CHAPTER 8

GENDER AND POSTTRAUMATIC STRESS DISORDER

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Gender powerfully influences the way people think about themselves and others. It may be the first quality that a person notices in others (Cross & Markus, 1993) and is one of the earliest social constructs that children apprehend (Kohlberg, 1966; Kohlberg & Ullian, 1974). Most children have a clear sense of their gender identity by the time they are two or three years old (Slaby & Frey, 1975; Thompson, 1975). Once this identity is developed, it profoundly influences subsequent thought, feelings, and behavior (Sherif, 1982). Given the power of gender to affect the way in which events are processed, it is expected that notions of gender would influence the processing of extreme events. This chapter focuses upon how gender influences the processing of these extreme events. Specifically, we review how gender, traumatic events, and posttraumatic stress disorder (PTSD) are related.

The most well documented psychopathological response to extreme events is PTSD. Attention has recently been devoted to differential prevalence rates of PTSD in traumatized men and women. A number of large epidemiological studies have concluded that women are more at risk for PTSD than men (Breslau, Davis, Andreski, & Peterson, 1991; Breslau & Davis, 1992; Cottler, Compton, Mager, & Spitznagel, 1992; Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995; Norris, 1992). These studies have found that women have up to twice the rate of PTSD as men (e.g., Kessler et al., 1995), findings which are consistent with sex differences reported for rates of major depression and for other anxiety disorders (Robins & Regier, 1991; Robins et al., 1984). The present chapter is concerned with understanding the meaning of these data. These critical findings on the higher prevalence of PTSD in women may be spurious, as systematic biases can enter any gender-related research. Alternatively, these findings may indicate important differences in vulnerabilities to traumatic events between women and men. In order to fully understand how gender, trauma, and PTSD are related, this chapter will begin with a review of these epidemiological studies. We will then review controversies with these studies and use multiple perspectives in order to understand their meaning. Specifically, we will review biological, psychodynamic, and social-cognition perspectives on gender in order to understand whether women are more vulnerable than men to traumatic events, and how systematic biases can enter into research on gender. We use a multi-perspective approach because the construct of gender is so complex, controversial, and powerful that no one perspective appears to capture the totality of it's influence.

There are numerous studies exploring the nature of PTSD and the nature of gender, respectively. Unfortunately, there are very few empirical studies examining how gender and PTSD are related. Thus far,

the literature on this topic is largely descriptive and primarily documents different prevalence rates of PTSD. A possible reason why this critical literature has not advanced is that the study of the relationship between gender, trauma, and PTSD is laden with difficult methodological and conceptual issues. For example, men and women tend to experience different types of traumatic events across the life span. Women are much more likely to experience interpersonal violence, particularly sexual violence, than men (e.g., Norris, 1992; Kessler et al., 1995). Women are also more likely to seek help for distress than men (e.g., Phillips & Segal, 1969). These methodological issues potentially confound any estimation of the differential effects of trauma on men and women. A major conceptual issue within the area of gender studies involves the concept that gender is not a binary variable. The construct of gender is multiply determined and influenced by genetics, hormonal environments, and socialization. Concepts such as gender identity and gender roles color the variable of gender into much finer hues than simply "male" or "female." Moreover the topic of gender and PTSD is laden with social and political controversy. For example, any notion of women being more "at risk" for PTSD, despite lower rates of exposure to trauma (e.g., Kessler et al., 1995), is reminiscent of the notion of women as the "weaker sex," which has deleterious political implications.

In the absence of any comprehensive or sophisticated empirical literature on the relationship between gender and PTSD, this chapter should be viewed as an exploration of the possible relationships between these two constructs and, particularly, about why data appears to conclude that women are more vulnerable to traumatic events than men. In concluding, we specifically outline areas of study that can lead to the development of further empirical study of the relationship between gender and PTSD.

PREVALENCE OF PTSD IN MEN AND WOMEN

In order to derive a preliminary understanding of how gender, trauma, and PTSD are related, it is important to understand differences in the rates of PTSD between traumatized females and males. The current section reviews a series of large community studies on the rates of PTSD in adults and children. After the data from community samples are reviewed, findings from a series of studies on PTSD following natural disasters are considered.

In one of the earlier studies, Breslau and colleagues (Breslau et al., 1991; Breslau & Davis, 1992) used the Diagnostic Interview Schedule (Spitzer, 1981; Robins, Helzer, Croughan, & Radcliffe, 1981) to study a large urban sample (n = 1,007) of male and female health membership organization (HMO) members and found that 39 percent (n = 394) of the combined sample described exposure to an event consistent with the definition of a traumatic stressor. Of individuals who reported trauma, nearly 24 percent met Diagnostic and Statistical Manual of Mental Disorders, third edition-revised (DSM III-R; American Psychiatric Association, 1987) criteria for PTSD, yielding a lifetime sample prevalence of 9.2 percent. Moreover, nearly 57 percent (n = 53) of those with the disorder were classified as "chronic," defined as being symptomatic for more than one year. These two studies together highlighted an important finding: The PTSD diagnosis was linked to certain respondent characteristics, notably female gender. In fact, results showed that female respondents were *four* times more likely than men to develop chronic forms of PTSD following exposure to a traumatic event. In addition to gender, study results identified other PTSD "risk" factors including early separation from parents, a family history of anxiety disorders or antisocial personality, pre-existing anxiety or depression in the proband, and "neurotic style," variables which are often widely represented in women. Apart from the sequelae of rape, in which the PTSD diagnosis was exceedingly high, negligible gender outcome differences were found following other forms of traumatic exposure. Thus initial findings of greater PTSD in women were not readily explained.

Subsequently, Cottler et al. (1992), using the St. Louis area sample from the National Institute of Mental Health's Epidemiological Catchment Area (ECA) study, explored PTSD rates and their relationship to substance abuse in men and women utilizing the Diagnostic Interview Schedule. Relying on a relatively ethnically diverse sample of young and middle-aged men and women, their results indicated that female gender and cocaine or opiate use were the two strongest

predictors of both exposure to a traumatic stressor and the subsequent development of PTSD. Although significant first-order correlations were found for younger age, Caucasian race, antisocial personality (ASP) diagnosis, and depression, there were no gender interactions among these outcomes. Similar to the work by Breslau et al. (1991, 1992), Cottler et al. (1992) based PTSD prevalence estimates on a model incorporating the most common traumatic life events, a method that potentially limits knowledge about the broader variety of stressor events. In addition, neither rape nor sexual assault—typically very strong predictors of PTSD in women—were distinctively classified, possibly influencing results based on the prevalence of the specific events and their sequelae.

Norris (1992) employed more rigorous diagnostic and stressor definitions to characterize traumatic exposure and PTSD in a large sample (n = 1,000) of men and women, classifying a spectrum of stressors into categories encompassing violent, hazard/natural disaster, and accidental occurrences. Also, the author obtained continuous measures of global distress and PTSD symptomatology using the Perceived Stress Scale (Cohen, Kamarck, & Mermelstein, 1983) and the Traumatic Stress Schedule (Norris, 1990), as opposed to earlier studies that relied exclusively on dichotomous classifications of these variables. These findings again showed the emergence of certain gender differences: Women were more likely to have suffered sexual assault while men evidenced increased risk for motor vehicle accidents, physical assault, and combat exposure, experiences producing higher overall exposure rates for males. In addition, a number of significant interactions pertaining to gender, event typology, and distress emerged. First, rape yielded the highest rates of PTSD although stated rates (14 percent) were lower than those found in other studies. Second, although the finding failed to reach statistical significance, women demonstrated a trend for higher rates of PTSD in general. Third, among participants who had been *criminally* victimized, women were significantly more likely to meet PTSD criteria than men. Thus, these data preliminarily suggest a differential gender risk for stressor exposure as well as for the subsequent development of PTSD when exposure is roughly comparable.

More recently, Kessler et al. (1995) studied the prevalence of PTSD in a nationally representative sample of 5,877 individuals between the ages of 15 and 54 as part of the National Comorbidity Survey using the Composite International Diagnostic Interview (Robins, Wing, Wittchen, & Helzer, 1988). In this study, 60.7 percent of men and 51.2 percent of women reported at least one traumatic event. Men were more likely than women to report witnessing someone being injured or killed, being involved in a fire, flood, or natural disaster, being involved in a life threatening accident, being physically attacked, and combat exposure. Women were more likely to report rape, sexual molestation, childhood parental neglect, and childhood physical abuse. Similar to previous studies, certain types of traumatic events were more likely to cause PTSD than others. For example, rape was the event most likely to lead to PTSD.

These authors reported that although men were more likely to experience a traumatic event than women, women were more likely to develop PTSD. As 20.4 percent of the women and 8.2 percent of the men developed PTSD, the investigators concluded that women exposed to a traumatic event were more than twice as likely to develop PTSD.

The National Vietnam Veterans Readjustment Study (NVVRS) offers some of the most comprehensive data on the long-term functioning of male and female veterans following war exposure (Kulka et al., 1988; 1990). Secondary analyses by Weiss et al. (1992) found surprisingly few differences in PTSD lifetime prevalence between men and women: Male Vietnam theater veterans demonstrated a lifetime PTSD rate of 30.9 percent while the rate among female theater counterparts was 26 percent. Lifetime rates for partial PTSD were also highly comparable: Just over 22 percent of men met partial PTSD criteria compared to 21.2 percent of women. Thus, although current diagnostic rates for male and female veterans were more disparate (e.g., 15.2 percent men, 8.7 percent women), the likelihood of having had the disorder at some point following the war was similar. Still, these analyses do not consider possible differences in PTSD base rates nor potential interactions of gender by stressor type (Wolfe, Brown, Furey, & Levin, 1993).

Using a sample of young adults, Fischer (1992) evaluated college students and determined that among child abuse victims, females were significantly more likely than males to have suffered incest; also, heterosexual forms of abuse were significantly more common in girls than boys. Importantly, the attributions of females about the childhood event were substantially less likely to evidence blame for the perpetrator. These findings suggest that both exposure and event-related attributions vary by gender. Finally, childhood sexual abuse was a significant predictor of subsequent teenage or adult sexual abuse for women, suggesting that traumatic exposure is a factor leading to adult women's subsequent traumatic exposure and adverse psychological outcomes. Walker (1980) reported that boys experience significantly more physical abuse from their mother, a finding that, again, suggests a complex interaction between gender and exposure to trauma.

Unlike interpersonal violence, the relevance of gender as a factor in outcome following natural or technological disasters is equivocal, although some authors have shown an association between female gender and poorer recovery (e.g., Burger, 1992; Steinglass & Gerrity, 1990). Realmuto, Wagner, and Bartholow (1991) evaluated a community 13 months after its exposure to a technological disaster and found that PTSD was significantly more common among women overall. Positively diagnosed individuals also were more likely to be older and to have histories of prior psychiatric problems. Steinglass and Gerrity (1990), in another study involving two communities exposed to a severe natural disaster, found that female gender was again associated with higher rates of PTSD (although PTSD for the total sample decreased over time at four and 16 month follow-ups). Thus, there is preliminary information suggesting poorer post-disaster recovery in females in community samples when event characteristics are relatively stable. Still, the broad lack of event comparability makes these analyses difficult.

IS GENDER A "RISK-FACTOR" FOR PTSD?

The majority of the aforementioned studies appear to support the conclusion that women are more at risk for PTSD then men. A number of the reviewed studies find that males are more likely to be exposed to a traumatic event but females are more likely to develop PTSD after a given trauma. This conclusion—that female sex is a "risk-factor" for PTSD—must be critically evaluated. Accepting such a notion, as previously mentioned, has enormous social and political consequences and must be reviewed with particular scrutiny. The following section reviews a number of methodological difficulties with this literature.

1) The Nature of the Stressor. The types of traumatic events men and women experience may differ markedly. Women are more likely to be exposed to rape, sexual molestation, and childhood parental neglect. With the exception of physical attacks, men are more likely to be exposed to impersonal stressors including life threatening accidents, fires, floods, natural disasters, combat, and witnessing the injury or death of another (Kessler et al., 1995). As numerous investigators have reported, sexual trauma is associated with high rates of PTSD. The literature also suggests that women are significantly more likely to be exposed to sexual stressors. Although some studies have controlled for differences in exposure and found higher rates of PTSD in women (Kessler et al., 1995), these studies have not collected important details about the traumatic event. For example, analyses of the different events that women and men experience reveal that women are more likely to experience events that occur repeatedly (childhood sexual and physical abuse and neglect, perhaps rape) and in childhood. No study of sex differences in the prevalence rates of PTSD has systematically studied dimensions of the traumatic experience factors such as the chronicity of the event or the age at which the event occurred, that could conceivably influence rates of PTSD. In a recent review of this issue, Wolfe and Kimerling (1996) suggest that the following domains of the traumatic event must be assessed in order to fully evaluate apparent differences in rates of PTSD between men and women: "a) the total number of traumatic events, b) the duration of exposure (e.g., episodic or chronic), and c)the severity of exposure across dimensions (e.g., life threatening vs. non-life threatening; moderate vs. severe)" (p. 217). They add

that it is particularly important to assess "role-related, social/contextual, and symbolic or connotative factors associated with particular stressors" (Wolfe & Kimerling, p. 217) in order to understand the differential effect of these stressors on men and women.

2) Reporting Styles. Extensive research shows that women and men have different reporting styles (Phillips & Segal, 1969; Russo & Olmedo, 1983; Russo & Sobel, 1981). These differences may affect the degree to which women and men disclose experiences of traumatic events and symptoms of PTSD. Women endorse more symptoms of physical illness and emotional distress than men. Further, they tend to report a greater severity of symptoms overall (Verbrugge, 1983, 1985). These findings may mean that women truly have a greater frequency and degree of symptoms than men. Alternatively, they could also suggest that women either have a bias to over-report or men to under-report symptoms. Such reporting biases may affect estimates of PTSD prevalence rates between men and women.

3) Diagnostic Biases. There is evidence that health-care practitioners have diagnostic biases about gender. For example, studies of depression have found that women are more likely to be diagnosed with depression independent of whether they actually have that disorder (Loring & Powell, 1988). The higher rates of PTSD among females may have been influenced by similar diagnostic biases.

4) Gender or Sex Differences. As the aforementioned studies involved sex differences in prevalence of PTSD, they are indirectly related to the influence of gender on PTSD. It is important to distinguish sex from gender as gender is a much more powerful and important construct. As previously described, men and women vary in the degree to which they identify with their biological sex and conform to traditional notions of sex roles. Lott and Maluso (1993), making the distinction between sex and gender, write,

> *Whereas sex denotes a limited set of innate structural and physiological characteristics related to reproduction, and divides the animal species into female and male, gender is specific to humans and connotes all the complex attributes ascribed by culture(s) to human females and males, respectively (p. 99).*

These "complex attributes" about what it means to be a woman or man, girl or boy, amplify and re-amplify biological differences between males and females. Powerful messages from family, community, and culture further structure these attributes. Although gender involves the subtle variables of identity, roles, and relationships, sex is defined as a binary variable. To date, no empirical study of PTSD has measured the construct of gender and associated correlates, yet all the studies reviewed in this chapter have examined sex differences in PTSD rates. One can thus only indirectly surmise the effect of gender on PTSD from their results.

PERSPECTIVES ON GENDER

The literature involving PTSD prevalence variations by gender cannot fully be understood without a grounding in basic conceptions of gender. We review three perspectives on gender: biological, feminist/psychodynamic, and social-cognition. Each of these perspectives has a distinct, but not mutually exclusive, way of understanding gender. We review how each of these perspectives can be used to understand the literature reporting the different prevalence rates of PTSD that were observed between men and women. Although the biological, psychodynamic, and social-cognition perspectives on gender are rather well developed, to our knowledge, no attempts have been made to link these theoretical perspectives to an understanding of how individuals respond to traumatic events. We attempt to make this link because we believe this information can greatly enrich our understanding of the trauma response.

1. Biological Perspective

The biological perspective looks at structural and physiological differences between men and women in order to determine whether any of these known differences can account for the observed differences in outcome. An important caveat is that, to date, al-

most all biological studies of PTSD have been conducted with male subjects. No biological studies, to our knowledge, have directly compared males and females, and only a very limited number of studies have examined the relationship between PTSD and a sex steroid (e.g., testosterone; Mason, Giller, Kosten, & Wahby, 1990). Therefore any discussion regarding the biology of gender differences and their relation to PTSD should be considered preliminary. In the following section we review a number of important psychobiological differences between men and women and their possible relationship to PTSD. Since there are large literatures on the biologies of sex differences and of PTSD, respectively, we present findings that could be most relevant to understanding gender differences in PTSD.

a) Hippocampal Damage. The hippocampus is potentially one of the most critical structures implicated in the processing of traumatic experience through its role as supplier of contextual information in memory. Recently, three studies using magnetic resonance imaging (MRI) have shown reduced hippocampal volumes in subjects with PTSD. Bremner et al. (1995) and Gurvitz, Shenton, and Pitman (1995) found reductions in hippocampal volume in male combat veterans with PTSD. Similarly, Stein and colleagues (1994) found that women with PTSD who experienced childhood sexual abuse had smaller hippocampal volumes.

These studies suggest that a hippocampal volumetric reduction might be related to PTSD in males and females. Since no study has directly compared females and males with PTSD, it is undetermined whether there are any systematic differences in hippocampal volume between men and women that could explain some of the reported greater PTSD prevalence rates among females. Despite the lack of data on this issue, there is evidence that there are sex differences in the response of the hippocampus to the environment. The hippocampus has been found to be more plastic in female rats (Juraska, 1991). Females responded to enriched environments with greater sprouting of dendritic trees than males. This difference stemmed from a suppression of plasticity by testosterone (Juraska, 1991). This pre-clinical finding (i.e., the hippocampus of females are more responsive to enriched environments) potentially suggests that this critical brain structure might be highly susceptible to damage by noxious environments. A recent study using magnetic resonance imaging (MRI) and positron emission tomography (PET) found that aging diminishes the size and activity of the hippocampus to a greater degree in women than men (Murphy et al., 1996). This study found that although there was more brain atrophy over time in men than women, certain brain structures (particularly the hippocampus) diminished more in women. These data preliminarily suggest that females could be more vulnerable to hippocampal damage than males, suggesting one possible mechanism in the higher prevalence of PTSD in women.

b) Hemispheric Lateralization. A recent study using PET in patients with PTSD found that there are important hemispheric differences in the processing of intrusive memories (Rauch et al., 1996). This study measured regional cerebral blood flow changes in 8 patients (6 females, 2 males) with PTSD who were induced to reexperience their trauma with script-driven imagery. The investigators reported increased blood flow on the right limbic, paralimbic, and visual areas and decreased blood flow on the left inferior frontal and middle temporal cortex. This study is limited by a small number of subjects and the absence of a comparison group that did not have PTSD. Nevertheless, the findings suggest the possibility of important hemispheric differences in the processing of traumatic memories; specifically, the increased activation of the right limbic system and the decreased activity of the left inferior frontal system (responsible for speech production). As numerous studies have described important sex differences in the lateralization of the brain (LeVay, 1993), this study may be useful for understanding sex differences in rates of PTSD.

Females have a larger corpus callosum and anterior commissure relative to brain size then males (Allen, Richey, Chai, & Gorski, 1991; de Lacoste, Adesanya, & Woodward, 1990). Consistent with these differences, females have reduced hemispheric asymmetry compared to males (LeVay, 1993). This

difference is particularly pronounced in the area of speech production. A study using functional magnetic resonance imaging found that during speech production women used both the left and right inferior frontal lobe whereas men used only the left inferior frontal lobe (Shaywitz et al., 1995). This finding may give females a protective advantage in PTSD since the aforementioned study found that the activity of the inferior frontal lobe was only diminished on the left during an intrusive memory provocation. No study, however, has directly compared men and women with PTSD in terms of the activity of the inferior frontal lobe. Speech production could be implicated in the development of PTSD since the ability to conceptualize and verbalize feelings has been described as an important protective factor in this disorder (Krystal, 1988).

While the findings reported by Rauch et al. (1996) suggest that a greater use of both hemispheres for language (Shaywitz et al., 1995) may offer a protective advantage in PTSD, there is some evidence that limbic processing in females could constitute an additional vulnerability. A study using PET that measured regional metabolism during induced feelings of sadness found that when women felt sad, they had increased bilateral activity of the limbic system compared to men (George et al., 1995; George, Ketter, Parekh, Herscovitch, & Post, 1996). As described above, there was increased limbic system activation during intrusive memories in subjects with PTSD on the right hemisphere. Females' heightened limbic responsiveness to basic emotional stimuli in general could represent a vulnerability to the development of PTSD.

c) Norepinepherine Function. Norepinepherine (NE) is a neurotransmitter that is primarily stored in the locus coeruleus and released diffusely in the brain. This neurotransmitter is instrumental in influencing levels of arousal and attention (Zigmond, Finlay, & Sved, 1995). A number of studies of Vietnam veterans with PTSD have found it to be related to PTSD. Vietnam veterans with PTSD have been found to have elevated 24-hour urinary norepinepherine levels (Kosten, Mason, Giller, Ostroff, & Harkness, 1987) and augmented MHPG response to yohimbine administration (an agent that stimulates the locus coeruleous) (Southwick et al., 1993), as well as a decrease in platelet alpha$_2$-adrenergic receptors compared to a non-PTSD control group (Perry, Giller, & Southwick, 1987). Yohimbine administration also induces flashbacks and panic attacks in veterans with PTSD (Southwick et al., 1993). These studies support the role of a dysregulated norepinepherine system in individuals with PTSD. Specifically, individuals with PTSD have higher norepinepherine output and subsequent down-regulation of norepinepherine receptors than controls. Norepinepherine has been exclusively studied in men with PTSD, making it difficult to infer any role for this neurotransmitter in the differential rate of PTSD between men and women. Nevertheless, important sex differences have been found in norepinepherine function. Thus this system may be implicated in the difference in prevalence rates and PTSD.

Estrogen administration, *in vitro,* increases central norepinepherine availability (Paul, Axelrod, & Saavendra, 1979). Chronic estrogen treatment reduces B-adrenergic receptors in the rat cortex (Wagner, Crutcher, & Davis, 1979). In humans, estrogen alters platelet alpha$_2$-adrenergic binding with variations in the levels of these receptors throughout the menstrual cycle (Best, Rees, Barlow, & Cowen, 1992). Jones and colleagues (1983) found an increase in platelet alpha$_2$-adrenergic receptors in women just after menstruation. Studies comparing females and males for norepinepherine activity found that neonate and adult females have greater NE output than males (Claustre, Peyrin, Fitoussi, & Mornex, 1980; Cuche, Kuchel, Barbeau, & Genest, 1975; Dalmaz & Peyrin, 1982). Norepinepherine levels have also been found to fluctuate across phases of the menstrual cycle and are highest during the luteal phase (Goldstein, Levinson, & Kaiser, 1983; Zuspan & Zuspan, 1973; Jones et al., 1983). These findings, however, have not been replicated in some studies (Frankenhauser, Dunne, & Lundberg, 1976; Patkai, Johansson, & Post, 1974). If they are accurate, they represent one possible mechanism implicated in higher rates of PTSD in females.

Fluctuations of NE throughout the menstrual cycle are intriguing as this suggests that symptoms of

PTSD would be highest during phases of high NE output (luteal phase). No study to our knowledge has assessed fluctuations in PTSD symptoms throughout the menstrual cycle but such studies can yield useful information. As NE influences basic systems of arousal and attention and is implicated in the processing of traumatic events, it is possible that women would be more vulnerable to traumatic events during specific phases of the menstrual cycle.

d) Hypothalamic-Pituitary-Adrenal (HPA) Axis. The HPA axis has been broadly implicated in the pathogenesis of PTSD. Subjects as diverse as Vietnam combat veterans (Mason et al., 1990) and Holocaust survivors (Yehuda, Kahane, et al., 1995) with PTSD have been found to have low urinary cortisol levels compared to non-PTSD control subjects. Combat veterans with PTSD have been found to have an increase in lymphocytes glucocorticoid receptors (Yehuda, Boisoneau, Lowy, & Giller, 1995; Yehuda, Lowry, Southwick, Shaffer, & Giller, 1991) and an increased suppression of cortisol in response to dexamethasone (Yehuda et al., 1993). The number of glucocorticoid receptors is a particularly interesting index as it has been found to be correlated with the severity of PTSD. A recent study of female rape victims found that those with the lowest levels of salivary cortisol measured shortly after the rape were more likely to acquire PTSD measured six months later (Resnick, Yehuda, Pitman, & Foy, 1995). The findings of low cortisol and subsequent up-regulation of glucocorticoid receptors are important for understanding the pathogenesis of PTSD, as the glucocorticoid release has been called a "containing" or "counter-regulating" response (McEwen, 1995). That is, the release of glucocorticoids are thought to prevent the stress response from becoming too excessive. Given the critical role of the HPA axis in the pathogenesis of PTSD, it is possible that intrinsic differences in this system between women and men constitute a mechanism for the increased vulnerability of women to PTSD.

Although no studies have compared HPA axis function in men and women with actual PTSD, one study has compared men and women exposed to extreme stress. A study of individuals living near the Three Mile Island nuclear power plant at the time of the nuclear accident found that men who lived close to the power plant had higher urinary cortisol levels than women. Importantly, no differences in cortisol levels were found between men and women who lived a prescribed distance from the plant (Schaeffer & Baum, 1984). Consistent with this finding, a study of neonates found that when males were exposed to the mild stress of a behavioral assessment they had higher salivary cortisol responses than females, although females had higher heart rate increases to the same stress (Davis & Emory, 1995). A study of adolescents and adults under mildly stressful conditions (public speaking and performing mental arithmetic in public) found that males had 1.5 to 2-fold higher cortisol levels than females (Kirschbaum, Wust, & Hellhammer, 1992). Further, males had increased cortisol levels in anticipation of these stressors than females who remained unchanged or even showed decreased cortisol levels while anticipating a stressful event (Kirschbaum et al., 1992). This finding of higher cortisol responses to stress in males than females has also been documented in animal studies (Weinberg & Wong, 1986). A number of studies, however, have not found greater release of cortisol in males (Gallucci et al., 1993; Scallet, Suomi, & Bowman, 1981).

The findings that males tend to have higher glucocorticoid responses to stress then females has important implications for understanding sex differences and PTSD. If the release of cortisol is an important method for "counter-regulating" stress, then the increased release of this steroid offers males an advantage over females in responding to stressful conditions. The finding that low cortisol after rape predicts PTSD symptoms, and that individuals with PTSD have lower cortisol levels and up-regulation of glucocorticoid receptors, are consistent with this hypothesis.

Other studies have implicated sex steroids in the attenuated cortisol response to stress in females. One study found that females taking oral contraception pills containing sex steroids had lower cortisol responses during stress (Kirschbaum, Pirke, & Hellhammer, 1995). Cortisol release also fluctuates routinely during the menstrual cycle. Specifically, women had lower cortisol responses to stress in the follicular than in the luteal phase (Tersman, Collins, & Eneroth,

1991). Similar to the data on norepinepherine response, the fact that glucocorticoid responses to stress fluctuate systematically in the menstrual cycle suggests that perhaps symptoms of PTSD fluctuate in a similar way. Such data also raise the possibility that women might be more vulnerable to traumatization if exposed during certain phases of the menstrual cycle. Although this hypothesis is speculative, studies of women's stress-related symptoms across the menstrual cycle are clearly needed.

e) Behavioral Sensitization. Several investigators have speculated that the phenomena of behavioral sensitization or kindling may be an important pathogenic factor contributing to the development of PTSD (Charney, Deutch, Krystal, Southwick, & Davis, 1993; van der Kolk, 1994; Post, Weiss, & Smith, 1995). Sensitization or kindling refers to the phenomenon of increased response magnitude following exposure to a given stimulus. Repeated presentations of the stimulus create a situation of perpetually increasing magnitudes of response. Sensitization and kindling are mechanisms well known for their link to cocaine dependence (Post, Weiss, Pert, & Uhde, 1987) and seizures (Goddard, McIntyre, & Leech, 1969). They have also been used as models for understanding bipolar disorder (Post, Rubinow, & Ballenger, 1986) and have recently been used to explain the symptoms of PTSD (Charney et al., 1993; van der Kolk, 1994; Post et al., 1995). These processes are useful in explaining the increasing responsiveness to stressful events that are known to occur in individuals with PTSD. They help explain the chronicity and treatment refractory nature of PTSD and are consistent with what is known about the neurobiology of PTSD (Charney et al., 1993; van der Kolk, 1994; Post et al., 1995).

There is evidence suggesting that females are more vulnerable to sensitization than males. Studies in animal populations have demonstrated that female rats have significantly greater behavioral response magnitudes to repeated administrations of amphetamines, often twice as high as males (Robinson, Becker, & Presty, 1982). This increase in sensitization was found in both normal and ovarectomized females but not in genetic males with testes. Such results suggest that the decrease in sensitization to amphetamine in males is due in large part to the presence of testosterone (Robinson et al., 1982; Camp & Robinson, 1988a, 1988b). There is also evidence that estrogen, but not testosterone, can lower seizure thresholds (Newmark & Penry, 1980). Such data, on the increased behavioral sensitization in females and the reduced seizure thresholds caused by estrogen, could support a sensitization or kindling explanation for the increased prevalence of PTSD in women.

This section reviewed sex differences in a number of neurobiological systems and the evidence supporting the idea that these differences may be instrumental in understanding the documented higher prevalence of PTSD in females. Although the data reviewed are far from conclusive, and some data are contradictory, there is emerging evidence that the female hippocampus is more vulnerable to damage, that the female limbic system has an increased responsivity to emotional signals (at least negative ones, e.g., sadness), that there is increased noradrenergic and decreased glucocorticoid activity to stress in females, and that the female brain is more vulnerable to mechanisms of sensitization. Each of these neurobiological responses has in some way been linked to PTSD. Thus, there is a literature suggestive of neurobiological vulnerability in females (or resiliency in males) although, to date, no study has directly compared traumatized men or women or men and women with PTSD. Thus, there is a great need for studies of sex differences in brain structure and function in individuals with PTSD. The compelling literature on the neuroendocrinology of PTSD must be expanded to include gender. At the very least, females should be included as subjects in neurobiological studies. In the absence of such studies, any conclusions regarding gender-related neurobiological vulnerabilities to PTSD remain speculative.

Future studies must also account for the relationship between the menstrual cycle and neurobiological changes in PTSD. The literature on changes in noradrenergic and glucocorticoid differences across the menstrual cycle is preliminarily compelling. It is important to study the possible consequent changes in posttraumatic symptoms across the menstrual cycle, and whether women are more vulnerable to PTSD if traumatized at certain phases of the menstrual cycle.

2. Feminist/Psychodynamic Perspective

Psychodynamic and psychoanalytic perspectives of gender have experienced a tremendous degree of upheaval in recent years due to feminist challenges to Freud's earlier notions about gender differences (Freud, 1931). Although details of this debate are beyond the scope of this chapter, they have resulted in a "self-in-relation" theory about women and men which, although still controversial, has received a large degree of acceptance (Jordan & Surrey, 1986; Miller, 1986). This theory describes separate lines of development between men and women, particularly around the nature of relationships.

The self-in-relation theory suggests a special status of relationships for women. According to this model, a woman's sense of herself is very closely related to relationships with others and, particularly, to the reciprocal caring in relationships. Miller (1986, p. 597) suggests that women's sense of themselves is defined by "the ongoing intrinsic inner awareness and responsiveness to the continuous existence of other or others and the expectation of mutuality in this regard." This sense is "...very much organized around being able to make and then to maintain affiliation and relationships" (Miller, 1986, p. 597). A woman's self-esteem is thus highly related to the quality of her relationships and is based on the sense that she is "a part of relationships and is taking care of relationships" (Jordan & Surrey, 1986, p. 597). Although relationships are, of course, important to most men, men define themselves less by relationships. Theories on the nature of these differences concern early attachments and identifications primarily based on the mother–child relationship. Chadorow (1978) proposes that mothers and daughters experience a sense of similarity and continuity with each other that is not experienced in a mother–son relationship. When daughters think about issues related to who they are, they have a ready reference point—"I am like my mother." According to Chadorow, a son must answer "I am not like my mother." Because boys must change their identifications early in development, they can more easily see themselves as separate and distinct than can girls and are less focused on relationships than are girls. Girls' development, in contrast, is marked by a stronger sense of connection.

From an interpersonal point of view, women and men thus have very different ways of thinking about themselves and others. Gilligan (1982) extends this theory into other domains when she writes about differences in moral judgments between women and men. The female approach is based on attachment and caring while the male approach is based on separation and individuality. Thus, women tend to base judgments in larger part on the preservation of relationships while men tend to make judgments more strongly on rules of justice and fairness. Numerous studies have found that females are more empathic than males (e.g., Eisenberg & Lennon, 1983; Hoffman, 1977). In an extensive review of the literature, Hall (1978) reported that females were better than males at decoding and interpreting visual and auditory cues about others' affective states.

The self-in-relation perspective to gender differences offers one possible explanation for why women may be more vulnerable to traumatic events than men. Using this perspective, women could be more vulnerable to interpersonal traumatic events because relationships are more closely tied to personal identity and sense of self. If a woman's sense of herself and her self-esteem is closely tied to "...being able to make and then to maintain affiliation and relationships" (Miller, 1986), then she would be particularly vulnerable to the violation of these relationships by others. In this way, the experience of assault by another person, particularly in a close trusting relationship, may lead to strong tendencies to restore the relationship or to blame herself for losing the relationship or causing the assault.

Studies reviewed in this chapter have reported that women are more likely to experience interpersonal trauma then men (Norris, 1992; Kessler et al., 1995). They are more likely to be traumatized by someone they know, and are much more likely to experience sexual trauma. Using a self-in-relation perspective, one can surmise that these are precisely the types of traumatic events to which women would have the most difficulty coping. Thus women may have higher prevalence rates of PTSD than men because the types of trauma that they tend to experience are the types of

traumas to which they are most vulnerable. The types of traumas that women are more likely to be exposed to—domestic violence, rape, childhood sexual abuse—are so laden with relational meanings that they would lead to profound reappraisals of "connections" with others. Such connections are a critical factor in women's development and are integrally linked to a woman's sense of identity and self (Jordan and Surrey, 1986; Miller, 1986). Further, as interconnections are so important for women, the impact of disclosing the traumatic experiences in interpersonal relationships are particularly salient for women. Disclosure of trauma, particularly rape, may have devastating effects on one's relationships with others (Herman, 1992). No study has examined sex differences in rates of disclosure after a traumatic experience, but one would expect that the experience of disclosing an interpersonal trauma would be different for women for the reasons outlined above. As the propensity to disclose and share one's experience is generally an important protective factor after a traumatic event (Pennebacker & Sussman, 1988), this difficulty could contribute to the observed vulnerability of women to traumatic events.

Traumatic events are alienating experiences. Victims frequently feel totally alone. As Herman (1992) has written

> *Traumatic events call into question basic human relationships. They breach the attachments of family, friendship, love, and community. They shatter the construction of the self that is formed and sustained in relation to others.... The damage to relational life is not a secondary effect of trauma, as originally thought. Traumatic events have primary effects not only on the psychological structures of the self but also on the systems of attachment and meaning that link individual and community (p. 51).*

This experience of disconnection is very difficult for women. It is fueled by the consistent finding that the types of traumatic events that women tend to experience are private (sexual trauma, domestic violence) and, at times, cannot be shared without severing relations with one's community. The experience of support and belonging that individuals acquire through membership in community is a critically important factor for recovery after trauma (Harvey, 1996).

A particular manner in which interpersonal traumas may leave women increasingly vulnerable, and would be expected from a self-in-relation perspective, concerns the way in which women tend to attribute responsibility for these events. Studies have demonstrated that females are more likely to attribute blame for events to themselves than to others (Fischer, 1992). Traumatic events in particular are more likely to lead to self-blame among female than male victims. Fischer (1992) found that female child abuse victims were more likely to blame themselves for the abuse and to display confusion about what behaviors constituted abuse and assault than male victims. Males were more likely to attribute blame to the perpetrator. Such differences in attributional styles have significant implications for outcome after a traumatic event. Gidycz and Koss (1991) found that college age females who blamed themselves for a traumatic event had significantly poorer outcomes than those who did not blame themselves. There are many possible explanations for such differences in attributional style. A self-in-relation perspective would explain such differences through women's greater need to maintain, restore, and repair relationships.

The self-in-relation perspective focuses on social and developmental differences between women and men and offers important ways to understand why women could have greater vulnerability to traumatization. Specifically, as women's development is integrally related to connections with others, women may be vulnerable to the types of trauma they encounter, to the degree that these are relationship-based. This perspective offers ways of understanding why women may blame themselves after a trauma and fail to disclose the trauma. Although the self-in-relation perspective offers many ways to understand gender-related differences in response to interpersonal trauma, it is limited by the fact that no studies have directly compared the impact of relationships on traumatized women and men. These ideas are testable and require studies on how traumatized men and women experience relationships and the impact of this experience on posttraumatic sequelae. Further, studies can evaluate variables such as how traumatized women and men attempt to maintain and restore relationships and how they make decisions about disclosing the trauma.

3. Social-Cognition Perspective. Social-cognition theories describe gender as a "social category" (Ashmore, 1990; Cross & Markus, 1993; Deaux, 1984). According to this perspective, an individual's gender identity is partially determined by the meanings of being a male and female in the social environment in which an individual grows up and lives. Social-cognition theorists describe gender as a central organizing construct by which individuals develop a self-concept and the way in which this self-concept is constructed is strongly influenced by the social meanings of being a male or female in a given environment. In a comprehensive review of these ideas, Ashmore (1990) describes the factors that lead to the development of gender identity as (1) the influence of culture, (2) relationships with specific men and women, and (3) self-guided activities (activities that children engage in have a self-perpetuating influence on gender identity). According to this view, biology has an important place in the development of gender identity, in that identity begins with the awareness of physical difference, but this identity is impacted more by social environment.

Cross and Markus (1993) describe gender as a basic dimension used to divide the universe "perhaps second only to what is part of the self and what is not part of the self" (p. 58). Gender is one of the first social categories acquired by children (Slaby & Frey, 1975; Spence, 1985). This category is powerfully used by children to understand themselves and others and, once developed, determines a great deal of subsequent behavior (Sherif, 1982). Cross & Markus (1993) describe the influence of gender as so pervasive that "...referring to it as a role or a category, while useful in detailing its precise behavioral consequences, runs the risk of trivializing the importance of gender identity in human experience" (p. 59).

In order to fully understand the meaning of the different prevalence rates of PTSD between men and women, it is critical to understand how gender is constructed as a social category and the power of this category to influence the thoughts, feelings, and beliefs of traumatized individuals. Such an understanding requires research which directly compares the thoughts and beliefs of traumatized women and men, and examines the effect of these cognitions on symptoms and behavior. In order to definitively understand the influence of the social categorization of gender, such studies must directly measure gender identity and cognitions about gender. In the absence of such studies, notions about the influence of the social categorization of gender are preliminary. Nevertheless, given the power of this category, it is critical that PTSD researchers and clinicians consider the possible influences of gender on their subjects and patients. With these caveats, we offer the following hypotheses about the influence of the social categorization of gender on the development of PTSD.

In many social environments, boys and girls learn that men are active, aggressive, and instrumental while women are passive, relational, and emotional (Ashmore, 1981; Ashmore, Del Boca, & Wohlers, 1986; Eagly, 1987). Although such notions of gender are changing somewhat as women enter the work force, there is evidence that they have changed little in the past twenty-five years (Bergen & Williams, 1991; Heilman, Block, Martell, & Simon, 1989). These notions of the meanings of gender are repeatedly reinforced by family, school, community, and culture (Hoffman & Hurst, 1990; Hyde, Krajnik, & Skuldt-Niederberger, 1991). These notions are remarkably similar across cultures (Kenrick & Trost, 1993). For a great many reasons, individuals are motivated to conform to these shared social notions about gender. Social environments, of course, vary in the degree to which the above gender meanings are accepted and expressed. Individuals also vary in terms of the degree to which (1) gender as a social category is integrated into self-concept and (2) the above notions of gender are a part of that self-concept (Ashmore, 1990). Nevertheless, most studies of men and women, at least in western culture, have found a high degree of acceptance of the above notions of gender (Ashmore, 1981; Ashmore et al., 1986; Eagly, 1987).

Using a social-cognition perspective, one can surmise the differential impact of trauma on women and men by understanding how the meanings of the traumatic event relate to the shared meanings of being a woman or man in a given social environment. Traumatic events lead to profound feelings of passivity, helplessness, and powerlessness (Herman, 1992). The event is usually unexpected, and, frequently, victims

feel that their life is in jeopardy. During the event, the victim feels out of control and terrified. Later, if individuals are stricken with intrusive memories of the trauma, the feelings of passivity, helplessness, and terror are repeatedly relived. We believe this experience of passivity and helplessness is different for women and men. First, this experience is likely to be more dissonant with the social construction of masculinity than femininity. In most cultures, men have few frames of reference for the role of victim: They are not viewed as passive or helpless. In addition, the shared social notion of masculinity is as active, in control, and aggressive. The shared social notion of femininity, in contrast, is more passive and vulnerable (Ashmore, 1981; Ashmore et al., 1986; Eagly, 1987).

If it is true that cognitions related to traumatic events are more dissonant to male than female gender identity, the impact of this dissonance on traumatized individuals must be considered. Festinger (1957) proposed that cognitive dissonance is distressing and that individuals will be motivated to reduce this dissonance. Typically, cognitive dissonance can be reduced by altering cognitions or behavior. Traumatized men who experience a dissonance between their cognitions related to their gender (e.g., active, strong, in control) and their cognitions related to trauma (e.g., passive, weak, and helpless) may be motivated to change their thoughts and behavior in very meaningful ways. Men may be motivated to alter their cognitions about their gender identity in less adaptive (e.g., "I am not a 'real' man") or more adaptive ways (e.g., "Men are not always strong"). Men may also be motivated to alter their thoughts and beliefs about the trauma (e.g., "what trauma?", "it was no big deal," "life goes on...don't dwell on the past"). Men whose beliefs about their gender are particularly threatened may change their behavior in destructive ways in order to reduce cognitive dissonance. Aggressive behaviors and perpetration of trauma are well described in traumatized males (e.g., Groth & Burgess, 1980; Lewis, 1992) and may be motivated by this need to reduce dissonance ("I really am a man if I can assault you"). We thus hypothesize that the cognitive dissonance between constructs of masculinity and trauma create strong motivation in men to alter their thoughts and behavior in order to reduce the experienced impact of the trauma. To the degree that women experience less cognitive dissonance, they may be less motivated (for this reason at least) to minimize the impact of trauma. As described in the previous section, there are other reasons why females may be motivated to minimize the impact of trauma.

It is important to consider how shared social constructions of gender may influence clinicians and researchers in their assessments of traumatized individuals. There is very little empirical data on this topic. It should be stated at the outset that clinicians and researchers have historically not acknowledged the impact of sexual trauma on women (Herman, 1992). One can speculate, however, using a social-cognition perspective that clinicians and researchers may be less likely to acknowledge the impact of trauma on men because they share a social construct of gender. In other words, as clinicians and researchers have shared social constructs of men as active, instrumental, and aggressive; and women as passive, dependent, and emotional, they may similarly experience cognitive dissonance while assessing male trauma. As, we suspect, a primary means of reducing such cognitive dissonance is altering cognitions to minimize the impact of trauma, this could occur while assessing traumatized men and may be a reason that the prevalence rate of PTSD is higher in women. Consistent with this notion are findings that clinicians are more likely to diagnose women than men as depressed, independent of the degree of symptoms (Loring & Powell, 1988). Studies have also found that observers have important gender-related biases about the emotional state of others. For example, a well-known study had subjects observing a videotape of a baby playing with a jack-in-the-box toy and were told that the baby was either male or female. The baby cried at one point in the videotape when the jack-in-the-box opened. Subjects who were told that the baby was a girl were more likely to label the emotion as "fear." Subjects who were told that the baby was a boy were more likely to label the emotion as "anger." Although the total mechanisms for such judgments are not fully understood, this study suggests that observers judge the emotional state of others in ways that are at least partly consonant with their own beliefs about gender (Condry & Condry, 1976).

Using a social-cognition perspective, we hypothesize a cognitive dissonance in males between gender-related cognitions and trauma-related cognitions that is not experienced by females. We hypothesize that this dissonance influences men to minimize the impact of trauma and may be a reason for the difference in prevalence rates of PTSD between men and women. This dissonance may also contribute to changes in gender-related cognitions and to aggressive behavior in traumatized men. Women may be more likely to report posttraumatic symptoms because they can more easily acknowledge these symptoms than men. Clinicians and researchers may falsely elevate estimations of the prevalence rates of PTSD in women because of shared social biases about men and women. These ideas are, of course, preliminary but are testable and require the assessment of trauma and gender-related cognitions in comparably traumatized women and men.

SUMMARY AND CONCLUSIONS

Accumulating evidence supports a higher prevalence rate of PTSD in women than men. Well-designed epidemiological studies have found that women have approximately twice the rate of PTSD despite the fact that they are less likely to be exposed to traumatic stressors (Norris, 1992; Kessler et al., 1995). These data are compelling, but, as we have reviewed, the relationship between gender and trauma is multidimensional and complex. Differences between men and women on numerous variables, including types of trauma, reporting styles, and observer biases about gender, limit the interpretations of data related to definitive gender differences and PTSD. Further, the lack of studies which directly compare traumatized males and females on all but the most rudimentary descriptive indices makes any conclusions about gender and PTSD preliminary.

This chapter has filtered data from many sources through the lenses of three different psychological perspectives on gender. We have identified a number of important vulnerability factors for women. We have also found a number of different ways in which estimations of the higher prevalence of PTSD in women may be distorted. In our review of the literature, we have found evidence of differences in brain morphology and function that could lead to certain forms of vulnerability in women. Evidence of increased female vulnerability to trauma was also identified in a number of neurotransmitter systems. Review of the psychodynamic literature suggests that women may have a particular vulnerability to traumatic stressors that they encounter frequently. The social-cognition literature suggests a mechanism by which men may minimize the impact of trauma to themselves and to others. Such social interpretations could also be shared by clinicians and researchers, and lead them to minimize the impact of trauma on men.

We are aware that, in the absence of studies that directly compare traumatized men and women or that measure the construct of gender, such conclusions make important and unsubstantiated assumptions. At the very least, we hope that readers will find our review of these three perspectives on gender useful in their own struggle to understand their patients and to make sense of the existing data on sex differences and PTSD.

The future offers a number of important research directions. First, there are opportunities to study gender differences and PTSD across a range of neurobiological systems. To date, women have largely been excluded from neurobiological studies of PTSD. As we reviewed, there may be important gender-related biological differences between PTSD in women and men. There is also reason to believe that there are important neurobiological differences in women across the life span and across the menstrual cycle. As women may have particular developmental vulnerabilities to interpersonal traumas, there are important opportunities to study the meanings of relationships in traumatized women and men, and to discover the degree to which this relates to outcomes. There are also opportunities to study traumatized women and men within the context of relationships and to determine dynamic differences in emotional responsivity. We have suggested a number of important cognitive differences between traumatized men and women. Although we have hypothesized cognitive dissonance as one mechanism explaining differences between traumatized men and women, there are many other

testable ideas about the effect of trauma on cognition. We also strongly believe that, in order to fully understand the relationship between gender and PTSD, studies must actually measure a variety of gender correlates and not simply sex as a binary variable.

We are aware that there are a great many other responses to trauma than PTSD. For clarity and focus, we decided to primarily examine the relationship between gender and PTSD. There are many known sex differences in other disorders that are commonly described in traumatized individuals, such as: dissociative disorders (Saxe et al., 1993), somatoform disorders (Cloninger, Martin, Guze, & Clayton, 1986; Pribor, Yutzey, Dean, & Wetzel, 1993; Saxe et al., 1994), personality disorders (Gunderson, Zanarini, & Kisiel, 1991), mood disorders and other anxiety disorders (e.g., Robins & Regier, 1991; Robins et al., 1984). There is a need to understand the gender-related differences in these responses to trauma. Also, the high comorbidity of PTSD with these disorders raises other questions. The well-known difference between internalizing and externalizing symptoms between males and females, respectively, must be understood. We have alluded to some answers in this chapter, but, clearly, there is a great need to study these issues.

Gender continues to be a powerful construct that is highly influential in diverse contexts. Thus far, clinicians and researchers interested in trauma and PTSD have little empirical data to guide their practice and studies. We hope that the ideas presented in this chapter add to an ongoing effort to understand how gender and trauma are related, and contribute to the development of a new gender-based research agenda in PTSD.

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