

The sensitivity and specificity of flashbacks and nightmares to trauma

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Abstract

Traumatic events are commonly re-experienced by trauma survivors through nightmares and flashbacks. The current study examined the relative sensitivity and specificity of these two forms of re-experiencing trauma in female survivors of rape. The frequency of nightmares and flashbacks were assessed using the Nightmare Frequency Questionnaire (NFQ) and the Flashback Frequency Questionnaire (FFQ), respectively. The FFQ was developed for this study and is designed to assess the frequency and occurrence of flashbacks in trauma survivors. The NFQ, FFQ and a variety of other measures were completed by 34 female survivors of rape and 28 female control participants. Results provided support for the construct and criterion validity of the FFQ, and demonstrated that flashbacks are more sensitive and specific indicators of the presence of trauma than are nightmares.

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Persistent re-experiencing of a traumatic event is a symptom often reported by those who have experienced trauma, and two ways that trauma can be re-experienced are through nightmares and flashbacks. Of these two, nightmares are more common and have been more thoroughly investigated. Nightmares have been reported in as many as 75 percent of individuals with PTSD (Kilpatrick et al., 1994), and occur at a significantly greater rate in individuals exposed to combat, natural disaster, and rape, than in the general population. Goldstein, van Kammen, Shelly, Miller, and van Kammen (1987) found that recurrent nightmares

were still occurring 40 years after the traumatic event, in a sample of World War II prisoners of war. Data from The National Vietnam Veterans Study suggests that 52 percent of combat veterans with PTSD report frequent nightmares, compared to 5 percent of veterans without PTSD, and only 3 percent of civilian controls (Neylan et al., 1998). Survivors of natural disasters such as earthquakes (Wood, Bootzin, Rosenhan, Nolen-Hoeksema, & Jourden, 1992), hurricanes (David & Mellman, 1997) and fires (Krakow et al., 2004) also commonly report nightmares. Finally Krakow, Tandberg, Barey, and Scriggins (1995) found that in a sample of women who had been sexually assaulted, 60 percent of those women with a diagnosis of PTSD had nightmares. Of those sexually assaulted women without a diagnosis of PTSD, survivors of rape reported the highest frequency of nightmares (26 percent). Considered together, these findings have led some to suggest that nightmares may

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represent the most common PTSD symptom (Neylan et al., 1998). These rates are in sharp contrast to the occurrence of nightmares in the general population. A large normative study ($N = 2782$) found that nightmares were the least common type of sleep disturbance with less than 7 percent of the sample reporting the frequent experience of nightmares (Coren, 1994).

Nightmares in individuals with PTSD may also be differentiated from nightmares in the general population because they occur earlier in the night, are more frequent and are associated with more body movements (Germain & Nielsen, 2003). In a review of the literature comparing sleep patterns in PTSD and panic disorder, Sheikh, Woodward, and Leskin (2003) found that individuals with PTSD had dreams with trauma related content 50 percent of the time during REM sleep. In individuals with PTSD who survived a natural disaster, Krakow et al. (2004) reported that chronic nightmares were not just secondary symptoms to PTSD, but were sufficient enough to warrant a diagnosis of a primary sleep disorder. So, although nightmares commonly occur in the general population, the presence of recurrent nightmares, which are frequently reported in individuals with PTSD, is infrequent in the general population. The increased prevalence of nightmares experienced by those exposed to trauma becomes especially troubling in light of the research documenting a relationship between nightmares and other PTSD symptoms in trauma survivors. For example, Krakow et al. (2002a, 2002b) found significant associations between nightmares and psychiatric symptoms in a sample of rape survivors. Not only have nightmares been correlated with additional psychological symptoms, nightmares have been documented as a contributor to the physical health symptoms in rape survivors (Clum, Nishith, & Resick, 2001) and with other sleep impairments in individuals with PTSD (De Viva, Zayfert, & Mellman, 2004). The presence and frequency of nightmares in trauma survivors may provide an opportunity for early detection and remediation of increased symptoms following trauma exposure.

Unlike nightmares, few studies have examined the prevalence and significance of flashbacks in trauma survivors. The definition of flashbacks ranges from broader interpretations including any vivid, recurrent recollection of a traumatic event, to more narrow conceptualizations of flashback as re-experiencing part of a traumatic event with a realistic intensity as if it were happening in the present (Milo, 1999). One study examining the quality and characteristics of vivid intrusive memories found that individuals with chronic

PTSD resulting from heterogeneous trauma ($n = 22$) reported re-experiencing between one and four different intrusive memories, which were predominantly sensory in nature (Hackmann, Ehlers, Speckens, & Clark, 2004). In this sample, the most common type of memory intrusion involved the events immediately preceding the traumatic experience, or the time at which the victim became aware that the traumatic event was inevitable, rather than the worst moment in the trauma. Burstein (1985) documented flashbacks in 28 percent and 39 percent of individuals with PTSD in two small samples of people exposed to a variety of traumatic events. Of those who had experienced flashbacks, 41 percent reported one or fewer flashbacks in the past week, while the remaining 59 percent of the sample reported more than three flashbacks per week. In addition to the distress related to the flashback itself, flashbacks may impair an individual's concentration increasing the risk of harm (Burstein, 1985).

Flashbacks may also be related to increased psychological and physical symptoms associated with trauma. In a sample of children with PTSD related to physical, sexual abuse, neglect and witnessing domestic violence, Runyon and Kenny (2002) found that the presence of flashbacks predicted depression. In fact, there has been an association documented between nightmares and flashbacks (Burstein, 1985), with nightmares preceding the onset of flashbacks in trauma survivors. Orcutt, Erickson, and Wolfe (2002) also found that revictimization is differentially related to the cluster of reexperiencing symptoms. Based on the literature documenting an association between the presence of nightmares and other symptom severity in individuals who have been exposed to trauma, and the fact that both nightmares and flashbacks are intrusive symptoms of PTSD, one might expect a similar pattern to emerge with flashbacks and trauma symptoms, such that the frequency of flashbacks would be related to the severity of other symptoms.

Literature has documented that rape is one of the most prevalent types of traumatic events and is one of the most pervasive crimes in the world (Rozee & Koss, 2001). In a review of existing studies regarding rape prevalence, Koss (1993) concluded that within the United States, between 14 percent and 25 percent of adult-aged women are survivors of rape. Not only is rape one of the most prevalent traumatic events, but also one of the most traumatic events for both men and women (Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995). Sexual assault is perceived as more intrusive than other physical attacks (Krupnick et al., 2004). In fact, PTSD symptoms have been found in 94 percent of rape

survivors 12 days after the assault has taken place, and in 46 percent of rape survivors 3 months later (Rothbaum, Foa, Riggs, Murdock, & Walsh, 1992). This study will utilize a sample of rape survivors because of the broader implications associated with the high prevalence rates of rape, as well as the increased occurrence of PTSD or PTSD symptoms associated with rape.

The current study evaluated whether the frequency of flashbacks are related to the severity of other symptoms, utilizing a new measure designed to assess the frequency of flashbacks. Of primary interest was the relative sensitivity of flashbacks and nightmares to the presence of trauma, as well as the differential patterns of associations among these two forms of trauma re-experiencing and other symptoms commonly reported by survivors of trauma. Specifically, we expected that flashbacks would be a more sensitive and specific trauma related symptom than nightmares in a group of rape survivors. Furthermore, we expected flashbacks to show stronger association with other PTSD symptoms.

1. Methods

1.1. Participants

Fifty-nine women participated in the current investigation, including 34 who had been raped (survivor group), and 25 control participants who had never been sexually assaulted and had not experienced any type of trauma during the past year, as indicated by the Traumatic Stress Schedule (Norris, 1990). The definition of rape used in this study was penetration (oral, anal, or vaginal) that had occurred against consent, through force, threat of bodily harm, or when unable to consent. Participants were recruited via newspaper advertisements, fliers posted in counseling centers, hospitals, gyms, and around the campus of two major universities, or from the psychology subject pools of those universities. The control group was 24.8 ($SD = 9.7$) years old, had an average of 14.5 ($SD = 1.6$) years of education, and was 46 percent Caucasian, 25 percent Hispanic, 25 percent Asian, and 4 percent African American. The survivor group was 26.7 ($SD = 11.9$) years old, had 14.2 ($SD = 1.5$) years of education, and was 53 percent Caucasian, 21 percent Hispanic, 9 percent Asian, 3 percent African American, and 14 percent were of mixed race. There were no significant differences between the groups on age ($t = -.66$, $df = 56$, $p = .51$) or education ($t = .69$, $df = 56$, $p = .49$). Chi-square analyses indicated no differences between the groups on race (chi-

square = 6.2, $df = 4$, $p = .18$) or salary (chi-square = 1.18, $df = 3$, $p = .76$). For the survivor group, 18 percent of the women were assaulted by strangers, 29 percent by acquaintances, 15 percent by friends, 26 percent by a date, and the remaining 12 percent by family members. Forty-four percent ($n = 15$) of the women survivors had been raped on more than one occasion, and all had experienced rape within the past 5 years. Also, 38 percent had experienced another type of trauma within the last year with the most common trauma types including motor vehicle accidents and losing someone close to them.

All study procedures were approved by local Institutional Review Boards for the protection of human subjects, and all participants provided informed consent prior to completing any of the study procedures.

1.2. Measures

1.2.1. PTSD symptoms

The Traumatic Stress Schedule (TSS; Norris, 1990) and Trauma Symptom Checklist-40 (TSC-40; Briere & Runtz, 1989) were used to assess PTSD symptomatology. The TSS was designed to identify individuals at risk for PTSD by inquiring about whether they had experienced any traumatic event that would satisfy Criterion A of the DSM-IV (1994) PTSD criteria. Endorsement on any Criterion A traumatic event prompts 11 additional probe questions regarding details of the event and nine potential PTSD symptoms. Each of the 10 symptoms is rated on a 4-point scale (1 = never, 2 = rarely, 3 = sometimes, 4 = often). The TSC-40 is a 40-item self-report measure that assesses common symptoms associated with childhood or adulthood traumatic experiences. For each item participants rate how frequently they have experienced the symptom in the last 2 months on a scale of 0–3 (0 = never, to 3 = often). In addition to a total score, the TSC-40 has six subscale scores that include Anxiety, Depression, Dissociation, Sexual Abuse Trauma Index (SATI), Sexual Problems, and Sleep Disturbance. Subscale alphas range from .66 to .77. The full scale alphas range from .89 to .91.

1.2.2. Nightmare and flashback measures

Nightmares and flashbacks were assessed using the Nightmare Effects Survey (NES; Krakow et al., 2000), Nightmare Frequency Questionnaire (NFQ; Krakow et al., 2000), and Flashback Frequency Questionnaire (FFQ). The NES assesses how much the presence of nightmares disturbs 11 areas of functioning including work, school, daytime energy, sleep, relationships,

mood, sex life, diet, mental health, physical health, and leisure activities. Each of these areas is assessed using a question in Likert scale format (range = 0–4), with higher scores reflecting more impairment. The NES had a Cronbach's alpha of .91. The NFQ is a self-report questionnaire that was used in the current study to provide a quantitative evaluation of nightmares. Participants are directed to think back over the past 3 months, and indicate the number of nights that they have experienced nightmares during that period of time. Response options are broken down into per week, per month, or per year categories. Once the numbers of nights are established, further information is obtained regarding the number of nightmares that occurred each night. This information is used to calculate the number of nights with nightmares per year (frequency) and a total number of nightmares experienced per year (occurrence). Correlation coefficients and weighted kappas for test–retest reliability were over .85.

The Flashback Frequency Questionnaire (FFQ) was developed for the current study after the procedure described by Krakow et al. (2000) for assessing nightmare frequency with the NFQ. For the FFQ, the term flashback is broadly defined as a sudden, vivid, distracting memory. The FFQ utilizes the identical questions and response format of the NFQ, however, instead of inquiring regarding nightmares as in the NFQ, individuals are first asked to indicate the number of days they have experienced flashbacks and to then indicate the number of flashbacks experienced by circling the response choice of a number per day, per week, per month or per year. Answer options are then converted to a number of days per year that the participant has had a flashback (frequency) and a number of flashbacks experienced per year (occurrence). For both the NFQ and FFQ higher scores reflect a greater number of nightmares or flashbacks, respectively.

1.3. Procedures

Individuals who were interested in participating in the study contacted the investigator by telephone. During this initial phone contact, they received information regarding the purpose and procedures of the study. After receiving this information, if they were still interested in participating, they completed an oral informed consent and then were asked to provide demographic information, and respond to the items from the Traumatic Stress Schedule (Norris, 1990). Participants were included in the survivor group if they reported being raped within the last 5 years. Participants

who experienced rape were also asked if they had been raped on more than occasion, if they had ever experienced memory loss regarding the event and to describe whether their attacker was a date, stranger, family member, acquaintance or friend. Participants were excluded from participating in the control group if they had ever been raped, or if they had experienced another traumatic event in the last year. Fifteen participants were excluded because of traumatic experiences other than rape. Two participants had been sexually abused in childhood (longer than 5 years ago) and were not included in the survivor group.

Those participants that did not meet screening eligibility requirements based on the telephone interview were thanked for their participation, and those who reported trauma were provided with contact information for counseling services. Participants who met inclusion and exclusion criteria scheduled an evaluation, at which they initially completed a written informed consent. They were then administered the battery of tests, that included the TSC-40, the NES (Krakow et al., 2000), the NFQ (Krakow et al., 2000), and the FFQ. After completing the testing procedures, participants were debriefed and provided with the opportunity to ask any questions. They were also provided contact information for the investigators, in case they had questions later or would like results of the study. Each participant was also provided with the phone numbers for rape hotlines and other counseling resources, as well as, with a packet of exercises copied from The Post-Traumatic Stress Disorder Sourcebook (Schiraldi, 2000) designed to reduce anxiety.

1.4. Data analysis

The data analyses were designed to evaluate the relative specificity and sensitivity to trauma of nightmares as compared to flashbacks. Thus, appropriate tests were used to assess differences between the survivor and control group on all measures of trauma symptoms. Additionally receiver operating characteristic analyses (ROC) were used to examine the accuracy with which the FFQ, NFQ, and TSC-40 total score could differentiate between individuals who were raped and those who had not experienced trauma. In these analyses, the sensitivity (true positive classification rate) of each measure is plotted against the 1 - specificity (false positive rate) across the range of scores obtained on the test. The area under the ROC curve provides an indication of the tests ability to discriminate between the two groups, with an area of .50 indicating a classification rate that is no better than chance, and an

area of 1.0 indicative of perfect classification. Thus, in the current application, a larger AUC would indicate increased predictive discrimination between individuals with and without a history of rape. Finally, to examine the associations among nightmares and flashbacks with other trauma symptoms, the NFQ and FFQ were correlated with the subscales of the TSC-40 and the TSS total score.

2. Results

Preliminary inspection of the data lead to the exclusion of one control participant who reported a high incidence of flashbacks that were not trauma related, apparently due to a misunderstanding of the instruction regarding flashbacks. Additionally, two of the participants did not complete the TSC-40. Table 1 contains descriptive statistics for the Trauma Symptom Checklist-40 (TSC-40), Nightmare Effects Survey (NES), Nightmare Frequency Questionnaire (NFQ), and Flashback Frequency Questionnaire (FFQ) for each group. There was large variation even within the groups in the frequency and occurrence of both nightmares and flashbacks. For example, in the survivor group, some participants endorsed experiencing no nightmares and flashbacks while other participants reported as many as 200 nights in a year with nightmares and 365 days experiencing flashbacks. Those participants who reported experiencing frequent nightmares or flashbacks often experienced more than one on each day thereby inflating the variability within groups. Additionally, correlations between the days per week and number per week scores were significant for the NFQ ($r(58) = .91, p < .001$), as well as the FFQ ($r(58) = .76, p < .001$), suggesting that these two scores were measuring the same construct. Therefore, only the NFQ and FFQ days per week (frequency) scores were used in the remaining analyses. Inspection of the descriptive statistics for the TSC-40 indicated that, as in previous studies, individuals without trauma obtained scores in the mid-20s, while trauma survivors typically

scored above 40. This difference between the groups was significant ($F(1, 54) = 23.5, p < .001$). Non-parametric tests were used to compare the group's scores on the NES, NFQ, and FFQ measures because Levene's test for equality of variance was statistically significant and the data did not meet the assumptions for parametric analyses. Results of these analyses also indicated significant differences between the groups on the NES ($U = 225.5, z = -3.3, p < .001$), NFQ days per year ($U = 218.5, z = -3.0, p < .01$), and FFQ days per year ($U = 162.5, z = -4.2, p < .001$).

Given these differences in flashback frequency between the groups, ROC analysis was then used to examine the sensitivity and specificity of the FFQ to the presence of trauma. For comparison purposes, similar curves were calculated for the NFQ and TSC-40 total score. Results of the analysis indicated that the best classification was obtained with the TSC-40 ($AUC = .83, SE = .067, p < .0001$), followed by the FFQ ($AUC = .80, SE = .060, p < .0001$), and then the NFQ ($AUC = .73, SE = .067, p < .005$). These classification rates range from fair, for the NFQ, to good for the TSC-40 and FFQ. The ROC curves are presented in Fig. 1. No clear differences are present among the curves for the TSC-40 and the FFQ. Pairwise comparisons among the curves' AUCs (Hanley & McNeil, 1983) indicated that there were no differences. The comparison between the TSC-40 and NFQ yielded a difference of $-.12, p = .11$. One could expect these differences to become significant as the power increases with a larger sample size, suggesting that the TSC-40 may be better at correctly classifying participants than the NFQ. The pattern of results indicates that the TSC-40 has the greatest sensitivity in predicting the group of rape survivors, while the FFQ was less sensitive than the TSC-40, but more sensitive than the NFQ in predicting the group of rape survivors. Sensitivity and specificity estimates are provided in Table 2 and demonstrate the variation in sensitivity and specificity based on specific cut-off scores. For example, an FFQ score above 0 correctly classifies 67 percent of the individuals who

Table 1
Descriptive statistics for the trauma symptom measures

Trauma symptom measure	Control		Survivor		<i>U</i>	<i>p</i>
	Mean	<i>SD</i>	Mean	<i>SD</i>		
TSC-40	25.3	12.9	48.5	19.8	–	–
NES	1.3	3.8	9.5	12.4	225.5	.001
Nightmare frequency/year	10.5	15.9	47.7	57.8	218.5	.001
Nightmare occurrence/year	11.3	16.0	62.9	75.4	–	–
Flashback frequency/year	6.4	22.6	82.9	117.1	162.5	.001
Flashback occurrence/year	10.6	41.7	1458.7	4351.8	–	–

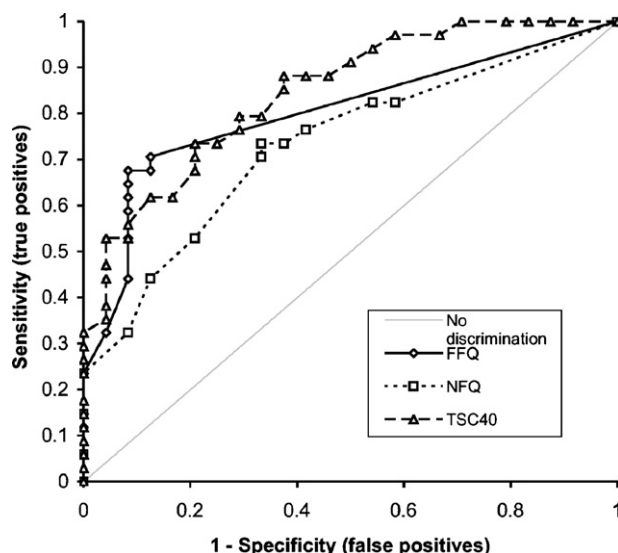


Fig. 1. Receiver operating characteristic curves for flashback frequency (FFQ), nightmare frequency (NFQ), and trauma symptom checklist-40 (TSC-40) for differentiating between individuals with and without history of rape.

have experienced sexual assault, yielding 23 true positives, and 11 false negatives. For controls, this same cut-off correctly classifies 21 as having not experienced sexual assault (true negatives) and misclassifies 3 individuals (false positives). In contrast, a score above 1.92 correctly classifies all of the controls (specificity = 100 percent), but correctly identifies only 8 of the 32 survivors. Comparison among the FFQ and TSC-40 cut off scores indicate the FFQ compares favorably to the TSC-40 with regard to sensitivity and specificity.

The FFQ and NFQ were then correlated with the TSS total score (which reflects the severity of overall PTSD

symptoms) in order to assess their relationships with the more general construct of PTSD symptoms. The TSS total score was derived by summing the nine TSS items that assess PTSD symptomatology. Results of these analyses indicated significant correlations between the FFQ and TSS ($r_s(34) = .35, p < .05$), but not between the NFQ and TSS ($r_s(34) = .06, p = .36$). Similar correlations were also calculated among the TSC-40 subscale scores and the NFQ and FFQ. Results of these analyses are presented in Table 3, including correlations for the total sample, as well as correlations for the survivor group alone. When considering the total sample, the NFQ and FFQ were significantly associated

Table 2

Sensitivity and specificity estimates based on ROC analysis for the NFQ, FFQ and TSC-40 total score

FFQ			NFQ			TSC-40		
Cut-off	Sn.	Sp.	Cut-off	Sn.	Sp.	Cut-off	Sn.	Sp.
0.00	70.6	87.5	0.00	82.4	41.7	25.00	88.2	58.3
0.02	67.6	87.5	0.08	76.5	58.3	26.00	88.2	62.5
0.04	67.6	91.7	0.12	73.5	62.5	27.00	85.3	62.5
0.08	64.7	91.7	0.13	73.5	66.7	28.00	79.4	66.7
0.12	61.8	91.7	0.15	70.6	66.7	29.00	79.4	70.8
0.23	58.8	91.7	0.23	52.9	79.2	30.00	76.5	70.8
0.46	52.9	91.7	0.46	44.1	87.5	33.00	73.5	79.2
0.69	44.1	91.7	0.69	32.4	91.7	34.00	70.6	79.2
1.00	32.4	95.8	1.00	23.5	100.0	37.00	67.6	79.2
1.92	23.5	100.0	1.92	14.7	100.0	40.00	61.8	87.5
2.92	14.7	100.0	2.92	5.9	100.0	42.00	55.9	91.7
4.85	11.8	100.0	3.85	0.0	100.0	44.00	52.9	95.8

Note: FFQ, Flashback Frequency Questionnaire; NFQ, Nightmare Frequency Questionnaire; TSC-40, Trauma Symptom Checklist-40; Sn, Sensitivity (percentage); Sp, Specificity (percentage).

Table 3

Correlations between the NFQ, FFQ and the TSC-40 subscales for the rape survivors and the entire sample

TSC-40 subscales	Total sample (<i>n</i> = 58)		Survivor group (<i>n</i> = 34)	
	Nightmares/week	Flashbacks/week	Nightmares/week	Flashbacks/week
Dissociation	.40**	.60**	.31*	.53**
Anxiety	.47**	.48**	.33*	.25
Depression	.41**	.32**	.37*	.26
SATI	.63**	.51**	.57**	.33*
Sleep Problems	.51**	.31**	.68**	.24
Sexual Problems	.32**	.35**	.11	.14
TSC-40 total	.52**	.42**	.41**	.21

Note: TSC-40, Trauma Symptom Checklist-40; SATI, Sexual Abuse Trauma Index, * $p < .05$, ** $p < .001$.

with TSC-40 total and all subscale scores. When considering only the group of rape survivors, FFQ scores were significantly associated with Dissociation and Sexual Abuse Trauma Index (SATI) scores. Comparatively, NFQ scores were significantly associated with all subscale scores with the exception of the Sexual Problems subscale. Nightmare frequency was much more strongly correlated with the Sexual Problems subscale and scores. Additionally, there was a statistically significant association between the frequency of nightmares and flashbacks ($r_s(34) = .32$, $p < .05$).

3. Discussion

This study investigated two symptoms that commonly occur after exposure to a traumatic event. While previous literature has documented the presence of both nightmares and flashbacks in trauma survivors, there have been few studies to empirically investigate the frequency of nightmares and flashbacks as they co-occur or how they may be associated with other trauma symptoms.

The current results support the fact that rape survivors experience significantly higher rates of flashbacks and nightmares than those who have not experienced trauma. And as might be anticipated, nightmares occurred at a relatively higher rate than flashbacks in the comparison sample, suggesting that while nightmares are a central feature of PTSD, they do not have the same level of specificity to the disorder as do flashbacks. More specifically, while the control and survivor samples reported nightmare frequency rates of 10.5 and 44.7 per year, respectively, the comparable rates for flashbacks were 6.4 and 82.9, indicating a much higher rate of flashbacks in the survivor group than in the controls. The ROC analyses further clarified the importance of this difference by demonstrating increased sensitivity and specificity of flashbacks to

sexual assault, as demonstrated by greater classification accuracy for flashbacks compared to nightmares. While this difference in classification accuracy between nightmares and flashbacks did not attain statistical significance, the FFQ performed comparably to the TSC-40, which includes a more extensive evaluation of a broader range of PTSD symptomatology. Thus, while occurring at an overall lower frequency, the univariate comparisons and ROC analyses suggest that flashbacks are a more unique and probably more central feature of PTSD and other acute stress syndromes, than are nightmares, which are less specific and may simply represent a more general indication of psychopathology.

Consistent with this suggestion, flashbacks were significantly correlated with PTSD symptoms as measured by the TSS ($r = .35$), while nightmares were not ($r = .06$). It was also apparent from comparisons with the TSC-40, that when the survivor group was examined alone, nightmares were associated in a general way with other PTSD symptoms as indicated by significant correlations with all of the TSC-40 subscales except for Sexual Dysfunction, and had its highest correlation with the Sleep Problems subscale. By way of contrast, flashback occurrence exhibited significant correlations only with the TSC-40 SATI and Dissociation subscales, with its highest correlation by far with the Dissociation subscale ($r = .53$). The correlation between nightmares and the Dissociation subscale was .31, again supporting the specificity of flashbacks as a core symptom of PTSD.

This study also provides support for the use of the FFQ to assess flashbacks in those surviving rape, and possibly other trauma survivor groups. Support for the FFQ's convergent and discriminant validity were established by its significant correlation with the severity of PTSD symptoms as measured by the TSS. As already mentioned, the NFQ was not significantly correlated with the TSS symptom score, providing evidence for the unique sensitivity of flashbacks to

trauma as measured by the FFQ. Convergent and discriminant validity of the FFQ were further established by examining correlations between it and the TSC-40, which is a widely used and well validated self-report measure of PTSD symptoms. When the total sample was considered, these correlations demonstrated that all of the TSC-40 subscales and the total score were significantly associated with the FFQ frequency score, its highest correlation being with the Dissociation subscale ($r = .60$). The criterion validity of the FFQ was also demonstrated in that the test scores themselves were able to differentiate among those with and without a history of rape, with the latter group reporting significantly more flashbacks.

A number of unique characteristics of the current sample should be considered when interpreting the result. First, the women in this study had been raped within the past 5 years limiting the generalizability of findings to women with a more recent history of rape. There is some suggestion that women who have been raped more recently experience a greater number of flashbacks. However, a non-significant correlation was present between months since assault and FFQ scores in our sample ($r_s(34) = -.03, p = .42$), months since the assault and NFQ scores ($r_s(34) = .20, p = .13$), and between months since the rape and TSC-40 total scores ($r_s(34) = -.05, p = .39$). Thus, it appears that there was no consistent relationship between flashbacks or more general symptom severity, and time since the assault. An additional consideration is that there are some individuals who continue to experience persisting symptoms following rape, and may eventually be diagnosed with PTSD, while there are others whose symptoms partially or completely resolve. The current sample undoubtedly contained a mix of these two groups as illustrated by the observation that 29 percent of the trauma group reported no flashbacks in the previous 3 months and relatively low levels of PTSD symptoms on the TSC-40. Thus it is likely that the current sample is a more representative cross section of trauma survivors, than would be a group composed exclusively of those diagnosed with PTSD or, alternatively, an asymptomatic group. It would also be expected that more severely affected individuals would have higher incidences of flashbacks than was the case in the current study. Parkes (1970) found that individuals with more severe PTSD reported higher incidence of flashbacks than those with milder forms of the disorder. Also, as is often the case with trauma samples, 38 percent of the current survivor group had been traumatized on more than one occasion. Research has documented higher levels of psychiatric distress

associated with multiple victimizations (Linares, 2004; Green et al., 2000; Stevens, Ruggiero, & Kilpatrick, 2005; Orcutt et al., 2002). While this study did not find any differences in flashback or nightmare frequency between individuals who had been raped only once and those who had been multiply victimized, the group experiencing multiple traumas had slightly higher levels of psychiatric distress. This study may not have found differences in psychiatric symptoms in the multiply traumatized sample because sexual abuse as a single traumatic event may lead to similar levels of distress as experienced by multiply victimized non-rape trauma survivors (Krupnick et al., 2004). In addition, the multiple victimization literature documents increased physical symptoms and other Axis I and Axis II disorders, and an increased risk of future exposure to trauma, factors that were not measured in this study (Classen, Palesh, & Aggarwal, 2005; Green et al., 2000; Stevens et al., 2005). Finally, this study had a sample size of 34 survivors of rape, which limits to some extent interpretation of the results. For example, it is likely that with a larger sample size, the classification differences for the FFQ and NFQ that were evident from the ROC analyses would have reached statistical significance. Despite these unique characteristics of the current sample, this study provides support for the validity of the FFQ and illustrates the unique nature of flashbacks as a “re-experiencing” symptom of PTSD. Additional research is necessary in order to generalize these findings to populations who have been exposed to trauma and diagnosed with PTSD, as well as individuals who have survived other types of trauma.

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