
Individual Differences in Emotional Memory: Adult Attachment and Long-Term Memory for Child Sexual Abuse

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In the present study, attachment-related differences in long-term memory for a highly emotional life event, child sexual abuse (CSA), were investigated. Participants were 102 documented CSA victims whose cases were referred for prosecution approximately 14 years earlier. Consistent with the proposal that avoidant individuals defensively regulate the processing of potentially distressing information (Bowlby, 1980), attachment avoidance was negatively associated with memory for particularly severe CSA incidents. This finding was not mediated by the extent to which participants reported talking about the abuse after it occurred, although postabuse discussion did enhance long-term memory. In addition, accuracy was positively associated with maternal support following the abuse and extent of CSA-related legal involvement. Attachment anxiety was unrelated to memory accuracy, regardless of abuse severity. Implications of the findings for theories of avoidant defensive strategies and emotional memory are discussed.

Keywords: *attachment; emotion; memory; individual differences; child sexual abuse*

According to attachment theory (Bowlby, 1969), experiences in close relationships can profoundly influence perceptions of the social world. In particular, individual differences in attachment quality have been proposed as an important moderator of the extent to which attachment-

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related information is attended to and processed (e.g., Fraley, Garner, & Shaver, 2000; Main, Kaplan, & Cassidy, 1985). Avoidant individuals, who are uncomfortable with closeness and intimacy, are theorized to limit the processing of potentially distressing information, with the goal of preventing activation of the attachment system (e.g., Edelstein & Shaver, 2004; Fraley, Davis, & Shaver, 1998). Anxious individuals, on the other hand, who are preoccupied with relationship partners and attachment-related concerns, are theorized to be hyper-vigilant to information that could result in attachment-system activation (e.g., Cassidy, 1994, 2000).

Findings from the few studies of attachment-related differences in attention and memory are consistent with these theoretical ideas, suggesting that avoidant compared to nonavoidant individuals are less attentive to material with emotional, attachment-related themes (e.g., pictures depicting close relationships; Kirsh & Cassidy, 1997; Main et al., 1985) and, perhaps as a result, have greater difficulty recalling such material (Edelstein, 2005; Fraley et al., 2000; Mikulincer & Orbach, 1995). In addition, although evidence is somewhat mixed, anxious individuals appear to be particularly vigilant to emotional, attachment-related information (e.g., Mikulincer, Gillath, & Shaver, 2002), which may enhance later recall (Mikulincer & Orbach, 1995).

Although extant research provides some preliminary support for the theorized link between attachment and memory, particularly among avoidant individuals, previous studies have relied almost exclusively on laboratory assessments of memory for attachment-related stimuli (e.g., Fraley et al., 2000; Zeijlmans van Emmichoven, van IJzendoorn, de Ruiter, & Brosschot, 2003) or on unverified recollections of past emotional experiences (Mikulincer & Orbach, 1995). The present study is an investigation of attachment-related differences in long-term memory for a highly emotional life event, child sexual abuse (CSA). Detailed information regarding participants' prior CSA experiences allowed us to assess the relation between individual differences in adult attachment and the accuracy of memory for abuse that occurred 11 to 19 years previously.

Moreover, in the present sample, the nature of the abuse experiences varied widely (e.g., from a one-time incident of exhibitionism to incest perpetrated for nearly 8 years), with more severe abuse presumably reflecting more negative and threatening experiences

(e.g., Spaccarelli, 1994, 1995). Although avoidant individuals are thought to restrict the processing of potentially distressing information (Bowlby, 1980, 1987), which may impair their subsequent memory for that information, this assumption has not been directly investigated. We therefore examined the moderating role of abuse severity to test explicitly the assumption that avoidant individuals' memory deficits would be most pronounced for particularly negative, emotional incidents.

Before describing the current study, we provide a brief overview of relevant research on memory for negative emotional experiences, followed by a discussion of theory and research on attachment-related differences in emotional memory.

Memory for Negative Emotional Experiences

Findings across many studies suggest that negative stimuli and experiences are better recalled than those that are nonemotional, and sometimes better than those that are positive (e.g., Canli, Zhao, Brewer, Gabrieli, & Cahill, 2000; Goodman, Hirschman, Hepps, & Rudy, 1991; LaBar & Phelps, 1998; Ochsner, 2000; see Reisberg & Heuer, 2004, for a review). Memory enhancement is thought to result from the involvement of the amygdala in the processing of negative information (e.g., Buchanan & Adolphs, 2004; Canli et al., 2000; LaBar & Phelps, 1998) and the ensuing release of stress hormones (e.g., Cahill & McGaugh, 1998; Cahill, Prins, Weber, & McGaugh, 1994), which may promote distinctive encoding of negatively valenced stimuli and the vividness with which those stimuli are recalled (Berntsen, 2001; Ochsner, 2000).

Although relatively few studies have investigated memory accuracy for emotional events experienced outside the laboratory, there are reasons to believe that memory for central details of such events, including CSA, may be similarly enhanced by negative emotion (Schooler & Eich, 2000). For instance, our previous research with this sample indicated that severe cases of abuse, as indexed by a composite measure of abuse duration, extent of sexual activity, use of force, and extent of injury to the child, were more likely to be disclosed in an interview nearly 14 years later (Goodman et al., 2003). Insofar as severe abuse is perceived and experienced more negatively (e.g., Spaccarelli, 1994), and assuming that failure to disclose reflects, at least in part, poorer memory for the incident(s), these findings are consistent with the idea that negative emotion enhances long-term memory. In addition, among participants who went to court as a consequence of the abuse, long-term memory for details of the court experience was positively associated with observer ratings of distress at the time of the

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legal involvement (K. Alexander, Quas, Ghetti, et al., 2005).

However, in some studies, high levels of negative emotion or distress have been associated with impaired memory (e.g., Kirschbaum, Wolf, May, Wippach, & Hellhammer, 1996), including for stressful life experiences (e.g., Merritt, Ornstein, & Spicker, 1994; Vandermaas, Hess, & Baker-Ward, 1993; see also Payne, Nadel, Britton, & Jacobs, 2004). These contradictory findings may be at least partially due to differences across studies in the conceptualization and measurement of negative emotion (e.g., observer ratings of crying vs. self-reports of anxiety). Another (although not mutually exclusive) possibility is that participant characteristics moderate the relation between emotion and memory. That is, for some individuals, negative emotion may facilitate memory; for others, memory may in fact be impaired by negative emotion. As discussed in the following section, attachment theory and research suggest that individual differences in attachment may be an important moderator of the influence of negative emotion on memory.

Attachment-Related Differences in Emotional Memory

Individual differences in adult attachment are generally assessed by a person's placement on two relatively independent continuous dimensions, avoidance and anxiety (Fraley & Waller, 1998). Individuals with high scores on the avoidance dimension are characterized by chronic attempts to "deactivate" or minimize activation of the attachment system (Cassidy, 2000; Edelstein & Shaver, 2004): In stressful situations, avoidant individuals tend to minimize expressions of distress (Fraley & Shaver, 1997) and are unlikely to turn to or provide support for others (e.g., Edelstein et al., 2004; Fraley & Shaver, 1998; Simpson, Rholes, & Nelligan, 1992). They dislike physical and emotional intimacy (Brennan, Clark, & Shaver, 1998; Fraley et al., 1998) and grieve less following a breakup compared to nonavoidant adults (Fraley & Shaver, 1999).

Attachment anxiety, in contrast, appears to reflect "hyperactivation" of the attachment system (Cassidy, 2000): Individuals scoring high on the anxiety dimension report fears of being alone and are preoccupied with intimacy and relationship partners. They are hypervigilant to attachment figures and attachment-related concerns (e.g., Mikulincer, Birnbaum, Woddis, & Nachmias, 2000; Mikulincer et al., 2002) and are easily distressed by even brief separations from attachment figures (Feeney & Noller, 1992; Fraley & Shaver, 1998). In this two-dimensional framework, individuals who score low on both dimensions are considered secure.

Recent research provides some support for the influence of these regulatory strategies on memory, particularly among avoidant individuals. Mikulincer and Orbach (1995), for instance, asked participants to recall childhood memories associated with specific emotions (e.g., anxiety, happiness) and recorded the number of memories recalled and the time participants took to retrieve them. Participants also rated the intensity of the emotions they experienced during the recalled events and the age at which the events occurred. Avoidant individuals recalled fewer emotional events and took longer to retrieve those they did recall, particularly events related to sadness and anxiety. They also rated their memories as less emotionally intense and the events as having occurred at an older age than those recalled by nonavoidant participants. These findings are consistent with the idea that avoidant individuals have limited access to emotional memories, perhaps because of restricted attention to or subsequent processing of emotional experiences. In addition, that the events recalled by avoidant individuals were less emotionally intense suggests that highly emotional experiences may be particularly inaccessible. Of course, it is also possible that avoidant individuals minimized the emotional intensity of the experiences they reported or chose to report only those that were less emotional. Moreover, because the accuracy of the reported experiences was not verified, it is unclear whether avoidant individuals in fact had more difficulty retrieving their memories, or whether they simply had fewer emotional experiences to recall.

In another study, Fraley et al. (2000) examined attachment-related differences in memory for a narrative about interpersonal loss. Memory for the narrative was assessed either immediately following presentation or after a delay ranging up to 3 weeks. Consistent with previous findings, avoidance was negatively associated with recall of narrative details in both the immediate and delayed interviews; however, avoidance was unrelated to the rate at which those details were forgotten. Insofar as memory is facilitated by postevent elaboration (e.g., thinking or talking with others about the event; Bahrick, 2000), these findings suggest that avoidant and nonavoidant individuals were equally likely to elaborate or rehearse the story after encoding. Fraley et al. thus proposed that encoding or attentional mechanisms underlie avoidant individuals' memory deficits. The extent to which participants thought about the information after leaving the laboratory was not directly examined, however. As acknowledged by the authors, it is possible that the interview, although emotional, was not personally salient for some participants (or was not equally salient across participants), which may have restricted the amount of postencoding rehearsal for both avoidant and nonavoidant individuals. In the pres-

ent study, participants were asked to report how often they had discussed their abusive experiences with others, allowing us to examine the extent to which any memory deficits observed among avoidant individuals were mediated by amount of postencoding rehearsal.

The findings described thus far are consistent with Bowlby's (1980, 1987) notion of defensive exclusion. Bowlby proposed that some individuals may selectively and defensively regulate the processing of material that could result in attachment-system activation. Such defensive behavior may serve to prevent the negative affect associated with reminders of attachment-related loss. Avoidant individuals are thought to rely on these kinds of defensive strategies to regulate attention to attachment-related information: If potentially upsetting information is not fully processed, the attachment system is less likely to be activated, thus preventing further rejection and distress and, of relevance to the present study, impairing memory.

A less consistent picture has emerged thus far with respect to attachment-related anxiety and memory. Theoretically, anxious adults, who are hypervigilant to attachment figures and concerns, should show enhanced memory for attachment-related information compared to nonanxious individuals; however, this hypothesis has received only mixed empirical support. There is some evidence that anxious adults show heightened cognitive accessibility of attachment-related threats (e.g., Mikulincer et al., 2002; Mikulincer & Shaver, 2001) and can retrieve emotional autobiographical memories more quickly than nonanxious individuals (Mikulincer & Orbach, 1995).¹ Yet, Zeijlmans van Emmichoven et al. (2003) found that anxious adults had poorer memory for emotional and nonemotional stimuli compared to secure (but not avoidant) adults (see also Kirsh & Cassidy, 1997), and other findings suggest that attachment anxiety is unrelated to memory (Edelstein, 2005; Fraley et al., 2000). The present study afforded the possibility to reexamine this association.

THE PRESENT STUDY

The goal of the present study was to investigate attachment-related differences in memory for child sexual abuse. Although previous research provides some support for the influence of attachment on emotional memory, it is unknown whether these findings extend to documented autobiographical experiences. In addition, the role of emotion per se has received surprisingly little attention. Although it has been assumed that the emotional nature of the to-be-remembered material underlies the deficits in memory observed among avoidant individuals, most studies have included only emotional stimuli, and none have examined the role of emotional intensity. Insofar as avoidant individuals' memory

impairments are the result of defensive attempts to limit the processing of potentially distressing information, the most pronounced impairments should be evident when the to-be-remembered material is particularly emotional.

Although any kind of unwanted sexual experience is likely to be emotional and possibly traumatic, the most severe cases are presumably experienced most negatively and, due to their potentially threatening nature, should be most likely to activate attachment-related concerns and defenses (e.g., Mikulincer, Florian, & Weller, 1993). We thus considered abuse severity to be an indicator of the emotional intensity of the abuse incident(s)² and expected avoidant individuals to have poor memory for particularly severe CSA experiences. In other words, an interaction was predicted between attachment avoidance and abuse severity, such that avoidant individuals' memory deficits would be most evident in cases of particularly severe abuse. Nonavoidant individuals, in contrast, were expected to be most accurate about severe cases. Because of previously inconsistent findings regarding attachment-related anxiety, no predictions were made for this dimension.

Finally, we examined several additional variables known to influence long-term memory (e.g., age, gender) that are often correlated with abuse severity (e.g., Finkelhor, 1994; Goodman et al., 1992) and potentially with individual differences in attachment. Specifically, our previous findings with this sample indicated that CSA disclosure was more likely among participants who were older when the abuse ended, received maternal support, and experienced more extensive legal involvement (Goodman et al., 2003). Although we did not previously find a significant gender difference in disclosure, some research suggests an advantage in emotional memory among women (e.g., Canli, Desmond, Zhao, & Gabrieli, 2002).

METHOD

Participants and Sample Characteristics

Between 1985 and 1987, 217 children (51 men, 166 women), ages 4 to 17 years, participated in a study of the emotional effects of criminal prosecutions on CSA victims (Goodman et al., 1992).³ At that time, detailed information was collected from multiple sources (i.e., prosecutor files, nonoffending caregivers, child victims) regarding characteristics of the abuse and the legal case. Approximately 13 years later (original study to current interview, $M = 13.09$ years, range = 10.66 to 16.58; end of abuse to first interview, $M = 13.86$ years, range = 11.50 to 19.00), the former participants were located and invited to take part in a study of legal attitudes and experiences. The follow-up study was conducted in three phases: (a) a

telephone interview, (b) mailed questionnaires, and (c) an in-person interview. Of the original 217 participants, 186 (85.7%) were located and 175 (80.6%) were interviewed at least once. Of those located but not interviewed, 10 (4.6% of the original sample) declined to participate and 1 was deceased (see Quas et al., 2005, for more detailed information about the follow-up study and K. Alexander, Quas, Goodman, et al., 2005, for information specific to the third phase of the project).

The present report concerns the 102 individuals (23 men, 79 women) who disclosed the documented abuse during the first phase of the study (see Goodman et al., 2003) and completed Phase 2, in which information about adult attachment style was obtained.⁴ Of these 102 individuals, 66% were Caucasian/non-Hispanic, 10% were African American, 13% were Hispanic, 1% was Asian American, and 10% were of mixed or other ethnicities. Participants' age at the time of the Phase 1 interview ranged from 16.67 to 30.08 years ($M = 23.14$, $SD = 3.35$).

Information regarding the documented abuse and subsequent legal involvement was obtained from the original study records (see Goodman et al., 1992). For the subset of participants included in the present report, age when the abuse began ranged from 2 to 16 years ($M = 8.90$, $SD = 3.12$), and age when the abused ended ranged from 3 to 16 years ($M = 9.42$, $SD = 3.24$). The alleged perpetrator of the abuse was classified as a parent (i.e., parent, stepparent; 22%), person in a position of trust (e.g., teacher, relative; 40%), acquaintance (30%), or stranger (8%). Eighty-eight percent of the cases involved genital contact and 40% involved penetration. Abuse severity, indexed by a composite of abuse duration, extent of sexual activity, use of force, and extent of injury to the child, ranged from 2 to 9 (on a 12-point scale; $M = 4.73$, $SD = 1.78$). The majority (94%) of children received maternal support (as rated by researchers at the time of the original study) following their disclosure of abuse. Legal involvement was assessed on a 3-point scale (1 = did not go to court, 2 = went to court but did not testify, 3 = testified; $M = 2.04$, $SD = .83$). Thirty-two percent of the children went to court at least once but did not testify, and 36% of children testified at least once.

The disclosing subsample that completed Phase 2 was comparable to the original Goodman et al. (1992) sample in terms of age at the beginning and end of the abuse, gender, abuse severity, and victim-perpetrator relationship; however, this subsample experienced greater legal involvement, $t(215) = 2.13$, $p < .05$, and was more likely to have received maternal support, $\chi^2(1) = 11.26$, $p < .01$, $n = 206$, compared to individuals from the original sample.

Materials and Procedure

Phase 1 interview. The Phase 1 interview was conducted via telephone by interviewers who were blind to individual participants' prior experiences (with minor exceptions, see Quas et al., 2005). For scientific and ethical reasons, participants were not told of the researchers' knowledge of past victimization, legal involvement, or original study participation. The study was described as a survey of legal attitudes and experiences. The first interview primarily concerned victimization (e.g., physical and sexual abuse, domestic violence) and legal experiences. CSA was defined as completed or attempted exhibitionism, sexual touching, rape, oral sex, or intercourse that occurred when the participant was younger than age 18 and with a person more than 4 years older. Participants who disclosed the target CSA experience (see Goodman et al., 2003) were then asked additional questions about the abuse and their subsequent legal involvement.

Four pieces of factual information about the target CSA experience were available from the Phase 1 interview and were scored to determine the accuracy of participants' current reports. Specifically, participants were asked (a) the age at which the abuse began, (b) the age at which the abuse ended, (c) the extent of sexual contact, and (d) the frequency with which the abuse occurred. For questions regarding age, responses within the same year were considered correct (e.g., if the beginning of the abuse was documented as age 7, only current responses from age 7 up to, but not including, age 8 would be considered correct). For the extent and frequency of sexual contact, participants were asked to provide answers on rating scales that corresponded to those in the original records (i.e., for extent of sexual contact, 1 = exhibitionism, 2 = nongenital contact, 3 = genital contact without penetration, 4 = penetration; for frequency of abuse, 1 = 1 time, 2 = 2-3 times, 3 = more than 3 times). To be considered correct, the current scaled response had to be an exact match to the original documentation. For each detail, a score of 1 was given if the current response matched the original documentation and a score of 0 was given if the current response was discrepant with the original documentation. A mean accuracy score was computed by averaging participants' scores across all four details.⁵

In addition, a variable was created to determine the types of errors participants made when their current reports were discrepant with the original documentation. That is, for the frequency of abuse and the extent of sexual activity, it was possible to determine whether current reports were minimized (e.g., reporting less intrusive sexual contact than originally documented) or exag-

gerated (e.g., reporting abuse more frequent than that originally documented). Indices of abuse duration (in years) also were computed from the reported and documented beginning and end of the abuse. For each of these three details, responses were scored as 0 if there was no discrepancy with the original documentation, -1 if current reports were minimized, or 1 if current reports were exaggerated. These scores were averaged to create an overall index of minimization versus exaggeration, with higher scores reflecting greater exaggeration of abuse details.

Finally, participants were asked to report how often they had discussed the abuse with others (i.e., friends and family members, on a 4-point scale; 1 = never, 2 = rarely, 3 = sometimes, 4 = frequently).

Phase 2 interview. The second assessment consisted of questionnaires that were completed by participants through the mail. These questionnaires primarily concerned current mental health functioning, delinquency, and legal attitudes (see Quas et al., 2005). Adult attachment also was assessed during this phase using the Relationship Questionnaire (RQ; Bartholomew & Horowitz, 1991). The RQ provides prototypical descriptions of each of four attachment styles: secure, preoccupied, dismissing, and fearful. Participants rate the extent to which each of these four prototypes is self-descriptive using 7-point Likert-type scales (1 = *not at all like me*, 7 = *very much like me*). These ratings were combined, following Griffin and Bartholomew (1994), to create scores for the two dimensions corresponding to attachment-related avoidance and anxiety. Higher scores indicate higher levels of avoidance and anxiety. RQ ratings are fairly stable throughout an 8-month period (i.e., correlations ranging from .64 to .73; Scharfe & Bartholomew, 1994).

The RQ was selected because of its brevity; space limitations in the mailed questionnaires precluded the addition of more extensive measures. Although longer, more reliable measures of adult attachment are generally preferred to the RQ, ratings obtained from the RQ are moderately to highly associated with those obtained from longer measures (i.e., correlations ranging from .54 to .72; Ognibene & Collins, 1998; Simpson, Rholes, & Phillips, 1996). In the present sample, scores for the four RQ prototypes were as follows: secure ($M = 3.85$, $SD = 1.96$), preoccupied ($M = 2.81$, $SD = 1.90$), dismissing ($M = 3.36$, $SD = 1.88$), and fearful ($M = 4.52$, $SD = 1.90$). Composite scores ranged from -7.00 to 11.00 ($M = 1.22$, $SD = 4.32$) on the avoidance dimension and from -12.00 to 10.00 ($M = .12$, $SD = 4.32$) on the anxiety dimension.⁶ These scores are comparable to those obtained in other sexually abused samples (P. Alexander, 1993; Roche, Runtz, & Hunter, 1999) and reflect greater insecurity

than would be expected in a nonclinical population (e.g., Bartholomew & Horowitz, 1991).

RESULTS

Memory Accuracy

CSA memory accuracy was defined as the proportion of correct responses to the four abuse-related questions ($M = .51$, $SD = .30$, range = 0-1). Correlations among the variables of interest are shown in Table 1. As predicted, accuracy was higher among individuals who had received maternal support, those with more extensive legal involvement, and those who had more frequently discussed the abuse with others.⁷

To examine the hypothesized interaction between attachment avoidance and abuse severity, a hierarchical regression analysis was conducted predicting memory accuracy. Because maternal support and legal involvement were significantly correlated with memory accuracy, these variables were entered on the first step, along with attachment avoidance, attachment anxiety, and abuse severity. The interaction between avoidance and severity was entered on the second step. The overall regression was significant (see Table 2), as was the predicted interaction between avoidance and abuse severity (R^2 change = .04, $p < .05$).⁸

To illustrate this interaction (see Figure 1), the simple slope of attachment avoidance on memory accuracy is plotted at 1 standard deviation above and below the mean of abuse severity (Aiken & West, 1991). Simple slope tests indicated that, at high levels of abuse severity, avoidance was negatively associated with memory accuracy ($\beta = -.29$, $p = .05$); avoidance was not significantly related to accuracy at low levels of abuse severity ($\beta = .14$, $p = .31$). That is, avoidant individuals' memory deficits were observable only when recalling cases of severe abuse. The main effects of avoidance and abuse severity were both nonsignificant, although the effect of avoidance was in the expected direction and may have not been detected due to lack of statistical power.

In addition, provision of maternal support remained a significant predictor of memory accuracy in the regression analysis, and the relation between extent of legal involvement and accuracy closely approached significance. The inclusion of participants' gender and age at the end of the abuse did not significantly increase the amount of variance explained (R^2 change = .01, $p = .95$).

To examine whether memory accuracy differed for avoidant participants with high versus low levels of attachment anxiety (i.e., fearful vs. dismissing individuals), three additional interaction terms were included in the regression analysis—the two-way interactions between (a) avoidance and anxiety and (b) anxiety and abuse severity, and (c) the three-way interaction among

TABLE 1: Correlations Among Variables of Interest

	1	2	3	4	5	6	7	8	9
Attachment avoidance									
Attachment anxiety	.04								
Abuse severity	-.26**	.06							
Maternal support	-.12	.00	.05						
Age at the end of abuse	.08	.02	.11	.05					
Gender	.08	-.09	.08	-.04	.03				
Legal involvement	.01	-.13	.01	.03	.18	-.05			
How often discussed abuse	-.21*	-.07	.05	.24*	-.17	-.04	.18		
Memory accuracy	-.09	-.06	.08	.22*	.08	-.05	.20*	.26**	
Type of error	-.04	.03	-.16	-.09	.24*	.01	-.08	-.04	-.05

NOTE: Unless otherwise noted, $n = 102$. Maternal support ($n = 97$; 0 = did not receive support, 1 = received support), gender (0 = male, 1 = female), legal involvement (1 = did not go to court, 2 = went to court but did not testify, 3 = testified), how often discussed abuse ($n = 101$; 1 = never, 2 = rarely, 3 = sometimes, 4 = frequently), and type of error (-1 = minimization, 0 = none, 1 = exaggeration).

* $p < .05$. ** $p < .01$.

TABLE 2: Regression Analysis Predicting Memory Accuracy

	B	SE	B	t
Attachment avoidance	-.03	.03	-.10	-.94
Attachment anxiety	.00	.03	.00	-.03
Abuse severity	.01	.03	.02	.19
Maternal support	.26	.12	.20	2.09*
Legal involvement	.07	.04	.18	1.90†
Avoidance × Severity	-.06	.03	-.21	-2.13*

NOTE: Maternal support (0 = did not receive support, 1 = received support), gender (0 = male, 1 = female), and legal involvement (1 = did not go to court, 2 = went to court but did not testify, 3 = testified). $F(6, 95) = 2.43^*$, $R^2 = .13$.

† $p = .06$. * $p < .05$.

avoidance, anxiety, and abuse severity. The inclusion of these interaction terms was nonsignificant (R^2 change $< .01$, $p = .91$), suggesting that both fearful and dismissing participants had poor memory for severe cases. Given the statistical power required to detect a three-way interaction, however, these results should be interpreted cautiously.

Finally, we examined whether the interaction between avoidance and abuse severity was mediated by how much participants reported having talked about the abuse with others ($M = 2.24$, $SD = .96$, on a 4-point scale). That is, avoidant participants who experienced especially severe abuse may have been less likely to discuss the abuse with others, which may at least partially account for the observed decrements in memory. Talking about the abuse was in fact significantly related to avoidance, the provision of maternal support, and memory accuracy (see Table 1): Avoidant individuals and those who did not receive maternal support were less likely to have discussed the abuse with others, and the less participants talked about the abuse, the less accurate was their memory for it.

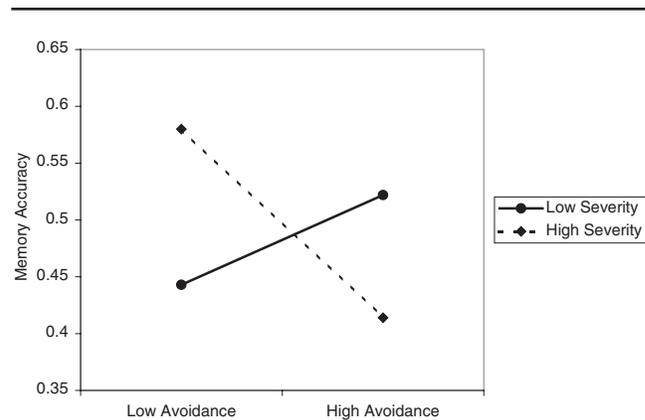


Figure 1 The relation between attachment avoidance and memory accuracy (proportion correct).

NOTE: Lines are plotted for cases 1 standard deviation above and below the mean of abuse severity.

The addition of talking about the abuse to the original regression analysis (which included avoidance, anxiety, abuse severity, maternal support, extent of legal involvement, and the interaction between avoidance and severity) resulted in a significant change in the amount of variance explained (R^2 change = .04, $\beta = .21$, $p < .05$). Nevertheless, the magnitude of the interaction between avoidance and abuse severity was essentially unchanged ($\beta = -.23$, $p < .05$). The relation between maternal support and memory accuracy became nonsignificant, however ($\beta = .16$, $p = .10$), suggesting that the extent to which participants discussed the abuse with others may have partially mediated the facilitative effect of maternal support on long-term memory. (Results of a Sobel test of mediation did not reach statistical significance, $z = 1.53$, $p = .13$.)

Errors: Minimization Versus Exaggeration

The average score on our index of minimization/exaggeration was .06 ($SD = .48$), indicating that, in general, when participants were inaccurate, they were no more likely to minimize or exaggerate details about the abuse. Type of error was significantly correlated only with participants' age at the end of the abuse (see Table 1): Participants who were older when the abuse ended were more likely to make exaggeration than minimization errors in their current reports. Age at the end of the abuse was therefore added to the original regression analysis, substituting type of error for accuracy as the dependent variable.

The overall equation for this analysis was significant, $F(7, 94) = 2.13$, $R^2 = .14$, $p < .05$. Both abuse severity ($\beta = -.23$, $p < .05$) and age ($\beta = .30$, $p < .01$) predicted the kinds of errors that participants made: Individuals who experienced more severe abuse were more likely to make errors of minimization, whereas those who were older when the abuse ended were more likely to make errors of exaggeration. Although not statistically significant, there was a general tendency for avoidant participants to make minimization errors ($\beta = -.15$, $p = .14$). No other effect reached significance (β s $< |.13|$, p s $> .20$), including the interaction between avoidance and abuse severity ($\beta = -.07$, $p = .48$). Thus, avoidant participants' memory deficits for severe abuse were not the result of attempts to minimize (or exaggerate) details of the abuse in their current reports. The inclusion of the additional interaction terms among avoidance, anxiety, and abuse severity did not significantly increase the amount of variance explained (R^2 change = .01, $p = .70$).

DISCUSSION

Attachment-Related Differences in CSA Memory

The goal of the present study was to investigate attachment-related differences in long-term memory for documented CSA experiences. Given previous research linking attachment avoidance with deficits in emotional memory (e.g., Fraley et al., 2000; Mikulincer & Orbach, 1995), and the proposal that avoidant defensive strategies should be most evident for highly emotional or threatening material (Bowlby, 1980), we expected the most pronounced deficits in memory for experiences of particularly severe abuse.

Consistent with these expectations, memory accuracy was predicted by an interaction between abuse severity and attachment avoidance: Avoidant individuals who had experienced severe abuse demonstrated especially poor recall of central abuse details. Nonavoidant individuals, in contrast, were more accurate about core details

of particularly severe cases. Although previous research suggests impairments in emotional memory among avoidant individuals, the present study is the first to demonstrate that avoidant individuals are least accurate about highly negative real-life experiences. Moreover, our findings suggest that these memory deficits do not result from avoidant participants' tendency to minimize characteristics of severe abuse in their current reports. Although a nonsignificant trend indicated that avoidant individuals were more likely to make minimization than exaggeration errors, this finding was not specific to severe cases and thus cannot account for the memory deficits observed. Rather, avoidant participants may have limited the encoding of particularly severe abuse experiences, or minimized the extent to which they thought about those experiences after they occurred, either of which could have impaired later memory.

Indeed, avoidant individuals in the present study were less likely to report having discussed their abuse experiences with others and, consistent with previous research (e.g., Bahrick, 2000; Quas et al., 1999), discussion with others facilitated long-term memory. The effect on memory of talking about the abuse was independent of the interaction between avoidance and abuse severity, however, suggesting that limited discussion per se did not underlie avoidant individuals' poor recall of severe abuse incidents. Although it is likely that our retrospective measure of postabuse discussion did not fully capture the complex nature of participants' experiences, this measure was nevertheless related in meaningful ways to other variables of interest, including the provision of maternal support following abuse disclosure. Moreover, our findings are generally consistent with those of Fraley et al. (2000) in suggesting that postencoding factors (e.g., thinking or talking about the experience after its occurrence) do not entirely explain avoidant individuals' memory deficits. Other research, in fact, points to restricted attention at encoding as a likely source of later memory impairment (e.g., Edelstein, 2005; Kirsh & Cassidy, 1997).

For nonavoidant individuals, in contrast, more severe abuse was better recalled, even after delays ranging from 11 to 19 years. This finding is consistent with previous research on emotional memory (e.g., Christianson, 1992; Goodman et al., 1991; Ochsner, 2000) and highlights the powerful influence of negative emotion on long-term retention. Taken as a whole, our findings demonstrate the importance of individual-difference factors as moderators of the link between emotion and memory: The extent to which emotion facilitates or hinders memory may well depend not only on characteristics of the event but also on characteristics of the individual.

Our findings do not support the theorized link between attachment-related anxiety and emotional

memory, however. In the present study, anxiety was unrelated to CSA memory, including in interaction with abuse severity. Although anxious individuals tend to be hypervigilant to emotional material (e.g., Mikulincer et al., 2002), and there is some evidence that attachment anxiety can facilitate retrieval of emotional memories (Mikulincer & Orbach, 1995), several studies suggest a negative relation between anxiety and long-term memory (e.g., Kirsh & Cassidy, 1997). Still others are consistent with the present findings in suggesting that anxiety is unrelated to memory (Edelstein, 2005; Fraley et al., 2000).

Of note, the inconsistent relation observed between attachment-related anxiety and emotional memory parallels that found for general (i.e., not specific to attachment) anxiety: Although high trait-anxious individuals generally exhibit attentional biases toward emotional stimuli (e.g., Fox, Russo, Bowles, & Dutton, 2001; Williams, Mathews, & MacLeod, 1996), they do not consistently demonstrate enhanced recall of emotional material (see MacLeod & Mathews, 2004, for a review). Based on these seemingly inconsistent findings, MacLeod and Mathews argue that high trait-anxious individuals may not allocate attention in a way that promotes elaborate or semantic encoding (e.g., they may focus on perceptual rather than conceptual features of the stimulus), and thus, selective attention per se may not enhance long-term memory for emotional stimuli for these individuals. General anxiety also has been associated with the experience of intrusive, disruptive thoughts that impair working memory processes (e.g., Derakshan & Eysenck, 1998; Klein & Boals, 2001), which could, in turn, hinder long-term memory. Although much less research has been focused specifically on attachment-related anxiety, it is possible that, for anxiously attached individuals, heightened attention similarly does not promote long-term memory for emotional material.

It should be acknowledged that, in the present study, individual differences in attachment were assessed at the follow-up interview, as opposed to concurrently with the abuse. Thus, we cannot determine how individuals' scores on avoidance and anxiety in adulthood would correspond to those obtained in childhood, when the abuse was initially experienced and encoded. Insofar as there is some continuity of individual differences over time (e.g., Bowlby, 1979; Fraley, 2002), it is reasonable to assume that an individual's current scores would be at least somewhat related to those obtained in childhood (Cassidy, 2000) and that childhood attachment may therefore have influenced the way the abusive events were processed and subsequently recalled. However, it is also possible that individuals' current scores reflect not their past attachment histories but rather more recent

relationship experiences and that the memory differences observed in the present study reflect the influence of attachment on the retrieval (as opposed to encoding or rehearsal) of CSA memories.

Additional Predictors of CSA Memory

Consistent with our previous findings regarding abuse disclosure in this sample (Goodman et al., 2003), participants in the present study who had received maternal support demonstrated better memory for details of the experience. Supportive mothers may have been more likely to legitimize their children's allegations or to discuss the abuse with them, both of which may have enhanced long-term memory for the experience. In fact, participants who had received maternal support at the time of the original study were more likely to report having discussed the abuse with others. When talking about the abuse was included in the regression predicting memory accuracy, the influence of maternal support became nonsignificant, suggesting that extent of postabuse discussion may have partially mediated the facilitative effect of maternal support on long-term memory.

In addition, participants with more extensive CSA-related legal involvement were more accurate in their memory for the abuse incidents. This finding also is consistent with our previous research on CSA disclosure in this sample (Goodman et al., 2003) and may reflect the frequency with which participants recounted the abuse to others.

Neither participants' gender nor age at the end of the abuse significantly predicted long-term memory accuracy, although children who were older when the abuse ended were more likely to make errors of exaggeration. With respect to age, it should be noted that participants who were younger when the abuse ended were less likely to have disclosed the documented experience (Goodman et al., 2003), which may have restricted the number of young participants in the present sample. In addition, the relatively small percentage of men in our sample, although representative of reported CSA cases (e.g., Sedlak & Broadhurst, 1996), may have precluded identification of gender differences in long-term memory.

It is also important to note that the accuracy of participants' current reports was determined from information obtained at the time of the original study. Although multiple sources were used to obtain this information and, ideally, to ensure its veracity, if the original allegations included errors, our results could be adversely affected.

Conclusions

Findings from the present study provide new insight into theories of attachment and emotional memory. For one, although extant research suggests that negative

emotion generally enhances memory, our results indicate that such facilitation may not occur for avoidant individuals. Moreover, the present study is the first to demonstrate that avoidant individuals' memory deficits extend beyond the laboratory to documented real-life events and that, even after delays ranging from 11 to 19 years, these deficits are most evident for what are likely to be highly emotional experiences. Finally, our findings dovetail with previous research in suggesting that postencoding processes, such as talking to others about the to-be-recalled event, may not fully account for avoidant individuals' memory deficits.

NOTES

1. Mikulincer and Orbach (1995) used a three-category measure of adult attachment in which anxious individuals also tend to be low in avoidance. Thus, it is possible that, in their study, the memory benefits observed among anxious individuals reflect lack of avoidance, as opposed to (or in combination with) high anxiety.

2. In fact, abuse severity (rated at the time of the original study) was positively correlated with a composite measure of participants' current ratings of the negative consequences of the abuse, $r(101) = .25, p = .01$.

3. Child sexual abuse (CSA) was defined based on state law, specifying a 4-year child-perpetrator age difference. One participant from the original study is not included in the present report because the perpetrator was not 4 years older. As such, the court dismissed the case.

4. Of the original 142 Phase I disclosers, 2 did not provide information about the abuse other than the perpetrator's name, 34 did not complete the second phase, and 4 partially completed the second phase but did not complete the attachment measure.

5. Additional information about the target CSA experience (e.g., perpetrator age, degree of coercion used) was obtained from a subset of participants ($n = 81$ from the present report) during the third phase of the study. Memory data from this interview are reported elsewhere in relation to post-traumatic stress disorder symptomatology (see K. Alexander, Quas, Goodman, et al., 2005). Results reported here are consistent with those obtained when the memory measure from the third phase is used.

6. Following Griffin and Bartholomew (1994), avoidance scores were computed by subtracting participants' ratings on the two low-avoidance prototypes (secure and preoccupied) from their scores on the two high-avoidance prototypes (fearful and dismissing); anxiety scores were computed by subtracting participants' ratings on the two low-anxiety prototypes (secure and dismissing) from their scores on the two high-anxiety prototypes (preoccupied and fearful).

7. Somewhat unexpectedly, abuse severity was negatively associated with avoidance. It is possible that avoidant participants were more likely to have minimized abuse details at the time of the original study, resulting in lower severity scores. However, information about the abuse was obtained not only from the child but also (as available) from other victims, witnesses, nonoffending caregivers, and the defendant. Furthermore, the correlation between abuse severity and avoidance was unchanged when only cases with corroborative evidence (e.g., confession, eyewitness, physical evidence) were included, $r(76) = -.23, p < .05$. It is also important to note that avoidance and anxiety scores in the present study are higher than those typically found in nonabused samples, suggesting a link in the expected direction between maltreatment and attachment insecurity (P. Alexander, 1992; Bowlby, 1984). In a similar vein, participants with more extensive CSA histories (indexed by the number of different-perpetrator incidents in addition to our documented case) had higher avoidance scores ($r = .23, p < .05$). Thus, our findings regarding abuse per se are consistent with previous research.

8. For the regression analyses, missing data ($n = 5$ for maternal support, $n = 1$ for how often participants discussed the abuse with others) were imputed via mean substitution. Results excluding participants with missing data were virtually identical to those presented here. Con-

sideration of "don't know" responses, which constituted 3% of all responses, did not alter the findings.

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