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Are Rape Memories Different? A Comparison of Rape, Other Unpleasant, and Pleasant Memories Among Employed Women[1]

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The study examined empirically-measured memory characteristics, compared pleasant and unpleasant intense memories as well as rape and other unpleasant memories, and determined whether rape memories exhibited significantly more "flashbulb" characteristics. Data consisted of responses to a mailed survey of women employees of a medical center (N = 1,037) and a university (N = 2,142). Pleasant and unpleasant memories were differentiated by feelings, consequences, and level of unexpectedness. The most powerful discriminator of rape from other unpleasant memories was the degree to which they were less clear and vivid, contained a less meaningful order, were less well-remembered, and were less thought and talked about. Few "flashbulb" characteristics discriminated among memory types. Implications for clinical work with rape survivors were discussed.

KEY WORDS: traumatic memories; rape; posttraumatic stress disorder; forensic psychology.

Memory is pivotal to both the diagnostic conceptualization of posttraumatic stress disorder (PTSD) and clinical treatments for trauma survivors. Cognitive research on emotional memory forms the scientific foundation for clinical work with these clients. However, little attention has been devoted to describing and measuring the content and characteristics of memory for traumatic experiences. Due to a skeptical climate regarding memory processing in therapy, clinicians must familiarize themselves with

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basic research on memory and support the development of a memory characteristics database that compares traumatic events and other intense real-life experiences. Traumatic memories is a descriptive term for recall of negative personal experiences, that is life events that are "new, unexpected, and potentially threatening" (Christianson, 1992a, p. 284). Traumatic memories by definition are always formed under high levels of emotional arousal.

A number of reviews of the affect-memory relationship including theoretical models, methodologies, and empirical findings are available (e.g., Burke, Heuer, & Reisberg, 1992; Christianson, 1992a; Koss, Tromp, & Tharan, 1995). These papers reveal that for many years a hotly debated controversy existed about the relationship between affect and memory. "Flashbulb" memory proponents asserted that memories formed under conditions of high arousal have a "live quality that is almost perceptual" (Brown & Kulik, 1977, p. 74). In contrast, the position endorsed by experts on eyewitness testimony was that emotional arousal impaired memory. Thus, a recent survey of 119 of these experts revealed widespread agreement that "very high levels of stress impair the accuracy of eyewitness testimony" (Kassin, Ellsworth, & Smith, 1989, p. 1091). In fact, studies of victims or witnesses to crimes and atrocities, survey participants recalling "flashbulb memories" for traumatic public and private events, and persons exposed to laboratory simulations of shocking experiences all suggest that neither the flashbulb nor the memory impairment position is accurate (Burke, Heuer, & Reisberg, 1992; Christianson, 1992a, 1992b; Christianson, Goodman, & Loftus, 1992; Egeth, 1994; LeDoux, 1994; Leichtman, Ceci, & Ornstein, 1992; Reisberg & Heuer, 1992; Revelle & Loftus, 1992; Winograd & Neisser, 1992). Earlier characterizations of vivid memories as prone to error now appear unwarranted (Christianson, 1992a, 1992b; Egeth, 1994; Reisberg & Heuer, 1992), but it is acknowledged that even the most emotionally intense memories lack complete indelibility (Wagenaar & Groeneweg, 1990; Winograd & Neisser, 1992). Consensus has now emerged that emotional memories, compared to memories for neutral events, are "detailed, accurate, and persistent" (Yuille & Cutshall, 1989, p. 181), and intense emotion yields better event recall (Bohannon & Symons, 1992; Christianson, 1989; Pillemer, 1984).

The current study addressed three understudied issues identified in the aforementioned reviews. First, the neural mechanisms underlying emotional memory suggest that any event that evokes intense arousal, whether it is positive or negative, could result in vivid and persistent memories (Cahill, Prins, Weber, & McGaugh, 1994). Robinson (1980) found that memories of personal experiences associated with very intense affect were more accessible than those associated with mildly intense feelings, and that the type of emotion involved was not important. Yet, the majority of the emo-

tional memory research has focused on unpleasant events (e.g., Bohannon & Symons, 1992; Brown & Kulik, 1977; Heuer & Reisberg, 1992; Holmes, 1970; Yuille & Cutshall, 1986, 1989). Christianson (1992a) concluded that future research should investigate recall of intense pleasant events to place conclusions concerning negative emotional events in a broader perspective.

Second, Yuille and Cutshall (1986) noted that too few memory studies involve actual events as opposed to simulated events, and even fewer involve the targeted victims, as opposed to eyewitnesses to the event. Between 1974 and 1982, 92% of the studies pertaining to "eyewitness testimony" were based on college students who participated in simulation studies (Yuille & Cutshall, 1986). However, staged events cannot duplicate the seriousness of, the affect of, the impact of, or the consequences of actual events. In laboratory research studies, participants are often forewarned that they are witnessing an event that is not real, and ethical constraints preclude causing harm. Therefore, the potential for surprise and real-life consequences for the witness is lost. Memory studies involving witnesses to real events are rare (Cutshall & Yuille, 1992; Yuille & Cutshall, 1986), and those that include the actual targets of the violence even rarer (Wagenaar & Groeneweg, 1990). Although psychologists are typically comfortable generalizing from college-student samples with regard to many memory issues, Heuer and Reisberg (1992) suggest that "it seems perilous in this domain . . ." (p. 176).

Third, the study of flashbulb memory moved the field forward by addressing a form of real, everyday memory. But, the research has been restricted to memories of shocking public events such as the assassination of John F. Kennedy, the *Challenger* shuttle disaster, and the shooting of Ronald Reagan (e.g., Christianson, 1989; McCloskey, Wible, & Cohen, 1988; Pillemer, 1984; Winograd & Neisser, 1992). Yet, a restriction of flashbulb memory to public events was not imposed by Brown and Kulik's (1977) original conceptualization. They argued for the existence of flashbulb memories from an evolutionary perspective, postulating an inherent special mechanism that is triggered by high emotional arousal, surprise, and perceived consequentiality. This neuropsychological "Now Print!" mechanism (see Livingston, 1967) was thought to preserve a photographic image of the circumstances surrounding the critical event (Brown & Kulik, 1977). When knowledge was transmitted orally from generation to generation, accurate, clear memories for dangerous situations would have conferred a survival advantage to the offspring of the rememberer. Rubin and Kozin (1984) have questioned whether the public event flashbulb memories constitute all vivid memories, or only a subset of vivid memories. In their research they used the clarity and detail requirements of flashbulb memories as criteria for vivid memory, but the memories were not required to be

caused by surprising or emotional events (Rubin & Kozin, 1984). A group of 58 undergraduates described three of their clearest memories that met these criteria. The type of public events that have been studied in the flashbulb literature were rarely (3%) among them. The most commonly vivid memories concerned injuries or accidents, sports, and encounters with the opposite sex. Among elderly respondents, the events most often remembered were births, marriages, deaths, holidays, illness/injury, education, family, war, love affairs, and recreation/sports (Cohen & Faulkner, 1989).

The present study addressed these understudied areas. Its purposes included: (1) to focus on rape memories, other intense unpleasant memories, and pleasant memories for events directly experienced by participants, (2) to compare memories of these three types on four factor scales derived from a standard measure of memory characteristics, and (3) to determine whether flashbulb memory characteristics differentiated among the memories. Rape was selected for examination because it is a relatively common event in women's lives [14–25% lifetime prevalence rates; for a review see Koss, (1993)], and virtually all victims feel victimized to some degree by the experience (Koss, Dinero, Seibel, & Cox, 1988; Koss, Figueredo, Bell, Tharan, & Tromp, 1995). The research was conducted in two samples of employed women. Although some of the memory characteristics we studied are part of PTSD, they may also occur outside it and at subsyndromal levels. Therefore, a community sample was chosen to allow examination of the spectrum of memory effects. Three sets of hypotheses were investigated.

The *first* set concerned pleasant versus unpleasant memories. These types of memories were expected to be discriminated best by ratings of affect, given that the groups were formed on the basis of emotional valence of the memories. Because neural mechanisms are believed to encode similarly both pleasant and unpleasant experiences of equal intensity, and because participants were all instructed to recall an intense memory, both pleasant and unpleasant memories were expected to be well-remembered, clear, and vivid. The *second* set of hypotheses concerned rape memories versus other unpleasant memories. Even after affect was accounted for, these memories were expected to differ in the intensity of sensations present in the memory, and in the frequency with which they were reexperienced both through involuntary intrusions and through intentional thinking about the experience. These hypotheses are based on well-established epidemiologic data on the prevalence of PTSD among rape victims. For example, a recent national survey revealed that among victims of completed rape, 32% qualified for the PTSD diagnosis at some time in their lifetime, and 12% qualified at the time they were surveyed (Resnick, Kilpatrick, Dansky, Saunders, & Best, 1993). Unbidden intrusion of memory fragments into consciousness is one of the hallmarks of PTSD. These fragments may

include visual images, emotions, body sensations, sounds, tastes, and smells. However, given a social context that is generally nonsupportive of rape victims, low levels of talking about the event were predicted in comparison to the frequency with which other memories are shared. The *third* set of hypotheses considered the ability of flashbulb memory characteristics to discriminate between the memory types. Flashbulb memory theory suggests that the most vivid and visually detailed memories result from experiences with high levels of emotional arousal, surprise, and consequentiality. Because the positive events of people's lives rarely involve the element of surprise thought to trigger the Now Print! mechanism, it was expected that unpleasant events in general and rape in particular might be differentiated from pleasant memories by the defining characteristics of flashbulb memories such as visual detail. Even though rape memories were expected to be talked about less, the flashbulb conceptualization suggests that they would still be experienced intensely because memory strength was built in at encoding (Brewer, 1992).

Method

Data were collected by a mailed survey following the total design method (Dillman, 1978). The total design method involved a presurvey publicity campaign, a preliminary first-class letter to the members of the sample set 2 weeks prior to the survey being mailed, the main survey mailing, and a follow-up mailing two weeks later. Spanish speakers were instructed (in Spanish) where to telephone to receive a copy printed in Spanish.

Participants

Sample 1 consisted of 2,173 surveys mailed to women medical center employees, from which 1,037 responses were received (48% response rate). The demographic characteristics of the 1,037 respondents were as follows: mean age, 36.6 years; range 18-67 years; 84% non-Hispanic White, 13% Hispanic, 1% each African American, American Indian, and Asian/Pacific Islander; 65% married or cohabitating, 19% single, 16% separated, divorced, or widowed; 2% high school education or less, 36% business, technical, or some college training, 62% college graduates; 13% with family incomes less than $15,000, 36% between $15,501-$35,000, and 51% over $35,000. The medical center workforce was an average of 38.3 years old and 76% non-Hispanic White, 18% Hispanic, 3% African American, 2%

Asian, and 1% Native American. Compared to the population, this sample was on average, 1.7 years younger ($d = -.19$, $t = 6.07$, $df = 992$, $p < .05$), and contained 8% more Whites, 5% fewer Hispanics, and 3% fewer members of other ethnic groups ($\chi^2 = 33.43$, $df = 4$, $p < .05$).

Sample 2 consisted of 5,411 surveys mailed to women university employees, from which 2,142 responses were received (40% response rate). Demographic characteristics of the respondents were as follows: mean age 40.5 years, range 17–75 years; 88% White, 8% Hispanic, 1% African American, 2% Asian, 1% Native American; 63% married or cohabitating, 17% single, 20% separated, divorced, or widowed; 6% high school education or less, 27% business, technical or some college, and 67% college graduates; 12% with family incomes less than $15,000, 37% between $15,501 and $35,000, and 51% over $35,000. The female university workforce is an average of 39.9 years old and is comprised of 79% non-Hispanic Whites, 12% Hispanics, and 9% other ethnic groups. Compared to the workforce, this sample was 0.6 years older ($d = .06$, $t = 2.64$, $df = 2{,}014$, $p < .05$), and contained 9% more non-Hispanic Whites, 4% fewer Hispanics, 3% fewer Asians, and 1% fewer each of African Americans and Native Americans ($\chi^2 = 90.008$, $df = 4$, $p < .05$).

Sample 1 was surveyed in fall, 1991, sample 2 in fall, 1992; both samples included all ranks, ranging from craft to executive level. The different time periods were necessitated by practical considerations in handling the volume of data and because the survey was used as a recruitment device for another study.

Survey Contents

Before detailing each component of the survey, we begin with a brief overview of the sequence of items as presented in the survey booklets. Respondents first answered health questions (not included in the present analyses). Then they turned a page and found questions about attempted and completed rape. If they had experienced one of these victimizations, they were asked to recall the memory of their most recent or most significant experience. Then they described the rape memory in response to standard memory characteristics. If respondents lacked a sexual victimization, they were asked to pick another significant memory, to rate its emotional valence as pleasant or unpleasant, and to respond to the same memory items given the victimized participants. A measure of social desirability and demographic questions completed the survey.

Rape. Five items based on the Sexual Experiences Survey (Koss & Gidycz, 1985; Koss & Oros, 1982), as previously modified for use with

women workers (Koss, Woodruff, & Koss, 1991), were used to screen for rape and attempted rape. The recall period for the five items is bounded by the participant's 14th birthday. This cutoff represents the statutory age for rape (the age below which sexual penetration is automatically rape). Only two states set a statutory age that is below 14 years (Searles & Berger, 1987). The questions operationalize rape, which is legally defined as vaginal, oral, or anal penetration against consent, by force, threat of force, or when the victim is intoxicated and incapable of giving consent. Penetration, no matter how slight, is sufficient to complete rape. Attempted rapes were included and defined as overt attempts to achieve intercourse, where for various reasons penetration did not occur. An example of a typical item is the following, "Has a man made you have sex by using force or threatening to harm you? When we use the word 'sex' we mean a man putting his penis in your vagina even if he didn't ejaculate (come)." The word rape is not used in these questions, allowing a woman to endorse a "rape" item without considering herself a "rape victim." In this study the rape and attempted rape items had the following internal consistency reliabilities: Sample 1, .74; Sample 2, .72. Significant correlations between a woman's level of victimization based on self report and her level of victimization as related to an interviewer have been reported (e.g., Koss et al., 1991, Kappa = .51, $p < .001$). In Sample 1, 8% of the respondents reported the most severe victimization they had encountered was an attempted rape, and 30% reported at least one completed rape. In Sample 2, the figures for attempted rape and rape were 8% and 29% respectively. Consistent with existing cross-sectional studies, most of the rapes reported on the surveys occurred 2 or more years prior to the study (92% of forcible vaginal rapes, 93% of forcible oral and anal rapes, and 93% of nonforcible rapes when intoxicated).

Valence. Respondents with a rape memory were assumed to be rating an unpleasant memory. No empirical evidence suggests that rape is potentially pleasant. However, the inclusion of questions about memory affect (see below) allowed us to test the null hypothesis that there is no difference in emotional intensity and valence between rape memories and other unpleasant memories. Respondents without a rape experience were asked to think of another intense life event and to indicate whether it was pleasant or unpleasant. Data from studies of pleasant and unpleasant memories in college students suggested that pleasant and unpleasant memories are equally likely to be recalled (Robinson, 1980), but adults typically responded to open ended questions about past experiences with more unpleasant than pleasant experiences (Kreitler & Kreitler, 1968). In Sample 1, 35% rated a pleasant memory and 65% rated an unpleasant memory; the figures for Sample 2 were 30% and 70%, respectively.

Memory. Most of the 23 memory items were taken from the first factor of the Memory Characteristics Questionnaire (17 items), developed by Suengas and Johnson (1988), and were supplemented by items relating to flashbulb memory qualities including surprise, consequentiality, and intense affect (J. F. Kihlstrom, personal communication, July 15, 1991). The Memory Characteristics Questionnaire assesses characteristics of memory useful for distinguishing real from imagined experiences. Included are items pertaining to clarity, visual detail, vividness, event detail, comprehensibility of the order of events, and frequency with which the memory is recalled. All of the memory items were rated on a 1 to 7 scale. Suengas and Johnson's (1988) items did not prove to be unifactorial in our analyses (for a fuller description of the factor analytic procedures see Koss et al., 1995). This is not surprising given the differences between the present samples of working women and the derivation sample of college students. Instead, we were able to discriminate four distinct but correlated factors in Sample 1 and assign the six flashbulb items among them. These factors were confirmed in Sample 2 and all items loaded significantly on the same factors identified in Sample 1. A summary of the item content and the factor loadings are found in Table 1. Confirmatory factor analysis such as we used is essentially a structural equations model. Therefore, the factor loadings are expressed as standardized regression coefficients or beta weights (Bentler, 1989). The factors were not orthogonal; it can be seen from Table 1 that the frequency of recalling the memory loads on two factors. Artificially creating orthogonal factors is undesirable in this case because it constrains complexity inherent in the constructs. The first factor, called Clarity (Alpha = .78), contained nine items pertaining to how well the experience was remembered, how much it was thought and talked about, the vividness and visual detail involved, the order of events, and the intensity of affect felt at the time. A typical item on this factor is, "My memory for the event is (1) Little or none—(7) Sharp, clear." The second factor, Affect (Alpha = .84), consisted of four items regarding feelings experienced during the event, feelings about the event now, how unexpected the event was, and the intensity of the consequences experienced as a result. A typical Affect item is, "My feelings at the time were (1) Positive—(7) Negative." The third factor, Reexperiencing (Alpha = .80), consisted of five items that addressed the number of times the event has been thought about, the reexperiencing of thoughts, emotions and physical sensations related to the event, and the intensity of affect felt now. A typical item on this factor is, "As I am remembering now, to what extent am I reexperiencing in my mind or body the emotions or feelings that I had during the event (1) No reexperiencing—(7) Complete reexperiencing". The four items comprising the final factor, Nonvisual Sensory (Alpha = .68), were related to how much the

Table 1. Common Factor Loadings for the Memory Factors[a]

Item Content	Memory Factors			
	Affect	Re-experiencing	Nonvisual Sensory	Clarity
Feelings at time	.88			
Feelings now	.86			
Unexpectedness	.53			
Consequences, valence	.62			
Affect intensity now		.66		
Re-experiencing physical		.71		
Re-experiencing feelings		.83		
Re-experiencing thoughts		.73		
Thought about since		.17		.49
Sound memory			.69	
Smell memory			.62	
Touch memory			.56	
Taste memory			.52	
Memory clarity				.88
Visual Detail				.74
Color/BW Memory				.52
Vividness memory				.90
Order of events				−.38
Overall memory				.91
Affect intensity then				.38
Talked about since				.55
Point of view				
Consequences, amount				

[a]*Note* Internal consistency reliability was not calculated for this confirmatory analysis because the regression weights for each item represent a significance test which reveals whether an item is related to the overall factor.

memory involved smell, taste, touch, and sound. For example, "My memory involves sound (1) Little or None—(7) A lot".

In addition, 14 of the 23 memory items were subcategorized to test the hypotheses related to flashbulb-type memories. Items were considered descriptive of flashbulb memories if they pertained to Brown and Kulik's (1977) original specifications including high levels of surprise, consequentiality, and intensity of feelings at the time of the event, clarity and detail of the stored material, and the frequency of subsequent rehearsal of the memory. Because flashbulb memory is perhaps better construed as an "emergent" construct, rather than a "latent" variable, no common factor was constructed for these items, but internal consistency was calculated. The 14 flashbulb-type memory items yielded a standardized item alpha of .81 for Sample 1, and .79 for Sample 2.

Data Analyses

All analyses were conducted using Multivariate Analysis of Variance (MANOVA). Three pseudovariates were constructed to serve as planned orthogonal comparisons. The first compared all pleasant to all unpleasant memories, whether or not the unpleasant memories were rape memories. The second contrasted rape memories with all other unpleasant memories. The third distinguished the datasets from the two samples. The interactions of memory types with datasets were also examined to determine if the two samples differed systematically in the pattern of results.

Two MANOVA models were constructed. The first model tested the effects of memory types on the general memory factors, the second tested the effects on the flashbulb characteristics. The Roy-Bargman Stepdown Procedure was used to partition the common variance between the correlated memory factors. Stepdown MANOVA is a special case of Sequential Canonical Analysis that does for the criterion variables what hierarchical regression does for the predictors. It statistically controls for any indirect effects of the predictor variables through the previous criterion variables. Because each subsequent comparison focuses on the variance remaining after the previous effect has been accounted for, the order of entry of variables is important. We entered the memory factors in the following theoretically specified order: (1) Affect, (2) Reexperiencing, (3) Nonvisual Sensory, and (4) Clarity. Affect was entered first because it was hypothesized to have the most power to discriminate among the types of memories, given that they were formed on the basis of the pleasantness and unpleasantness. The Reexperiencing factor was entered second because intrusive memory is an essential feature of the post rape symptom picture, especially among the victims with current PTSD. Among victims of completed rape, 32% qualified for the PTSD diagnosis at some time in their lifetime, 12% qualified at the time they were surveyed (Resnick et al., 1993). The Nonvisual sensory factor was entered third because it was hypothesized to offer some additional discrimination of the type of memories likely to recur intrusively. The Clarity factor was entered last because it was assumed to offer little discrimination between the types of memories as all respondents were instructed to select an intense and vivid memory, regardless of its emotional valence.

Because large sample sizes have the power to detect small differences that may not be theoretically or practically meaningful, the effect sizes were calculated hierarchically for each pseudovariate on each successive factor. These were calculated by dividing the sequential sum of squares associated with each multivariate hypothesis (Factor $MS \times$ Factor DF) by that number plus the residual, or "error," sum of squares (Error $MS \times$ Error DF). This

procedure results in an effect size that expresses the percentage of variance accounted for. The percentages of missing data for the memory factor MANOVA and the flashbulb memory characteristics MANOVA were 6% and 12%, respectively. Due to the low rate of missing data, no replacement strategy was used.

Results

Analysis Utilizing the Memory Factors

Pleasant/Unpleasant Memory comparison. This comparison examined whether the memory factors would discriminate between respondents rating pleasant memories and unpleasant memories. The overall discrimination value of the comparison was significant ($F(4, 2980) = .67, p < .001$). Roy-Bargman's Stepdown Procedure indicated that all four of the factors were significant: Affect ($p < .001$), Reexperiencing ($p < .001$), Nonvisual Sensory ($p < .016$), and Clarity ($p < .001$). Means and standard deviations for the memory factors are located in Table 2. Effect sizes for the factors, in terms of percentage of variance accounted for, were as follows: Affect = .64, Reexperiencing = .07, Clarity = .01, and Nonvisual Sensory = .00. Thus, the MANOVA procedure yielded four significant discriminators, but effect sizes suggest that the Affect factor accounted for the majority of the vari-

Table 2. Means and Standard Deviations for Memory Factors by Comparison

	Pleasant Memories		Unpleasant Memories			
			Not Raped		Raped	
Factor	*M*	*SD*	*M*	*SD*	*M*	*SD*
Clarity						
Sample 1	51.3	5.8	48.7	8.6	42.3	9.7
Sample 2	50.1	5.9	48.3	8.0	41.2	9.0
Affect						
Sample 1	7.3	4.2	21.2	4.8	23.4	3.5
Sample 2	7.4	3.5	21.2	4.8	23.0	4.0
Reexperiencing						
Sample 1	24.0	5.4	22.7	6.8	20.7	7.0
Sample 2	23.3	5.7	22.3	6.6	20.4	6.8
N.V. Sensory						
Sample 1	15.4	5.3	12.4	5.2	13.5	6.0
Sample 2	14.7	5.1	12.0	5.3	12.8	5.7

ance differentiating pleasant and unpleasant memories. Pleasant memories involved more positive feelings, more positive consequences, and were less surprising. Unpleasant memories tended to involve more negative feelings and consequences, and were more unexpected.

Rape/Other Unpleasant Memory comparison. The second comparison investigated whether the memory factors could further differentiate rape memories from other unpleasant memories. The overall discrimination value of this comparison was significant ($F(4, 2980) = .22, p < .001$). Again, all four factors were significant: Affect ($p < .001$), Reexperiencing ($p < .001$), Nonvisual Sensory ($p < .001$), and Clarity ($p < .001$); with effect sizes as follows: Clarity = .14, Affect = .04, Reexperiencing = .04, and Nonvisual Sensory = .02. These effect sizes revealed that the significant discrimination between rape and other unpleasant memories was primarily accomplished by the Clarity factor, but unexpectedly, the effect occurred in the negative direction. Since the pleasant/unpleasant comparison was entered into the analysis first, the significance of the rape/other unpleasant comparison indicated that it explains additional unique variance. In other words, rape memories are not differentiated from other unpleasant memories simply by their level of unpleasantness. Rape memories are also differentiated by the greater extent to which they are *less* well-remembered, are less clear and vivid, involve less visual detail, have been talked and thought about less, and are less likely to occur in a meaningful order.

Sample 1/Sample 2 comparison. The variable DATASET, which discriminated between the two samples, was significant, ($F(4, 2.64150) = .004$, $p < .032$). However, only two factors differentiated the samples, and their effect sizes both rounded to zero, showing that they were describing less than 1% of the variance: Reexperiencing ($p < .05$, effect size = .00), and Nonvisual Sensory ($p < .02$, effect size = .00). It is likely that significance was achieved due to the large sample used. The interactions Pleasant/Unpleasant × DATASET and Rape/Other Unpleasant × DATASET were not significant, suggesting that the pattern of effects was similar in both samples. The MANOVA analysis for the memory factors is located in Table 3. The Roy-Bargman Stepdown procedure, which shows the contribution of the memory factors to each of the variables, is located in Table 4.

Analysis Utilizing Flashbulb Memory Items

Pleasant/Unpleasant comparison. This comparison tested how well individual flashbulb memory items discriminated between pleasant and unpleasant memories. Means and standard deviations of the 14 flashbulb items are located in Table 5. The overall discrimination value was signifi-

Table 3. MANOVA for Memory Factors

Effect	Value[a]	Exact F[a]	Hypoth. F[a]	Error DF	Sig. of *F*
Pleasant/Unpleasant	.667	1491.9	4	2980	.000
Rape/Other Unpleasant	.221	0211.6	4	2980	.000
DATASET	.004	0002.6	4	2980	.032
Pleasant/Unpleasant X D AT AS ET	.001	0000.4	4	2980	.820
Rape/Other Unpleasant X DATASET	.001	0000.9	4	2980	.447

[a]These are Stepdown F's. See Methods section for explanation of the *F* values.

Table 4. Stepdown *F*-Tests for Memory Factors by Comparison

Comparison	Factor	Hypoth. *MS*	Error *MS*	Stepdn. *F* value	Hypoth. DF	Error DF	Sig. of *F*
Pleasant/Unpleasant	Affect	1266.6	.241	5265.3	1	2983	.000
	Reexperiencing	0109.5	.513	0213.6	1	2982	.000
	N.V. Sensory	0002.4	.418	0005.8	1	2981	.016
	Clarity	0006.3	.186	0033.8	1	2980	.000
Rape/Other Unpleasant	Affect	0030.4	.241	0126.6	1	2983	.000
	Reexperiencing	0057.0	.513	0111.1	1	2982	.000
	N.V. Sensory	0026.5	.418	0063.4	1	2981	.000
	Clarity	0090.2	.186	0485.2	1	2980	.000
DATASET	Affect	0000.0	.241	0000.0	1	2983	.850
	Reexperiencing	0002.0	.513	0003.9	1	2982	.048
	N.V. Sensory	0002.3	.418	0005.5	1	2981	.019
	Clarity	0000.2	.186	0001.1	1	2980	.213
Pleasant/Unpleasant X DATASET	Affect	0000.1	.241	0000.3	1	2983	.566
	Reexperiencing	0000.4	.513	0000.7	1	2982	.408
	N.V. Sensory	0000.0	.418	0000.1	1	2981	.792
	Clarity	0000.1	.186	0000.5	1	2980	.501
Rape/Other Unpleasant X DATASET	Affect	0000.3	.241	0001.4	1	2983	.245
	Reexperiencing	0000.1	.513	0000.2	1	2982	.630
	N.V. Sensory	0000.4	.418	0001.0	1	2981	.313
	Clarity	0000.2	.186	0001.1	1	2980	.293

Table 5. Means and Standard Deviations for the 14 Flashbulb Memory Items

	Pleasant Memories		Unpleasant Memories			
			Not Raped		Raped	
Flashbulb Memory Item	*M*	*SD*	*M*	*SD*	*M*	*SD*
Memory for event 1-little/none, 7-sharp/clear	6.31	0.95	6.03	1.25	5.23	1.64
Visual detail 1-little/none, 7-a lot	6.09	1.16	5.75	1.53	4.94	1.86
Overall vividness 1-vague/hazy, 7-very vivid	6.18	1.06	5.80	1.40	4.97	1.73
Experience remembered 1-hardly at all, 7-extremely well	6.39	0.92	6.05	1.25	5.25	1.62
Point of view memory 1-actor taking part, 7-watching it	3.09	2.36	3.94	2.35	4.82	2.09
Feeling at the time 1-not intense, 7-intense	6.46	1.05	6.43	1.08	5.73	1.66
Reexperiencing-physical 1-none, 7-complete	3.39	1.78	3.31	1.82	2.99	1.82
Reexperiencing-emotions 1-none, 7-complete	4.70	1.56	4.33	1.78	4.08	1.86
Reexperiencing-thoughts 1-none, 7-complete	4.36	1.68	4.40	1.76	4.10	1.90
# of times thought about it 1-not at all, 7-many times	5.88	1.31	5.72	1.60	4.78	1.85
# of times talked about it 1-not at all, 7-many times	5.31	1.66	4.47	2.04	2.55	1.78
Unexpectedness 1-expected, 7-unexpected	2.27	2.03	5.30	2.13	5.68	1.68
Amount of consequences 1-few, 7-many	5.30	2.21	4.82	2.13	3.96	2.16
Valence of consequences 1-positive, 7-negative	1.94	1.32	4.69	1.81	5.38	1.64

cant, ($F(14, 2805) = .50$, $p < .001$). The following formula was used to determine percentage of variance accounted for by each of the 14 flashbulb items: Discriminant function coefficient × Canonical correlation. The effect sizes of items revealed that only two of them accounted for 10% or more of the variance including: "The consequences were positive/negative" = .50, and "How unexpected was the event at the time, expected/unexpected" =

.33. As predicted, pleasant memories tended to be more expected and had more positive consequences, whereas unpleasant memories were more surprising and involved more negative consequences.

Rape/Other Unpleasant Comparison. The next comparison tested how well individual flashbulb memory items differentiated between rape and other unpleasant memories. The overall discrimination value was significant, ($F(14, 2805) = .23, p < .001$). Effect sizes demonstrated that 4 items accounted for at least 10% of the variance including: "Since it happened, I have talked about this event not at all/many times" = .52; "The consequences were positive/negative" = .11; "My feelings at the time were not intense/intense" = .11; and "My memory for the event is little or none/sharp, clear" = .10. Other unpleasant memories tended to be rated higher in the direction of being "flashbulb" like on these characteristics. In contrast, rape memories were described as less "flashbulb" like in that they were rated as less clear and less talked about. The MANOVA for the flashbulb items is summarized in Table 6.

Discussion

Only 2 of the 14 flashbulb items contributed significantly to discriminating pleasant memories from unpleasant memories. Pleasant memories, even though triggered by events that were less surprising and lacking in negative consequences, were equally likely to be ascribed flashbulb characteristics. With the remaining variance, only four flashbulb items further distinguished between rape and other unpleasant memories. The items that accomplished the differentiation were members of the same general memory factors (Clarity and Affect) that contributed most to discriminating pleasant from unpleasant and rape from nonrape unpleasant memories. We concluded that in our data, the general memory factors provided a more parsimonious account than specialized flashbulb qualities for the discrimination between pleasant, other unpleasant, and rape memories. These findings were consistent with current thinking in the field that flashbulb memories are not unique, but rather are a subtype of vivid memories that

Table 6. MANOVA for the 14 Flashbulb Memory Items

Comparison	Value	Exact *F*	Hypoth. DF	Error DF	Sig. of *F*
Pleasant/Unpleasant	.50	200.62	14	2805	.000
Rape/Other Unpleasant	.23	060.60	14	2805	.000

can be accounted for by standard mechanisms of memory encoding and retrieval (see Winograd & Neisser, 1992).

All the memories rated by participants were predicted to be vivid consistent with neurohormonal theories of the impact of emotional arousal on memory. This prediction was confirmed. Although pleasant and unpleasant memories differed in the valence of the feelings, the consequences they generated, and by the degree of surprise posed by the event that caused the memory, clarity or sensory detail contributed minimally to differentiating these memories. But, our findings comparing rape to nonrape unpleasant memories were unexpected. PTSD is found frequently among rape survivors even when the trauma was years earlier (Norris, 1992; Resnick et al., 1993), fueling expectations that their memories would be rated relatively high in intrusive quality. This effect was expected not only because of the percentage of the present victims who would be projected by the base rates to meet criteria for current PTSD (approximately 15%), but also on the assumption that subsyndromal levels of intrusion would be found among those who miss qualifying for PTSD. However, rape memories compared to nonrape unpleasant memories were *less* clear and vivid, *less* likely to occur in a meaningful order, *less* well-remembered, *less* thought about, and *less* talked about. This finding could mean that the rape memories provided by our participants were not intense, but this supposition was contradicted by concurrently obtained higher ratings of negative affect compared to other memories. Although rape victims as a group were less likely to talk about their experience than others, a phenomena we discuss further below, the lesser detail, clarity, and meaningfulness have potentially important implications for their social communications. Specifically, memory for detail makes personal communication appear more "truthful, accurate, or believable" and "more persuasive" (Pillemer, 1992, p. 244). In addition, sharing detailed memories of personal circumstances evokes empathy more readily by signaling intimacy and immediacy (Pillemer, 1992, p. 245).

If these results can be confirmed in other work, they suggest that many women attempt to cognitively cope with unpleasant experiences through mental control (Wegner & Pennebaker, 1993) or cognitive avoidance (Foa & Kozak, 1986). Creamer and colleagues suggested that avoidance is a cognitive coping strategy that impairs processing and results in higher symptom levels in the short term (Creamer, Burgess, & Pattison, 1990, 1992). But, over time, avoidance may become established as a coping response that is no longer driven by intrusion, and does not necessarily predict higher psychological symptomatology. Their conclusion is based on structural models that demonstrated no direct association between subjective or objective exposure to trauma and avoidance, instead the relationship was mediated by intrusion. As recovery proceeded across the 14 months

of the study, avoidance became less and less detrimental a coping strategy. In the present study participants were predominantly more than two years beyond the rape. Thus, it is possible that we were seeing the tail end of a process that began with intrusion. We expect to be able to examine the relationship of intrusion and avoidance across time in our ongoing studies and to link these cognitive responses to psychological, social, and physical health outcomes.

In addition to not thinking about their rape, many of the women in this study did not talk about it either. This result was predicted and supported previous findings that sexual assault is more difficult than other severe traumas to discuss given a social context that holds women culpable, at least to some extent, for their own rapes (Koss, 1985; Koss et al., 1991). Most studies have failed to support frequent thinking or talking about a memory, that is to say rehearsal, as necessary for the longevity of emotional memories (Bohannon, 1988; Brewer, 1992; Larsen, 1992). Instead, the evidence suggests that emotional events are remembered longer than neutral experiences because of durability built in at encoding. Not talking about rape memories may stem from inability to express the experience in words, a prerequisite for processing it intrapsychically and socially. People typically encode factual information about events that happen to them (which they may later be able to verbalize), while also encoding affective and sensory stimuli as auditory, visual and tactile memories. Freyd (1983, 1993, 1994; also see Nelson, 1993) proposes in her "shareability theory" that the process of sharing private information with others facilitates recoding of fragments from discrete memory modules into a categorical form of memory with multiple connections among the contributing pieces. This "shareable trace" enables future communications, both within the individual's mind as well as between minds. In the absence of a shareable memory trace, some traumatic memory fragments continue to exist outside of awareness where they may influence ongoing emotions, thought, and physiological responses. Because the extent to which memories change over time is predicted by the amount they are talked about (Larsen, 1992), not talking about a memory, rather than accomplishing the goal of making the experience go away, may actually contribute to mummifying it. Wright and Gaskell (1992) and others have suggested that attempts to account for traumatic memory processing must take into account the "interplay between social and cognitive mechanisms" (p. 277).

The picture that emerged of rape memories compared to other unpleasant and pleasant memories is provocative, but there are a number of other pieces of information that will be needed to interpret it unambiguously. Unfortunately, we could not obtain more detailed information in the brief survey used, but our ongoing research involves face-to-face data as-

sessment and a longitudinal design that includes collection of many additional variables that will allow us to revisit these effects in more depth and evaluate some competing explanations for them. All we can do for now is enumerate some of the possible influences that may partially account for the reported results. First, the lower intensity of the rape memories could related to the fact that some victims were intoxicated at the time of their rape, which could have reduced the quality of memories stored. Police files reveal the high frequency with which victims and witnesses to *all* crimes, not just rape, are under the influence of alcohol (Yuille & Tollestrup, 1990). However, most of the studies that have examined the effects of alcohol on memory have concentrated on short-term retention of verbal materials and concluded that it has detrimental effects if administered before initial encoding. The conclusion is somewhat different in research designed for forensic relevance. Yuille and Tollestrup (1990) exposed two groups of participants to a staged robbery. Witnesses under the influence of alcohol provided 21% less scorable detail than controls, but there was no difference in the accuracy of what was remembered (over 90% correct recall in all groups). Other potential influences on our results include possible differences between the age at which the rape occurred versus the other unpleasant incidents, or differences in the time that had elapsed since the experience. In our design, rape victims were constrained to remember that experience. It is possible that given a choice, some of the respondents might have chosen to rate memories for some other life event. Unfortunately, we cannot characterize any further the content of the nonrape memories, nor can we substantiate that the types of memories were equivalent in developmental stage or recency. Finally, this research was based on samples in which White respondents were predominant. Therefore, these findings should not be generalized to other ethnic groups.

In summary, the present study has taken a methodology used for differentiating real from imagined memories in laboratory studies involving college students and applied it to samples of employed women recalling true life intense memories. The ability to differentiate memories on the basis of their characteristics could have important clinical applications. By assessing memory characteristics, practitioners and researchers would be able (1) to obtain baseline data prior to the implementation of any intervention or research manipulation, (2) to monitor changes as intervention progresses, and (3) to evaluate whether or not the predicted or expected changes in memory occurred as a result of the intervention. The knowledge gained would encourage clinical interventions directed at traumatic memory to continue to develop in a principled way, with a foundation in cognitive science.

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