieval contexts or alternative tests of autobiographical memory. For example, numerous studies have shown that most autobiographical memories recalled by trauma victims and others are retrieved at the specific rather than the generic level (see Howe, Cicchetti, & Toth, 2006), especially memory intrusions or involuntary memories that accompany posttraumatic stress. More generally, research shows that autobiographical memory in traumatized individuals is at times well retained (e.g., Alexander et al., 2005; Ghetti et al., 2006). Furthermore, several studies using modified versions of the AMT or alternative measures of memory specificity (i.e., specificity coded from clinical interviews) have failed to find significant relations between abuse and reduced memory specificity (e.g., Bunnell & Greenhoot, 2009; Johnson et al., 2005; Orbach, Lamb, Sternberg, Williams, & Dawud-Noursi, 2001). Accordingly, the present study examined the extent to which reduced autobiographical memory specificity in CSA victims generalizes to an alternative retrieval test.

Although research findings concerning autobiographical memory specificity in trauma victims are somewhat mixed, with some studies reporting results directly opposite to that which would be predicted based on Williams and colleagues’ (1996, 2007) theories of overgeneral memory (i.e., positive relations between trauma and memory specificity; Kuyken, Howell, & Dalgleish, 2006; Peeters, Wessel, Merckelbach, & Boon-Vermeeren, 2002; Swales, Williams, & Wood, 2001), significant variations in the experimental methodology and in the clinical diagnostic characteristics of the tested samples may help to explain the discrepancies. These variations include reliance on retrospective self-reports of childhood maltreatment versus documented cases of maltreatment, the inclusion of samples with broadly defined childhood maltreatment histories versus samples with CSA histories only, memory specificity coded from general memory interviews versus reports elicited by affective cue-words, and timed versus untimed retrieval intervals. Many studies also included samples with low levels of self-reported abuse severity. As a result, the severity levels may have been insufficient to detect the influence of trauma. Furthermore, differences in the qualitative nature of the abuse experiences (e.g., developmental timing of abuse, abuse duration) and subsequent trauma-related sequelae (e.g., PTSD) may have affected the extent to which relations between child maltreatment and autobiographical memory specificity emerged. [For a review of results from studies that employed the standard AMT, see Moore & Zoellner (2008)]. Overall, the inconsistent findings in the empirical literature on autobiographical memory specificity highlight the need for further research to elucidate the impact of childhood trauma on autobiographical memory functioning.

## **Autobiographical Memory Specificity and Trauma-Related Psychopathology**

Symptoms of trauma-related psychopathology, including PTSD, may also be relevant to the relation between childhood trauma and autobiographical memory given the central role that autobiographical memory plays in the etiology of trauma-related disorders (e.g., Rubin, Berntsen, & Bohni, 2008). PTSD is often defined as a disorder of episodic memory, and it

has been associated with autobiographical memory gaps, memory monitoring problems, and greater error on laboratory memory tasks (e.g., the Deese/Roediger McDermott task using neutral words) in adults (e.g., Bremner, Shobe, & Kilhstrom, 2000; Zoellner, Foa, Brigidi, & Przeworski, 2000). However, the disorder has also been linked to heightened attention to or an overfocus on trauma-related information (McNally, 2003), which can result in better memory for such information (Vrana, Roodman, & Beckham, 1995). For example, Alexander et al. (2005) found positive relations between greater PTSD symptoms and memory accuracy for trauma histories in adult victims of CSA.

Research concerning PTSD and autobiographical memory specificity in adults has shown deficits in autobiographical memory specificity among veterans with PTSD compared to those without the disorder (McNally, Lasko, Macklin, & Pitman, 1995; McNally, Litz, Prassas, Shin, & Weathers, 1994). Note, however, that the traumas assessed in McNally's research with veterans were traumas experienced in adulthood. It is possible that symptoms of posttraumatic stress for events experienced in childhood versus adulthood might differentially affect the specificity of autobiographical memory reports. Consistent with this idea, research comparing autobiographical memory specificity in adults with self-reported histories of CSA and nonabused controls has at times failed to reveal significant differences in memory specificity between adults who qualified for PTSD diagnoses and those who did not (McNally et al., 2006).

In regard to memory development, although PTSD is one of the most common diagnoses assigned to maltreated children (Browne & Finkelhor, 1986), relatively little is known about the possible influence of PTSD symptomology on memory functioning in child and adolescent abuse victims. Although significant relations between PTSD diagnosis and memory performance among maltreated children have failed to emerge in several studies (Beers & DeBellis, 2002; Eisen et al., 2007), Moradi, Doost, Taghavi, Yule, and Dalgleish (1999) reported that children and adults with PTSD exhibited poorer overall memory performance compared to those without PTSD. In one of the few published investigations of autobiographical memory specificity in adolescent victims of CSA, significant relations between PTSD and memory specificity were not found (de Decker et al., 2003). It is as yet unclear whether PTSD affects adolescents' and adults' autobiographical memory specificity similarly. In the present study, relations between autobiographical memory specificity and symptoms of PTSD were examined in adolescents and adults.

## The Present Study

The primary aim of the present study was to investigate the relation between childhood trauma and autobiographical memory specificity in adolescents and adults with versus without CSA histories. Of particular interest was the extent to which the relations between CSA and autobiographical memory specificity vary across development. Studies that address this question are few, with the majority of previous research on trauma and autobiographical memory specificity including either adults or adolescents, but not both age groups (e.g., de Decker, Hermans, Raes, & Eelen, 2003; Stokes, Dritschel, & Bekerian, 2004). Of both theoretical and applied interest is whether a potential adverse (or beneficial) influence of childhood trauma on autobiographical memory begins in childhood or adolescence or emerges only in adulthood. Given that autobiographical memory develops gradually throughout childhood, with the ability to construct a life story emerging during adolescence (Habermas & Bluck, 2000; Nelson & Fivush, 2004), CSA may influence these processes and produce age-related changes in autobiographical memory. Another aim of the present study was to examine possible associations between abuse-related PTSD symptoms and autobiographical memory specificity in adolescents and adults while controlling



statistically for possible mental health confounders (i.e., anxiety, dissociation, and sexual problems).

Our study advanced extant research in several ways. First, in contrast to many previous studies, our sample included maltreated adolescents and adults for whom CSA was reported in childhood rather than reported retrospectively. The victimization experiences of individuals in our CSA group were also confirmed by clinicians' case files at the time of study.<sup>1</sup> Second, the comparison group consisted of age- and gender-matched adolescents and young adults who were closely screened to ensure the absence of CSA. Third, memory specificity was assessed using the Autobiographical Memory Interview (AMI; Kopelman, Wilson, & Baddeley, 1989) thereby testing the generalizability of reduced autobiographical memory specificity in trauma victims to an alternative test of autobiographical memory. In contrast to the cued recall task used most frequently in the overgeneral memory literature (i.e., the AMT), during the AMI, our participants were asked to verbally recall specific autobiographical memories from three time periods in childhood: preschool, elementary school, and 6th grade. Controlling the lifetime period from which memories could be reported permitted us to make developmental comparisons of abused and nonabused adolescents' and adults' episodic recall in a way that has not been possible with other tests of autobiographical memory specificity. Furthermore, in contrast to other studies using the AMT in which participants are required to produce a specific memory within 30 or 60 seconds, participants in our study were given an unlimited amount of time to provide a specific memory following the retrieval prompt.

Several hypotheses were advanced. Adolescents and adults with histories of CSA were expected to exhibit less specific autobiographical memories compared to their peers without histories of CSA, even with depression statistically controlled. Significant relations between psychopathology and autobiographical memory specificity were also expected to emerge. Based on previous research demonstrating a potential detrimental influence of PTSD on memory functioning (e.g., McNally et al., 2004, 2005; Moradi et al., 1999), it might be expected that participants with greater symptoms of PTSD would exhibit deficits in memory specificity. However, given that PTSD has also been linked to heightened attention to and better memory for emotional events, an alternative hypothesis was that symptoms of PTSD would be associated with more specific autobiographical recall for childhood events.

## Method

### Participants

Participants ( $N = 85$ , 73 female) included 49 14- to 17-year-olds ( $M = 15.12$  years,  $SD = .95$ ) and 36 18- to 37-year-olds ( $M = 21.94$  years,  $SD = 5.10$ ). Nineteen adults had histories of CSA, and 17 were no-CSA controls. Twenty-five of the adolescents had histories of CSA, and 24 were no-CSA controls. The sample included 57.6% Caucasians, 23.5% African Americans, 9.4% Hispanics, 1.2% Asian Americans, and 5.9% "other." Participants' mean annual income (reported as household income for adolescents) was \$25,000–\$40,000 (range less than \$15,000 to greater than \$90,000). Adolescents were required to have lived with their caregivers for six months or more, so that caregivers could provide valid information (e.g., on mental health measures). None of the participants were in non-kinship foster care or group homes.

---

<sup>1</sup>Two participants who were originally recruited as no-CSA controls disclosed CSA during the experimental session. Although Child Protective Service records and clinicians' case files were not available to confirm the abuse histories of these participants, they were reassigned to the CSA group thereby creating a more conservative test of our experimental hypotheses.

Participants with histories of CSA were recruited primarily from a child maltreatment diagnostic and treatment center on the basis of their abuse histories. A minimum of six months after these participants received services (e.g., counseling) at the maltreatment center, they were contacted via phone regarding the opportunity to participate in our study. A few ( $n = 4$ ) were recruited from district attorneys' offices also on the basis of their abuse histories. Control participants were recruited from various sources (i.e., medical clinics, newspaper and internet advertisements). In soliciting child and adult no-CSA controls, CSA was defined (e.g., fondling of genitals, penetration), and adults and caregivers were asked *not* to participate or have their children participate if they had experienced CSA. Additional screening for maltreatment history occurred at test. Participants were maintained in the control group even if they had experienced other forms of child abuse as long as there was no known history of CSA. Given the prevalence in CSA victims of multiple forms of maltreatment (e.g., neglect and abuse), the exclusion of individuals with such experiences would have potentially resulted in an unrepresentative sample (Toth, Harris, Goodman, & Cicchetti, 2010). Thirty-one participants in the CSA group reported experiencing child physical abuse, and 32 reported experiencing child neglect or emotional abuse. Three control adults experienced sexual victimization after age 18 and were retained in the control group to reduce sample bias and because past research indicates that childhood trauma rather than trauma in adulthood affects memory specificity (Stokes et al., 2004; Willebrand et al., 2002). Although it is often impossible to know for certain if an individual has or has not experienced child maltreatment or adult sexual trauma, misclassification provides a conservative test of the main hypotheses. All participants were determined to be free of serious disorders such as mental retardation, schizophrenia, and autism based on self-reported medical and psychiatric diagnoses, clinical records (for the CSA victims), and several of the following instruments.

## Measures

**Demographic questionnaire**—The demographic questionnaire included questions about age, gender, race/ethnicity, socioeconomic status (SES), and education.

**Autobiographical Memory Interview (AMI)**—The AMI (Kopelman et al., 1989) is a two-part semi-structured interview that assesses semantic autobiographical recall and the specificity of episodic memory. Part one (the Personal Semantic Schedule) requires participants to recall personal facts. Part two (the Autobiographical Incident Schedule) assesses autobiographical recall of specific incidents from three time periods: childhood, early adult life, and recent events. Because adolescents were included in the present study, only the Autobiographical Incident Schedule for the childhood lifetime period was administered, which includes assessment of three sub-periods from childhood: before school (i.e., up to age 5), elementary school (i.e., age 5–11), and secondary or high school (i.e., ages 11–18). Given the age of the youngest adolescents tested in the present study (i.e., 14 years), the last childhood period assessed was changed to 6<sup>th</sup> grade (i.e., age 12) in accordance with the authors' instructions to modify the testing period to suit the sample demographics. Specifically, the age periods were changed to prompt recall of an incident from the period before the participant went to school, an incident that occurred in elementary school (grades 1<sup>st</sup>–5<sup>th</sup>), and an incident that occurred during 6<sup>th</sup> grade. Scoring is based on the amount of detail regarding time and place provided for each incident. The AMI has been shown to have high inter-rater reliability and validity.

**Wechsler Adult Intelligence Scale (WAIS-III) and Wechsler Intelligence Scale for Children (WISC-III): Working memory and vocabulary subscales (Wechsler, 1991; Wechsler, 1997)**—The working memory subscale includes a digit span task in which participants are required to repeat series of numbers of varying list length

in forward and backward order. The vocabulary subtest was also administered. Reliabilities for these IQ subscales are high, and the subscales are well normed.

**Deese-Roediger/McDermott Memory Task (DRM)**—A DRM task was also administered. Performance on this task is described elsewhere (Block et al., 2009; Goodman et al., 2011).

**Dissociative Experiences Scale (DES) and Adolescent Dissociative Experiences Scale (ADES)**—The DES (Bernstein & Putnam, 1986) is a self-report questionnaire that includes 28 questions designed to measure normal to pathological dissociative experiences. On the adolescent version, the ADES (Armstrong, Carlson, Putnam, Libero, & Smith, 1997), adolescents indicate how frequently they experience each of 30 items using an 11-point scale (0 = never, 10 = always). Test-retest reliabilities for both measures are high (i.e., .77) and both have been used to distinguish effectively among abused, non-abused, and dissociative-disordered children.

**Post-Traumatic Stress Disorder Scale (PDS) and Child Post-Traumatic Stress Disorder Symptom Scale (CPSS)**—The PDS (Foa, 1995; Foa, Cashman, Jaycox, & Perry, 1997) is a self-report questionnaire that provides a categorical PTSD diagnosis as well as a continuous measure of PTSD severity and number of PTSD criteria met. The measure has been validated with clinical interviews and other self-report trauma measures among individuals with a wide range of trauma experiences (e.g., victims of natural disasters, assaults, war). The CPSS (Foa, Johnson, Feeny, & Treadwell, 2001) is the child version of this scale and is appropriate for children 8- to 18-years of age. Both the PDS and CPSS have high internal consistency, good test-retest reliability, and demonstrated validity.

**Trauma Symptom Checklist (TSC-40) and Trauma Symptom Checklist-Child Version (TSC-C)**—The TSC-40 (Briere & Runtz, 1989) is an adult self-report instrument that measures a broad range of trauma-related symptoms over a two-month period. The TSC-C (Briere, 1996) was developed for use with children ages 8- to 16-year-olds. Scores from the TSC-40 and TSC-C subscales measuring anxiety, depression, and sexual concerns were considered in the present study. Both instruments have good psychometric properties (e.g., Cronbach's coefficients for the subscales range from .66 to .89, and coefficients for the full scale average between .89 and .91; Elliott & Briere, 1992).

**Childhood Trauma Questionnaire (CTQ)**—The CTQ (Bernstein, Fink, Handelsman, & Foote, 1994) is a 28-item self-report questionnaire that screens for child maltreatment experiences including physical, sexual, and emotional abuse, as well as physical and emotional neglect. The scale demonstrates good reliability and validity in both adolescent and adult populations. Alpha reliabilities for the subscales range from .70 to .93 (Paivio & Cramer, 2004).

## Procedure

The study was approved by the University's Institutional Review Board. Participants were tested individually. The demographic questionnaire was administered first followed by the working memory and vocabulary subtests of the WISC and WAIS. Two versions of memory test presentation were created. In Version 1, the DRM test preceded the AMI, whereas in Version 2, this order was reversed. Whether participants were administered the DRM or the AMI first was counterbalanced within age and across maltreatment group.<sup>2</sup> Researchers who administered these tests were blind to maltreatment status. Before AMI testing commenced, participants were instructed to report memories of specific events that included details of time and place, and were given examples of both a specific and a general memory. There



was no time limit placed on responses. When an overgeneral response was given, participants were prompted again to provide a specific memory. After the autobiographical memory and DRM memory tests, participants completed the following questionnaires: DES/ADES, PDS/CPSS, TSC-40/TSC-C, and CTQ. Participants were then debriefed.

## Results

### Scoring

Memory reports elicited using the AMI were scored for details of time and place using a 4-point rating scale. A score of 0 was given in instances when participants were unable to recall an event and for responses based on semantic memory alone. A score of 1 was given to vague personal memories of general events without indicators of time or place. A score of 2 was given to personal memories of specific events that included details of time or place. Finally, personal memories of specific events with indicators of both time and place were given a score of 3. Inter-rater reliability for two independent coders was 86%. The coders were blind to CSA status, age, and individual difference scores.

### Preliminary Analyses

Preliminary data analysis consisting of a one-way analysis of variance (ANOVA) confirmed that there were no significant differences in age for participants with ( $M = 18.21$ ,  $SD = 5.45$ ) and without ( $M = 17.81$ ,  $SD = 4.0$ ) CSA histories,  $F(1, 83) = 0.03$ . Further matching success for the abused and control participants was determined through a series of 2 (Age Group: adolescents vs. adults)  $\times$  2 (CSA History: with vs. without) ANOVAs. There were no significant main effects or interactions for SES, ethnicity (majority vs. minority), or digit span or vocabulary  $Z$  scores from the WISC and WAIS,  $F_s(1, 77-81) = 3.25, p > .14$ .

Means and standard deviations for psychopathology and individual difference measures are presented in Table 1. Participants with CSA histories scored significantly higher than those without such histories in the number of criteria met for a diagnosis of PTSD ( $Z$  scores),  $F(1, 81) = 6.85, p < .01, \eta^2 = .08$ . On the TSC-40 and TSC-C ( $Z$  scores), participants with CSA histories reported more sexual problems,  $F(1, 78) = 7.81, p < .01, \eta^2 = .09$ , greater depression,  $F(1, 81) = 22.27, p < .001, \eta^2 = .22$ , and more anxiety,  $F(1, 81) = 11.60, p < .001, \eta^2 = .13$ , than did controls. On the DES and A-DES ( $Z$  scores), participants with histories of CSA reported greater dissociation compared to controls,  $F(1, 81) = 12.88, p < .001, \eta^2 = .14$ .

### Main Analyses

First, a 2 (Age Group: adolescents vs. adults)  $\times$  2 (CSA History: with vs. without)  $\times$  3 (Time Period: preschool, elementary school, 6<sup>th</sup> grade) repeated-measures analysis of covariance (ANCOVA) was conducted with the latter factor varied within-subjects and memory specificity scores entered as the dependent measure. Given previous studies showing a relation between depression and memory specificity and also between working memory and autobiographical memory specificity (e.g., Moore, Watts, & Williams, 1988; Williams et al., 2007), scores from the depression subscale of the TSC-40 and TSC-C, and digit span scores were covaried to better isolate possible effects of CSA. Significant main effects of time period and age group emerged,  $F(2, 78) = 4.02, p < .05, \eta^2 = .09$ , and  $F(2, 79) = 4.68, p < .05, \eta^2 = .06$ , respectively, which were qualified by a significant Time Period  $\times$  Age Group

<sup>2</sup>Order of memory tasks (DRM vs. AMI) did not significantly affect AMI performance,  $F(1, 83) = .06$ . The Big Five Inventory (John, Donahue, & Kentle, 1991); the Semantic Autobiographical Memory Test (Meesters et al., 2000), from which specificity scores cannot be reasonably derived; and the Experiences in Close Relationships Questionnaire (Brennan, Clark, & Shaver, 1998) were also administered prior to the AMI and were not counterbalanced in relation to it.

interaction,  $F(2, 78) = 3.85, p < .05, p^2 = .09$  (Table 2). Simple effects analyses revealed that for the preschool period, adolescents reported significantly less specific memories than adults,  $F(1, 81) = 11.11, p = .001, p^2 = .12$ . In contrast, the specificity of memories from elementary school and 6<sup>th</sup> grade was not significantly different for adolescents and adults,  $F(1, 81) = .30$ . Whereas the specificity of adults' memories did not significantly differ across the three time periods,  $F(2, 32) = .71$ , adolescents reported significantly less specific memories for the preschool period compared to the elementary school period and compared to 6<sup>th</sup> grade,  $F(2, 45) = 7.08, p < .05, p^2 = .24$ .

There was also a significant Age Group X CSA History interaction,  $F(1, 79) = 4.26, p < .05, p^2 = .05$ . Simple effects analyses revealed that adolescents without CSA histories ( $M = 2.18, SD = .48$ ) reported more specific memories than adolescents with CSA histories ( $M = 1.91, SD = .70$ ),  $F(1, 45) = 5.21, p < .05, p^2 = .10$ . In contrast, no significant differences were found in the specificity of memory reports for adults with ( $M = 2.39, SD = .55$ ) or without ( $M = 2.28, SD = .53$ ) CSA histories,  $F(1, 32) = .21$ . For participants with histories of CSA, adults reported more specific memories than adolescents,  $F(1, 40) = 7.59, p < .01, p^2 = .16$ . However, no significant effect of age was found for participants without CSA histories,  $F(1, 37) = .047$ .<sup>3</sup>

Although the focus of the present study concerned CSA and autobiographical memory functioning, some participants experienced other forms of child abuse, including physical abuse and physical or emotional neglect. Disentangling the possible effects of CSA from potential effects of other forms of abuse is challenging. To explore this issue in the present study, a broader measure of maltreatment severity was calculated by summing scores from the five clinical scales of the CTQ (i.e., emotional abuse, physical abuse, sexual abuse, emotional neglect, and physical neglect; Merckelbach & Jelicic, 2004). When a mean split of the CTQ Maltreatment Severity Score was analyzed in place of CSA history, the main effects of time period and age group remained significant,  $F(2, 78) = 3.37, p < .05, p^2 = .08$ , and  $F(1, 79) = 5.04, p < .05, p^2 = .06$ . These effects were qualified by a significant Time Period x Age interaction,  $F(2, 78) = 3.14, p < .05, p^2 = .08$  (preschool: adolescents,  $M = 1.61, SD = 1.10$ , adults,  $M = 2.33, SD = .80$ ; elementary school: adolescents,  $M = 2.20, SD = .82$ , adults,  $M = 2.22, SD = .83$ ; 6<sup>th</sup> grade: adolescents,  $M = 2.31, SD = .94$ , adults,  $M = 2.42, SD = .81$ ). However, the simple effects were not significant,  $F(32-45) = .85$ . Of importance, in contrast to the analyses in which the effect of CSA history on autobiographical memory specificity was examined, the interaction between age and the CTQ Maltreatment Severity Score was not significant,  $F(1, 79) = .51$  (adolescents: high maltreatment severity,  $M = 2.02, SD = .64$ , low maltreatment severity,  $M = 2.05, SD = .61$ ; adults: high maltreatment severity,  $M = 2.35, SD = .50$ , low maltreatment severity,  $M = 2.33, SD = .57$ ). Thus, the age-related changes in the memory specificity of individuals with CSA histories did not generalize when adolescents and adults were reclassified according to the severity of their general child maltreatment histories.

It is also possible that the developmental timing of abuse experiences may affect autobiographical memory for childhood events. Although this issue could not be examined fully in the current study given the low number of participants in each age group who reported their age at first CSA experience, a one-way ANOVA revealed no significant differences in age at first CSA experience between adolescents ( $M = 10.8, SD = 3.28$ ) and adults ( $M = 10.67, SD = 3.65$ ) for whom data were available ( $n = 15$  for each age group), [ $F(1, 29) = .01, p > .05$ ].

<sup>3</sup>Data were reanalyzed with the three control participants who reported adult sexual assault omitted. All results were the same, with the exception of the main effect of Time Period, which approached significance at  $p = .09$ . The means were in the same direction as those reported for the full sample.

The second aim of the present study was to examine relations between trauma-related psychopathology (i.e., PTSD) and memory specificity. Correlations among key variables are presented in Table 3. First, a hierarchical linear regression was conducted with depression scores entered on the first step, and age, digit span, and number of PTSD criteria met entered as predictors of mean specificity scores on the second step. Although the overall model was significant, [ $F(4, 84) = 2.68, p < .05, R^2 = .12$ ], only age emerged as a significant predictor ( $\beta = .25, p < .05$ ). The  $\beta$ s for number of PTSD criteria met and digit span were .11 and .19, respectively. It is possible, however, that no-CSA controls in the present study experienced life traumas other than CSA for which they exhibited symptoms of PTSD. For example, some of the controls in our sample reported experiencing emotional abuse, natural disasters, and non-sexual assaults. Given that the present study concerned the relation between CSA and memory specificity, only participants with CSA histories who reported CSA as their most traumatic life event on the PDS or CPSS (DSM-IV criteria A for a diagnosis of PTSD; American Psychiatric Association, 1994) were included in the following regression to isolate the associations of CSA with memory specificity (Tables 4 and 5,  $n = 31$ ). For this subsample of participants, a hierarchical linear regression with depression scores entered on step one, and age, digit span scores, and PTSD criteria met entered on step two revealed that symptoms of PTSD significantly predicted mean specificity scores [overall model,  $F(4, 30) = 4.07, p = .01, R^2 = .37$ ]. A greater number of PTSD criteria met predicted more specific memory,  $\beta = .44, p < .05$ . Age ( $\beta = .44$ ) and digit span ( $\beta = .36$ ) were also significant predictors,  $p < .05$ . Thus, more specific memory reports were associated with greater working memory capacity and older age among participants with CSA histories who reported the CSA experience as their most traumatic life event. To test for potential mental health confounders, including dissociation, sexual problems, and anxiety, a series of separate hierarchical regressions was conducted in which each of the potential confounders was entered on the first step, and age, digit span scores, and PTSD criteria met were entered on the second step. The results did not change when the potential confounders were analyzed. All PTSD  $\beta$ s were  $.45, p < .05$ .

## Discussion

In the present study, adolescents with documented histories of CSA reported less specific autobiographical memories than adolescents without histories of CSA. These findings are consistent with previous literature and with predictions derived from the CaR-FA-X theory of reduced autobiographical memory specificity (Williams et al., 2007). In contrast, reduced memory specificity in adult CSA victims versus adult controls was not observed. Adults with documented CSA histories did, however, report more specific memories for childhood events compared to adolescents with CSA histories. Although causal inferences must be made with caution, these results suggest that the detrimental influence of CSA on autobiographical memory specificity attenuates with age.

According to Williams' (1996) theory of overgeneral autobiographical memory development, individuals who suffer early abuse may exhibit difficulty advancing beyond the level of generic memory retrieval characteristic of young children and may develop and maintain a pervasive overgeneral memory retrieval style into adolescence. Defensive or preferential encoding following trauma exposure may further contribute to overgeneral memory (Williams, Teasdale, Segal, & Soulsby, 2000). Consistent with this proposal, Valentino, Toth, and Cicchetti (2009) demonstrated that abused children reported fewer specific memories on the AMT than neglected and nonmaltreated children. In the present study, for adolescents with CSA histories, the experience of CSA may have disrupted the normal development of autobiographical memory specificity, causing adolescents with CSA histories compared to controls to maintain a categorical retrieval style that is typical of early memory functioning, leading to reduced memory specificity for childhood events.

In further comparing our results to those of previous research, it is important to note that the specificity of autobiographical memories in the present study was scored on a 4-point scale. In contrast, AMT studies have used dichotomous scoring methods (e.g., specific vs. categorical) and analyzed the total number of specific memories elicited by positive and negative cue-words. The scoring technique used in the present study may have captured greater variability in individuals' responses resulting, at least in principle, in greater ability to detect individual and age differences among individuals with and without CSA histories.

Despite the many advantages of the present study, it should be noted that our investigation included relatively few participants. Greater statistical power afforded by a larger sample size would have enhanced our ability to detect significant relations among variables of interest. In addition, the present study did not provide a direct test of the affect regulation or executive functioning components of the CaR-FA-X theory of overgeneral memory. Future research aimed at disentangling the relative contributions of executive functioning deficits and emotion regulation strategies to overgeneral memory in adolescents and adults is needed. Moreover, the specificity of individuals' abuse memories was not examined directly in the present study. Instead, participants were questioned about three lifetime periods in childhood. If memories of abuse had been tested directly, such memories may have been reported in greater (or less) detail compared to the memories examined in the present study. Finally, given the correlational nature of our research, it is not possible to make causal inferences about the effects of CSA on memory.

In summary, the present findings suggest that CSA per se is unrelated to adult victims' specificity of episodic childhood memories as assessed by the AMI. However, for adolescent victims, CSA was associated with less specific memories of childhood experiences. Furthermore, adult victims of CSA reported significantly more specific childhood memories relative to adolescents with histories of CSA suggesting that the detrimental influence of childhood trauma exposure on autobiographical memory specificity may attenuate with age. Symptoms of posttraumatic stress in victims who indicated CSA as their most traumatic life experience were associated with greater memory specificity. These findings underscore the importance of examining the role of age, trauma-related psychopathology, and retrieval context in the study of trauma victims' autobiographical memory functioning.

## Acknowledgments

This research was supported in part by the National Science Foundation (grants 0004369 and 0545413) and by the National Institute on Aging (5T32 AG000029-35). Any opinions, findings, conclusions, or recommendations expressed in this article are those of the authors and do not necessarily reflect the views of the National Science Foundation.

We thank Else-Marie Augusti, Michelle Culver, Nathaniel R. Herr, Rakel P. Larson, and many undergraduate assistants for their contributions to this research.

## References

- Alexander KW, Quas JA, Goodman GS, Ghetti S, Edelstein RS, Redlich AD, Jones DPH. Traumatic impact predicts long-term memory for documented child sexual abuse. *Psychological Science*. 2005; 16:33–40. [PubMed: 15660849]
- American Psychiatric Association. *Diagnostic and statistical manual of mental disorders*. 4. American Psychiatric Association; 1994.
- Armstrong JG, Putnam FW, Carlson EB, Libero DZ, Smith SR. Development and validation of a measure of adolescent dissociation: The Adolescent Dissociative Experiences Scale. *Journal of Nervous and Mental Disease*. 1997; 185:491–497. [PubMed: 9284862]

- Beers SR, De Bellis MD. Neuropsychological function in children with maltreatment-related posttraumatic stress disorder. *American Journal of Psychiatry*. 2002; 159:483–486. [PubMed: 11870018]
- Bernstein DP, Fink L, Handelsman L, Foote J. Initial reliability and validity of a new retrospective measure of child abuse and neglect. *American Journal of Psychiatry*. 1994; 151:1132–1136. [PubMed: 8037246]
- Bernstein EM, Putnam EW. Development, reliability, and validity of a dissociation scale. *Journal of Nervous and Mental Disease*. 1986; 174:727–734. [PubMed: 3783140]
- Block, SD.; Ogle, CM.; Harris, LS.; Augusti, E.; Larson, RP.; Culver, MA.; Pineda, R.; Urquiza, AJ. False memory findings in maltreated adolescents and adults. Presented at the meeting of the Society for Research in Child Development; Denver, CO. 2009 Apr.
- Brennan, KA.; Clark, CL.; Shaver, PR. Self-report measurement of adult attachment: An integrative overview. In: Simpson, JA.; Rholes, WS., editors. *Attachment theory and close relationships*. New York: Guilford Press; 1998. p. 46-76.
- Brennen T, Hasanovi M, Zotovic M, Blix I, Skar AMS, Prelic NK, Mehmedovic I, Pajevic I, Popovic N, Gavrilov-Jerkovic V. Trauma exposure in childhood impairs the ability to recall specific autobiographical memories in late adolescence. *Journal of Traumatic Stress*. 2010; 23:240–247. [PubMed: 20419732]
- Briere, J. Professional manual for the Trauma Symptom Checklist for Children (TSC-C). Odessa, FL: Psychological Assessment Resources; 1996.
- Briere J, Runtz M. The Trauma Symptom Checklist (TSC-33): Early data on a new scale. *Journal of Interpersonal Violence*. 1989; 4:151–163.
- Brown DW, Anda RF, Edwards VJ, Felitti VJ, Dube SR, Giles WH. Adverse childhood experiences and childhood autobiographical disturbance. *Child Abuse & Neglect*. 2007; 31:961–969. [PubMed: 17868865]
- Browne A, Finkelhor D. Impact of child sexual abuse: A review of the research. *Psychological Bulletin*. 1986; 99:66–77. [PubMed: 3704036]
- Bremner JD, Shobe KK, Kilhstrom JF. False memories in women with self-reported childhood sexual abuse: An empirical study. *Psychological Science*. 2000; 11:333–337. [PubMed: 11273395]
- Bunnell, SL.; Greenhoot, AF. Autobiographical memory in victims of maltreatment: Joint effects of avoidance and retrieval contexts. Presented at the meeting of the Association for Psychological Science; San Francisco, CA. 2009 May.
- Conway MA, Pleydell-Pearce CW. The construction of autobiographical memories in the self-memory system. *Psychological Review*. 2000; 107:261–288. [PubMed: 10789197]
- Dalgleish T, Golden AJ, Barrett LF, Au Yeung C, Murphy V, Tchanturia K, Watkins E. Reduced specificity of autobiographical memory and depression: The role of executive control. *Journal of Experimental Psychology*. 2007; 136:23–42. [PubMed: 17324083]
- Dalgleish T, Rolfe J, Golden A, Dunn BD, Barnard PJ. Reduced autobiographical memory specificity and posttraumatic stress: Exploring the contributions of impaired executive control and affect regulation. *Journal of Abnormal Psychology*. 2008; 117:236–241. [PubMed: 18266501]
- de Decker A, Hermans D, Raes F, Eelen P. Autobiographical memory specificity and trauma in inpatient adolescents. *Journal of Clinical Child and Adolescent Psychology*. 2003; 32:22–31. [PubMed: 12573929]
- Edwards VJ, Fivush R, Anda RF, Felitti VJ, Nordenberg DF. Autobiographical memory disturbances in childhood abuse survivors. *Aggression, Maltreatment, and Trauma*. 2001; 4:247–263.
- Eisen ML, Goodman GS, Qin J, Davis S, Crayton J. Maltreated children's memory: Accuracy, suggestibility, and psychopathology. *Developmental Psychology*. 2007; 43:1275–1294. [PubMed: 18020811]
- Elliott DM, Briere J. Sexual abuse trauma among professional women: Validating the Trauma Symptom Checklist-40 (TSC-40). *Child Abuse & Neglect*. 1992; 16:391–398. [PubMed: 1617473]
- Foa, EB. *The Posttraumatic Diagnostic Scale (PDS) Manual*. Minneapolis, MN: National Computer Systems; 1995.
- Foa EB, Cashman L, Jaycox LH, Perry KJ. The validation of a self-report measure of posttraumatic stress disorder: The Posttraumatic Diagnostic Scale. *Psychological Assessment*. 1997; 9:445–451.



- Foa EB, Johnson K, Feeny NC, Treadwell K. The child PTSD symptom scale (CPSS): A preliminary examination of its psychometric properties. *Journal of Clinical Child Psychology*. 2001; 30:376–384. [PubMed: 11501254]
- Ghetti S, Edelstein RS, Goodman GS, Cordon IM, Quas JA, Alexander KW, Jones DPH. What can subjective forgetting tell us about memory for childhood trauma? *Memory & Cognition*. 2006; 34:1011–1025. [PubMed: 17128600]
- Golden A, Dalgleish T, Mackintosh B. Levels of specificity of autobiographical memories and of biographical memories of the deceased in bereaved individuals with and without complicated grief. *Journal of Abnormal Psychology*. 2007; 116:486–795.
- Goodman GS, Ogle CM, Block SD, Harris LS, Larson RP, Augusti E, Cho Y, Beber J, Timmer S, Urquiza A. False memory for trauma-related DRM lists in maltreated adolescents and adults. *Development and Psychopathology*. 2011; 23:423–438. [PubMed: 23786687]
- Goodman GS, Quas JA, Ogle CM. Child maltreatment and memory. *Annual Review of Psychology*. 2010; 61:325–351.
- Hauer BJA, Wessel I, Geraerts E, Merckelbach H, Dalgleish T. Autobiographical memory specificity after manipulation retrieval cues in adults reporting childhood sexual abuse. *Journal of Abnormal Psychology*. 2008; 117:444–453. [PubMed: 18489221]
- Hermans H, Van den Broeck K, Belis G, Raes F, Pieters G, Eelen P. Trauma and autobiographical memory specificity in depressed inpatients. *Behaviour Research and Therapy*. 2004; 42:775–789. [PubMed: 15149898]
- Howe ML. Children's memory for traumatic experiences. *Learning and Individual Differences*. 1997; 9:153–174.
- Howe ML, Cicchetti D, Toth SL. Children's basic memory processes, stress, and maltreatment. *Development and Psychopathology*. 2006; 18:759–769. [PubMed: 17152399]
- Howe ML, Courage ML. The emergence and early development of autobiographical memory. *Psychological Review*. 1997; 104:499–523. [PubMed: 9243962]
- Hunter ECM, Andrews B. Memory for autobiographical facts and events: A comparison of women reporting childhood sexual abuse and non-abused controls. *Applied Cognitive Psychology*. 2002; 16:575–588.
- John, OP.; Donahue, EM.; Kentle, RL. *The Big Five Inventory-Versions 4a and 54*. Berkeley, CA: University of California, Berkeley; 1991.
- Johnson RJ, Greenhoot AF, Glisky E, McCloskey LA. The relations among abuse, depression, and adolescents' autobiographical memory. *Journal of Clinical Child and Adolescent Psychology*. 2005; 34:235–247. [PubMed: 15901224]
- Kopelman MD, Wilson BA, Baddeley AD. The autobiographical memory interview: A new assessment of autobiographical and personal semantic memory in amnesic patients. *Journal of Clinical and Experimental Neuropsychology*. 1989; 11:724–744. [PubMed: 2808661]
- Kremer IP, Spinhoven P, Van der Does AJW, Van Dyck R. Autobiographical memory in depressed and nondrepressed patients with borderline personality disorder after long-term psychotherapy. *Cognition & Emotion*. 2006; 20:448–465.
- Kuyken W, Brewin CR. Autobiographical memory functioning in depression and reports of early abuse. *Journal of Abnormal Psychology*. 1995; 104:585–591. [PubMed: 8530760]
- Kuyken W, Howell R. Facets of autobiographical memory in adolescents with major depressive disorder and never-depressed controls. *Cognition & Emotion*. 2006; 20:466–487.
- Kuyken W, Howell R, Dalgleish T. Overgeneral autobiographical memory in depressed adolescents with, versus without, a reported history of trauma. *Journal of Abnormal Psychology*. 2006; 115:387–396. [PubMed: 16866580]
- McNally RJ. Progress and controversy in the study of posttraumatic stress disorder. *Annual Review of Psychology*. 2003; 54:229–252.
- McNally RJ, Clancy SA, Barrett HM, Parker HA, Ristuccia CS, Perlman CA. Autobiographical memory specificity in adults reporting repressed, recovered, or continuous memories of childhood sexual abuse. *Cognition & Emotion*. 2006; 20:527–535.

- McNally RJ, Lasko NB, Macklin ML, Pitman RK. Autobiographical memory disturbance in combat-related posttraumatic stress disorder. *Behaviour Research and Therapy*. 1995; 33:619–630. [PubMed: 7654154]
- McNally RJ, Litz BT, Prassas A, Shin LM, Weathers FW. Emotional priming of autobiographical memory in post-traumatic stress disorder. *Cognition & Emotion*. 1994; 8:351–367.
- Meesters C, Merckelbach H, Muris P, Wessel I. Autobiographical memory and trauma in adolescents. *Journal of Behavior Therapy and Experimental Psychiatry*. 2000; 31:29–39. [PubMed: 10983745]
- Merckelbach H, Jelici M. Dissociative symptoms are related to endorsement of vague trauma items. *Comprehensive Psychiatry*. 2004; 45:70–75. [PubMed: 14671740]
- Moore RG, Watts FN, Williams JMG. The specificity of personal memories in depression. *British Journal of Clinical Psychology*. 1988; 27:275–276. [PubMed: 3191311]
- Moore SA, Zoellner LA. Overgeneral autobiographical memory and traumatic events: An evaluative review. *Psychological Bulletin*. 2007; 133:419–437. [PubMed: 17469985]
- Moradi AR, Doost HTN, Taghavi MR, Yule W, Dalgleish T. Everyday memory deficits in children and adolescents with PTSD: Performance on the Rivermead Behavioural Memory Test. *Journal of Child Psychology and Psychiatry*. 1999; 40:357–361. [PubMed: 10190337]
- Moradi AR, Herlihy J, Yasseri G, Shahraray M, Turner S, Dalgleish T. Specificity of episodic and semantic aspects of autobiographical memory in relation to symptoms of posttraumatic stress disorder (PTSD). *Acta Psychologica*. 2008; 127:645–653. [PubMed: 18178168]
- Nelson K, Fivush R. The emergence of autobiographical memory: A social cultural developmental theory. *Psychological Review*. 2004; 111:486–511. [PubMed: 15065919]
- Orbach Y, Lamb ME, Sternberg KJ, Williams JMG, Dawud-Noursi S. The effect of being a victim or witness of family violence on the retrieval of autobiographical memories. *Child Abuse & Neglect*. 2001; 25:1427–1437. [PubMed: 11766009]
- Paivio SC, Cramer KM. Factor structure and reliability of the Childhood Trauma Questionnaire in a Canadian undergraduate student sample. *Child Abuse & Neglect*. 2004; 28:889–904. [PubMed: 15350772]
- Peeters F, Wessel I, Merckelbach H, Boon-Vermeeren M. Autobiographical memory specificity and the course of major depressive disorder. *Comprehensive Psychiatry*. 2002; 43:344–350. [PubMed: 12216009]
- Porter S, Peace KA. The scars of memory: A prospective, longitudinal investigation of the consistency of traumatic and positive emotional memories in adulthood. *Psychological Science*. 2007; 18:435–441. [PubMed: 17576284]
- Ros L, Latorre JM, Serrano JP. Working memory capacity and overgeneral autobiographical memory in young and older adults. *Aging, Neuropsychology, and Cognition*. 2010; 17:89–107.
- Rubin DC, Berntsen D, Bohni MK. A memory-based model of posttraumatic stress disorder: Evaluating basic assumptions underlying the PTSD diagnosis. *Psychological Review*. 2008; 115:985–1011. [PubMed: 18954211]
- Rubin DC, Boals A, Berntsen D. Memory in posttraumatic stress disorder: Properties of voluntary and involuntary, traumatic and non-traumatic autobiographical memories in people with and without PTSD symptoms. *Journal of Experimental Psychology: General*. 2008; 137:591–614. [PubMed: 18999355]
- Rubin DC, Dennis M, Beckham JC. Autobiographical memory for stressful events: The role of autobiographical memory in posttraumatic stress disorder. *Consciousness and Cognition*. 2011; 20:840–856. [PubMed: 21489820]
- Rubin DC, Feldman ME, Beckham JC. Reliving, emotions, and fragmentation in the autobiographical memories of veterans diagnosed with PTSD. *Applied Cognitive Psychology*. 2004; 18:17–35.
- Rubin, DC.; Wetzler, SE.; Nebes, RD. Autobiographical memory across the lifespan. In: Rubin, DC., editor. *Autobiographical memory*. NY: Cambridge University Press; 1986. p. 202-221.
- Stokes DJ, Dritschel BH, Bekerian DA. The effect of burn injury on adolescents autobiographical memory. *Behaviour Research and Therapy*. 2004; 42:1357–1365. [PubMed: 15381443]
- Stokes DJ, Dritschel BH, Bekerian DA. Semantic and episodic autobiographical memory recall for memories not directly associated with childhood sexual abuse. *Journal of Family Violence*. 2008; 23:429–435.

- Swales MA, Williams MG, Wood P. Specificity of autobiographical memory and mood disturbance in adolescents. *Cognition & Emotion*. 2001; 15:321–331.
- Toth, SL.; Harris, LS.; Goodman, GS.; Cicchetti, D. Influence of violence and aggression on children's psychological development: Trauma, attachment, and memory. In: Mikulincer; Shaver, editors. *Second Herzliya Symposium on Personality and Social Psychology: Understanding and Reducing Aggression, Violence, and their Consequences*. Washington, D.C: American Psychological Association; 2010. p. 351-365.
- Valentino K, Toth SL, Cicchetti D. Autobiographical memory functioning among abuse, neglected, and nonmaltreated children: the overgeneral memory effect. *Journal of Child Psychology and Psychiatry*. 2009; 50:1029–1038. [PubMed: 19490313]
- Vrana SR, Roodman A, Beckham JC. Selective processing of trauma-relevant words in posttraumatic stress disorder. *Journal of Anxiety Disorders*. 1995; 9:515–530.
- Watkins E, Teasdale JD. Rumination and overgeneral memory in depression: Effects of self-focus and analytic thinking. *Journal of Abnormal Psychology*. 2001; 110:353–357. [PubMed: 11358029]
- Watkins E, Teasdale JD, Williams RM. Decentering and distraction reduce overgeneral autobiographical memory in depression. *Psychological Medicine*. 2000; 30:911–920. [PubMed: 11037099]
- Wechsler, D. Wechsler Intelligence Scale for Children (WISC-III). San Antonio, TX: Psychological Corp; 1991.
- Wechsler, D. Wechsler Adult Intelligence Scale- III (WAIS-III). San Antonio, TX: Psychological Corp; 1997.
- Wessel I, Meeren M, Peeters F, Arntz A, Merckelbach H. Correlates of autobiographical memory specificity: The role of depression, anxiety, and childhood trauma. *Behaviour Research and Therapy*. 2001; 39:409–421. [PubMed: 11280340]
- Wessel I, Merckelbach H, Dekkers T. Autobiographical memory specificity, intrusive memory, and general memory skills in Dutch Indonesian survivors of the World War II era. *Journal of Traumatic Stress*. 2002; 15:227–234. [PubMed: 12092915]
- Willebrand M, Norlund F, Kildal M, Gerdin B, Ekselius L, Andersson G. Cognitive distortions in recovered burn patients: The emotional Stroop task and autobiographical memory test. *Burns*. 2002; 28:465–471. [PubMed: 12163286]
- Williams, JMG. Depression and the specificity of autobiographical memory. In: Rubin, DC., editor. *Remembering our past: Studies in autobiographical memory*. NY: Cambridge University Press; 1996. p. 244-267.
- Williams JM, Broadbent K. Autobiographical memory in suicide attempters. *Journal of Abnormal Psychology*. 1986; 95:144–149. [PubMed: 3711438]
- Williams JM, Barnhofer T, Crane C, Hermans D, Raes F, Watkins E, Dalgleish T. Autobiographical memory specificity and emotional disorder. *Psychological Bulletin*. 2007; 133:122–148. [PubMed: 17201573]
- Williams JM, Teasdale JD, Segal ZV, Soulsby J. Mindfulness-based cognitive therapy reduces overgeneral autobiographical memory in formerly depressed patients. *Journal of Abnormal Psychology*. 2000; 109:150–155. [PubMed: 10740947]
- Zoellner LA, Foa EB, Brigidi BD, Przeworski A. Are trauma victims susceptible to “false memories? *Journal of Abnormal Psychology*. 2000; 109:517–524. [PubMed: 11016121]