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A Family Study of PTSD: Occurrence and Correlates of Internalizing Disorders in
Children of OIF/OEF Soldiers with Combat Posttraumatic Stress Disorder

A dissertation submitted in partial satisfaction of the
requirements for the degree Doctor of Philosophy

in

Clinical Psychology

by

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2011

EPIGRAPH

Let us strive on to finish the work we are in,
to bind up the nation's wounds,
to care for him who shall have borne the battle
and for his widow and his orphan.

Abraham Lincoln

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Letamendi, A., Chavira, D., Hitchcock, C., Roesch, S., Shipon-Blum, E., & Stein, M. B. (2008). The Selective Mutism Questionnaire: Measurement structure and validity. *Journal of the American Academy of Child and Adolescent Psychiatry, 47*, 1197-1204.

Letamendi, A., Chavira, D., & Stein, M. B. (2009). Issues in the assessment of social phobia: A review. *Israel Journal of Psychiatry and Related Sciences, 46*, 13-24.

Simon, N. M., Herlands, N. H., Marks E. H., Mancini, C., Letamendi, A., Li, Z., et al. (2009). Childhood maltreatment linked to greater symptom severity and poorer quality of life and function in social anxiety disorder. *Depression and Anxiety, 0*, 1 - 6.

Ravindran L., Kim, D., Letamendi, A., & Stein, M. B. (2009). A randomized control trial of atomoxetine in generalized social anxiety disorder. *Journal of Clinical Psychopharmacology*, 29, 561-564.

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Letamendi, A., Espinosa de los Monteros, K., & Ulibarri, M. (2008, November). *Sociocultural Adaptation of Group Cognitive Behavioral Therapy for Distressed Latina Immigrants in the U.S.* Poster presented at the National Latina/o Psychological Association Conference, Costa Mesa, CA.

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Treatment Utilization among Older Rural U.S. Latinos with Anxiety and Depression.

Poster presented at the annual meeting of the Association for Behavioral and Cognitive Therapies, New York, NY.

Marks, E. H., Simon, N. M., Herlands, N. N., Mancini, C., Letamendi, A. M., Li, Z. et al.

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Poorer Quality of Life and Function in Social Anxiety Disorder. Poster presented at the annual meeting of the Association for Behavioral and Cognitive Therapies, New York,

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June). *Siblings of Children with Selective Mutism: Social Phobia Fears and Comorbidity.*

Poster presented at the 6th World Congress of Behavioral and Cognitive Therapies.

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research, practice, and networking. Paper presented at the annual meeting of the

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Letamendi, A. M., Hitchcock, C. A., Ball, T. M., Chavira, D. A., & Stein, M. B. (2010,

November). *A Family Study of PTSD: Predictors of Anxiety in Children of OIF/OEF*

Soldiers with Posttraumatic Stress Disorder (Preliminary Findings). Paper presented at

the Child and Adolescent Anxiety Special Interest Group meeting at the annual conference of the Association for Behavioral and Cognitive Therapies. San Francisco, CA.

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Letamendi, A. M., Rosenberg, R., Langley, T., & Wein, L. (2011, July). *The Superhero Battlefield: Resiliency in the Face of Loss and Destruction*. Paper presented at the annual meeting of Comic-Con International. San Diego, CA.

ABSTRACT OF THE DISSERTATION

A Family Study of PTSD: Occurrence and Correlates of Internalizing Disorders in
Children of OIF/OEF Soldiers with Combat Posttraumatic Stress Disorder

by

Andrea M. Letamendi

Doctor of Philosophy in Clinical Psychology

University of California, San Diego, 2011
San Diego State University, 2011

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Posttraumatic stress disorder (PTSD) is one of the most common psychiatric disorders among U.S. combatants who are deployed to Operation Iraqi Freedom and Operation Enduring Freedom conflicts (OIF/OEF). Combat PTSD has been shown to be associated with impaired social, occupational, and physical functioning. An understudied area of

research is how PTSD from combat affects interpersonal functioning at the family level. Of particular vulnerability to disruption in relational systems is the parent-child dyad. The present study focused on parental PTSD, child environment, and child psychological symptoms in order to begin delineating pathways connecting parent trauma to child psychopathology.

The sample consisted of 21 dyads: Adult participants with and without combat-related PTSD and biological child participants (aged 6 – 17). Parents and children were administered structured diagnostic interviews and dimensional measures of anxiety, depression, and PTSD and home environment. Simple linear regression was used to test a predictive model between fathers' level of PTSD symptoms and child clinical symptoms. Multiple regression was used to test the mediation model of child home environment on the relationship between parent and child symptomatology.

Results from descriptive analyses showed that level of fathers' combat exposure was a significant predictor at the $\alpha = 0.05$ level for child anxiety, PTSD symptoms, oppositional, and conduct problems. However, level of fathers' combat exposure did not predict child depression, somatization, or withdrawn symptoms. Results showed no interaction effects.

This pilot study demonstrates that the experiences of OIF/OEF combatants such as the nature of their combat exposure during deployment may be important in impacting the psychological outcomes of their offspring. Furthermore, the warzone experiences of OIF/OEF combatants during deployment appear to predict child anxiety, PTSD, and externalizing symptoms, but not child depression, withdrawn symptoms, or somatization. Results of this pilot study should be considered preliminary and the design should be

replicated with a larger sample of OIF/OEF combatants. The current findings may be relevant in advancing our knowledge of etiological models of psychiatric illness in youths, identifying at-risk individuals during early life stages, and advancing mental health interventions for military families.

Introduction

The lifetime prevalence rate of posttraumatic stress disorder (PTSD) is between 7% and 8% (Kessler, Berglund, Demler, Jin, & Walters, 2005; Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995). Among adults, soldiers sent to fight wars are the most at risk for trauma exposure and the development of PTSD. Veteran rates of trauma exposure are nearly 20% higher than civilian samples, with lifetime PTSD four times the rate of civilians (Keane, Marshall, & Taft, 2006). A disconcerting trend is emerging from research on veterans returning from Operation Iraqi Freedom and Operation Enduring Freedom (OIF/OEF) which not only replicated previous veteran rates of PTSD (Seal, Berterntal, Miner, Sen, & Marmar, 2007), but also demonstrated an increase of PTSD prevalence at six-month follow-up among OIF/OEF soldiers (Milliken, Auchterlonie, & Hoge, 2007). Conceptually, these rates are consistent with the trauma literature which has established a higher risk for PTSD among survivors of traumatic events that are human generated or interpersonal in nature (Charuvastra & Cloitre, 2008; Ozer, Best, Lipsey, Weiss, 2003). Taken together, these findings raise critical questions about the functioning of interpersonal networks following “human-intent” traumas such as combat violence. The symptomatology of PTSD from war-zone exposure includes hypervigilance, elevated startle response, increased irritability, sleep disturbance, avoidance of close relationships, and impulsivity. How do combat trauma survivors maintain relationships against the experience of interpersonal violence or violation? Is there a disruption of human bonding following exposure to combat stressors, and, if so, at which level of functioning? Of particular vulnerability to disruption of relational bonds is the parent-child dyad, as this relationship constitutes a seminal role in the

psychological development of youth. Most veterans who have endured combat-related trauma are male, yet little is known about the psychiatric functioning of children cared for by fathers experiencing combat PTSD. With 1.2 million children under 18 with a military parent in the U.S. (Stephens, Harrison, Wilson, Ringler, & Robinson, 2003), identifying at-risk groups in this population addresses a national health need, bridges a gap in the trauma literature, and elucidates potential sensitive developmental periods along mental health trajectories.

Though few studies have addressed the impact of PTSD on parenting and child psychiatric functioning, some noteworthy research has examined correlates of parenting with posttraumatic distress. From these studies, it has been shown that posttrauma parenting is associated with increased parent aggression towards offspring, child misbehavior, child hostility, and overall poor family functioning (Lauterbach, Bak, Reiland, Mason, Lute & Earls, 2007; Ruscio, Weathers, King, & King, 2002; Glenn, Beckham, Feldman, Kirby, Hertzberg, & Moore, 2002; Davidson & Mellor, 2001). However, the majority of reports on child functioning in prior research has been made by parents—often during symptomatic phases of their PTSD. Furthermore, the assessment of internalizing symptoms in their children has not been explicitly examined in the same way that child externalizing behaviors have been examined. This is surprising given the wealth of data demonstrating the familial loading of anxiety disorders (Hettema, Neale, & Kendler, 2001). Finally, because children with anxiety and related internalizing disorders often go unrecognized—and disproportionately so when compared to children with externalizing disorders (Chavira, Stein, Bailey, & Stein, 2004)—it is likely that a significant portion of youth who are parented by a caregiver with PTSD may be anxious

and depressed. Overall, the impact of PTSD on parenting deserves further attention within the research on detection of early-life familial risk markers of abnormal behavior. Therefore, this study aimed to elucidate whether parental posttraumatic stress leads to youth dysfunction along psychiatric dimensions such as anxiety and depression. This project represents a forward step in the science of traumatic stress by elucidating correlates between parent PTSD, family functioning, and child psychopathology.

To summarize, this family study of PTSD hypothesizes a predictive relationship between parental posttraumatic response and child psychological functioning, and explores whether that relationship is mediated by measurable characteristics of family functioning. The study comprised a sample of 21 OIF/OEF servicemen with at least one biological offspring living at home between the ages of 6 and 17 in order to test the following aims:

Exploratory Aim 1: Characterize the psychological functioning of youths of fathers with combat PTSD across observed variables from clinical assessments.

Specific Aim 1: Determine the strength of the relationship between combat-related PTSD in fathers and youth psychological functioning. It is hypothesized that increased paternal posttraumatic stress symptoms will be predictive of increased internalized symptoms in children (Figure 1).

Specific Aim 2: Examine the role of family functioning on the relationship between combat-related PTSD in fathers and offspring psychopathology. It is hypothesized that *unbalanced styles* of family functioning will mediate the relationship between paternal PTSD and internalizing symptoms in children (Figure 1).

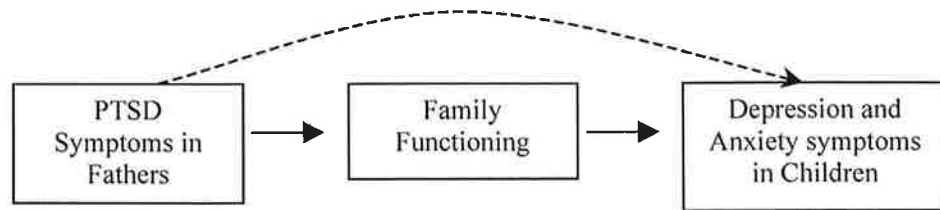


Figure 1: Predicted relationships between paternal PTSD, family functioning, and internalizing disorders in youth.

Background

The impact of parental mental illness

Research on parental psychopathology and offspring functioning has focused mainly on maternal depression, now a well-established risk factor for psychiatric illness in youth (Pilowsky, Wickramaratne, Rush et al., 2006; Martins & Gaffan, 2000; Murray, Fiori-Cowley, Hooper, & Cooper, 1996). Children of depressed mothers have high rates of disruptive behavior, depressive, and anxiety disorders (Weissman, Pilowsky, Wickramaratne et al., 2006). Furthermore, early-life symptoms may develop into long-term adult problems; maternal dysphoria during a child's early years has been shown to be related to greater social impairment in teen and early adult years (Weissman, Warner, Wickramaratne, Moreau, & Olfson, 1997). The mechanisms by which parent psychopathology transmits child illness remain unclear, though likely involves the complex interplay of genetic, neurobiological, neurocognitive, and environmental factors. Promising results from one treatment study demonstrate that *wellness* is also an intergenerational phenomenon: Remission of maternal depression (after treatment) was associated with remission of child psychopathology (Weissman, Pilowsky, Wickramaratne et al., 2006). This "intergenerational remission" suggests an underlying environmental influence with a measurable impact on child functioning. Research on treatment of maternal depression, therefore, draws attention to the role of environmental mechanisms responsible for the transmission of parental illness, while also alerting us to the value of child mental health evaluation when a parent is identified with psychiatric illness. **The study examines and describes the psychiatric illness among children during a period in which their caregiver endures combat PTSD, in order to begin to**

understand whether intergenerational disease-models hold true for a traumatic stress disorder.

The impact of PTSD

PTSD is a disabling psychological condition characterized by symptoms of reexperiencing, avoidance, and hyperarousal stemming from an event in which the person was exposed to serious threat of injury or death (APA, 1994). The general population lifetime prevalence of PTSD ranges from 7 to 12% (Kessler et al., 1995; Breslau, 2001).

Adults with PTSD experience considerable psychological, social, occupational, and physical impairment associated with the disorder. Depressed mood, poor life satisfaction, legal problems, and job loss are common problems associated with PTSD (Keane, Marshall, & Taft, 2006). Physical health conditions associated with PTSD are highlighted by the higher prevalence rates of PTSD in primary care than in the general population (11-12%; Stein, McQuaid, Pedrelli, Lenox, & McCahill, 2000), and findings on the direct relationship between PTSD symptoms and dysregulation of autonomic and central nervous systems further underlie the premise that the disorder compromises physical health (Schnurr & Jankowski, 1999). However, **the impact of adult PTSD on family functioning is a less studied area of impairment.**

PTSD disrupts social and familial bonds

In recent years, PTSD has been conceptualized as a *relational* phenomenon, with dysfunction not circumscribed at the individual level, but operating on a broader, social-attachment level (Renaud, 2008; Charuvastra & Cloitre, 2008; Zulueta, 2007; King, Taft, King, Hammond, & Stone, 2006; Scheeringa & Zeanah, 2001). Figure 2 graphically represents the correlates of adult PTSD in regards to social and interpersonal bonds

according to the current literature. For example, studies that have explored the relational impact of PTSD in adults point to poorer social support (King et al., 2006), avoidant attachment styles (Renaud, 2008); disrupted marital relationships (Riggs, Byrne, Weathers, & Litz, 1998), and divorce (Jordan, Marmar, Fairbank, et al., 1992).

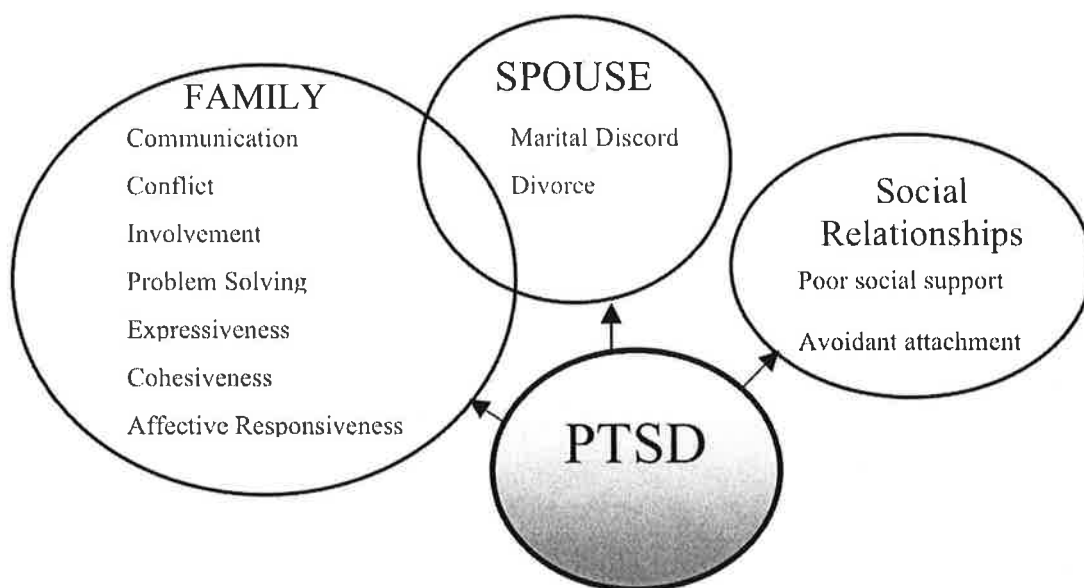


Figure 2: Social-Attachment Correlates of PTSD in Adults

Though little research has explored family level impairment as a result of PTSD, the disorder has been implicated as a correlate of unhealthy family behavior. Two studies on combat veterans have demonstrated a relationship between PTSD and unhealthy family functioning. One is a study in which Australian Vietnam veterans reported their family functioning across three groups: veterans with PTSD, veterans with no PTSD, and civilians (Davidson & Mellor, 2001). Fathers and offspring ages 14 and older were mailed self-report assessments on the dimensions of affective involvement, affective

responsiveness, communication, behavior control, roles, and problem solving through self-report questionnaires. The study found that veteran fathers with PTSD rated their family communication as indirect, vague, and less healthy than both non-PTSD veterans and civilian fathers. (Davidson & Mellor, 2001). Similarly, veteran fathers with PTSD rated their family members as less interested and involved with each other than both non-PTSD veterans and civilian fathers. Additionally, veteran fathers with PTSD perceived their families as less able to respond to individual family members with appropriate affect. Youth ratings were similar: Offspring of veterans with PTSD rated their families as less skilled in the areas of problem solving and affective responsiveness compared to youth ratings of non-PTSD veteran and civilian families. Furthermore, youths in families of veterans with PTSD rated their families as lower in overall global functioning when compared to non-PTSD veteran and civilian youth ratings. Taken together, these findings demonstrate a correlation between PTSD in fathers and lower family functioning in regards to communication, affective responsiveness, and problem solving, although it remains unclear whether these deficits preceded combat trauma or PTSD of the parent. Authors speculated that emotional numbing associated with PTSD may have created barriers to communication (Davidson & Mellor, 2001).

Similarly, a study on Israeli soldiers during the 1982 Lebanon War measured aspects of family environment and levels of PTSD (Solomon, Mikulincer, Freid, & Wosner, 1987). Specifically, combat-exposed soldiers who had been referred to mental health personnel reported on the family dimensions of cohesiveness, expressiveness, and conflict one year following the end of the Lebanon War. *Cohesiveness* referred to the degree in which family members help and support each other; *expressiveness* referred to

the degree of openness and sharing of feelings; and *conflict* referred to which anger, violence, and struggle characterized the family. The study found that higher rates of PTSD were correlated with low levels of expressiveness and low levels of cohesiveness. High levels of family conflict also correlated with higher rates of PTSD, but this relationship did not reach statistical significance (Solomon et al., 1987). Authors speculated that both cohesiveness and expressiveness may assist in the natural course of recovery from PTSD (Solomon et al., 1987). The authors also cautioned that interpretation of their results is problematic in that it was unclear whether families did not permit veteran fathers to express themselves or whether fathers did not make use of communicative avenues provided by other family members (Solomon et al., 1987).

The above-described studies on family and interpersonal areas of impairment associated with PTSD are compelling. However, the mechanism(s) by which posttraumatic symptoms interfere with interpersonal functioning and bonding are unknown. One hypothesis surrounds the specific features common in adults with PTSD—self-isolation, detachment, dissociation, and angry outbursts (King et al., 2006). The family—the immediate, most proximal, and primary social network—would be the level most impacted by these impairments. If family functioning is disrupted, what is the impact of a caregiver’s PTSD on the functioning of offspring during developmental stages of childhood and early adolescence? To date, PTSD research on children typically place the focus on child trauma, child maltreatment, and child exposure to parent trauma (e.g., domestic violence), limiting our understanding of *parental* PTSD on the functioning of youth. When revisiting Figure 2 and the correlates of PTSD in adults in respect to relationships and bonding, it is clear that the parent-child dyad is an

understudied, missing piece of the possible impact of PTSD. **Given the isolating and detachment features central to PTSD, and the findings on impaired interpersonal and family functioning associated with these features, examining the impact of parent PTSD on youth psychiatric functioning is the next step in understanding complex mental illness risk and protective processes during early-life periods in which internalizing symptoms may begin to manifest.**

The importance of trauma type

Trauma type explains almost 17% of variance in the rate of PTSD and is the strongest predictor of severity (Frans, Rimmo, Aberg, & Fredrikson, 2005). Combat exposure, childhood abuse, rape, and physical assault constitute human intent (or man-made) traumas, whereas accidents, natural disasters, and witnessing a trauma are non-personal in nature and are half as likely to result in PTSD (Kessler, McGonagle, Zhao, et al., 1994; Kessler et al., 1995; Kessler & Merikangas, 2004). One explanation for these findings is that appraisal of threat is higher when it is interpersonal in nature (Ozer et al., 2003). Indeed, perceived distress explains more variance in PTSD development than other factors such as ethnicity and gender (Frans et al., 2005). Thus, human-intent trauma may be associated with higher levels of subjective distress and therefore more likely to result in the development of PTSD. These findings support an ecological approach to PTSD as a social-attachment disorder wherein social or interpersonal mechanisms are disrupted to the degree the experiential stressor is interpersonal (Zulueta, 2007; Charuvastra & Cloitre, 2008). As explored in the next section, the impact of human intent/interpersonal trauma is pervasive and spans generations.

PTSD in the caregiver: Lessons from the Nazi Holocaust and Vietnam War

Few studies have examined the effects of parental PTSD on youth functioning. However, a small body of research examining the intergenerational effects of PTSD focuses on the adult offspring of Holocaust survivors. Though respondents are adults, retrospective reports on their early experiences are meaningful. For example, adult offspring of Holocaust trauma survivors report higher levels of their own childhood emotional abuse and neglect compared to offspring of individuals not exposed to Holocaust trauma (Yehuda, Halligan & Grossman, 2001). This effect was attributed to the presence of PTSD in the Holocaust survivor parent, with a greater effect for offspring of parents who both had Holocaust-related PTSD. Authors conclude that parental PTSD, rather than trauma per se, is a consequential variable in the prediction of childhood trauma (Yehuda et al., 2001). They speculate that parents recovering from trauma such as the Nazi Holocaust may not be equipped to respond to their traumatized offspring with the appropriate emotional connectivity; in turn, their offspring may experience guilt and blame associated with their parents' trauma, and may perhaps experience the world as dangerous (Yehuda et al., 2001).

A similar intergenerational study from the same research group examined psychiatric disorders in offspring of Holocaust survivors (Yehuda, Halligan, & Bierer, 2001). Comprehensive psychiatric interviews were administered across three groups of adult offspring categorized by parents' characteristics: Holocaust survivor parent with PTSD, Holocaust survivor parent without PTSD, and parent with no Holocaust exposure. Findings demonstrated a correlation between adult offspring PTSD and parental PTSD (Yehuda et al., 2001). In addition, parental trauma exposure, rather than parental PTSD,

was associated with lifetime depressive symptoms in adult offspring (Yehuda et al., 2001).

Investigators are now able to study the intergenerational impact of trauma surrounding third generation offspring of Nazi Holocaust survivors. One study assessed the psychosocial functioning of the second and third generation of Holocaust survivors in a metropolitan area of Northern Israel (Scharf, 2007). Adolescent males ages 17 and 18 with parents who were offspring of Holocaust survivors were assessed on coping, attachment styles, and parenting representations. Third generation adolescents in families where both parents who were Holocaust survivor offspring perceived their mothers as less accepting and less encouraging of their independence, compared to adolescents with one or no parent who was a Holocaust survivor offspring. Similarly, these adolescents perceived their fathers as less accepting and less encouraging of their independence compared to adolescents with one or no parent who was a Holocaust survivor offspring. Additionally, second generation participants rated their own parent satisfaction as lower than that of offspring of parents without Holocaust backgrounds (Scharf, 2007). Holocaust researchers acknowledge the limitations of retrospective accounts of experiential factors. However, Holocaust studies bring to light the pervasive, chronic impact of traumatic stress on families of survivors.

A similar intergenerational model of PTSD has been hypothesized and examined among Vietnam combat veterans and their offspring. These findings are generally consistent with Holocaust studies in they provide some evidence that PTSD in caregivers has a transmission or transactional effect on offspring. In a study examining father-child relationships and PTSD symptom clusters among Vietnam vets, severity of paternal

numbing was most highly associated with poor father-child relationships compared to other paternal PTSD symptoms (Ruscio, Weathers, King, & King, 2002). Fathers reported on their own symptoms (categorized by PTSD clusters of reexperiencing, avoidance and numbing [effortful avoidance vs. emotional numbing] and hyperarousal), as well as their perceived relationships with their children across dimensions of dyadic functioning. Children, who were not participants themselves, ranged from infancy to 39 years of age. Results demonstrated that severity of emotional numbing in fathers was associated with higher ratings of misbehavior in their children and disagreement/disapproval of them by their children, and lower ratings of mutual sharing, overall contact between fathers and children, and overall relationship quality (Ruscio et al., 2002). The authors theorized that the disinterest, detachment, and emotional unavailability in fathers with severe numbing symptoms of PTSD may hamper their ability to seek out and enjoy interactions with his children. Conversely, authors emphasize the unknown direction and causality of the relationship found between paternal symptoms and father-child relationship quality and suggest that future research elucidate the nature of this relationship.

In a replication and extension of the Ruscio et al. study (2002) described above, Samper and colleagues examined parenting satisfaction among Vietnam veterans with combat-related PTSD (Samper, Taft, King & King, 2004). In this study, parenting satisfaction referred to fathers' reports of their efficacy as parents, their perception of the quality of the child-parent relationship, their satisfaction of how their children were "turning out", and the problems the children presented (Samper et al., 2004). Results demonstrated that PTSD symptom severity in fathers with combat-PTSD was negatively

correlated with parental satisfaction, with the avoidance/numbing symptoms the most strongly related to lower self-ratings of parenting satisfaction when compared to other symptom clusters. Furthermore, the inverse relationship between parent satisfaction and PTSD held after controlling for substance abuse and depression (Samper et al., 2004). The authors speculate that veterans' feelings of detachment and inability to regulate emotions may carry over the parent-child relationship. However, it was unclear in this study whether children experienced similar dissatisfaction surrounding their relationship with their fathers. Given the complexity of family dynamics, authors recommend that mediating factors that influence the relationship between parenting satisfaction and child behavior be clarified in future research.

Though more circumscribed, a study surrounding violence and hostility provides additional evidence of family correlates of PTSD in parents (Glenn et al., 2002). Again, focusing on a Vietnam veteran sample, the study obtained self-report assessment of violent and aggressive behaviors among fathers with combat-related PTSD, their domestic partners, and their adolescent and adult children. Fathers' self-reported PTSD symptoms were positively associated with child hostility, and fathers' violent behavior was positively associated with offspring violent behavior (Glenn et al., 2002). Therefore, co-occurring or pre-existing symptoms in a parent with PTSD, that is, aggression or hostility, may account for the increased externalizing symptoms in offspring.

Finally, like research on families of Holocaust survivors, Vietnam studies have explored the intergenerational transmission of posttraumatic stress symptomatology itself. Stein (1995), for instance, demonstrated an association between Vietnam veteran's posttraumatic stress symptoms—particularly, trauma imagery—and their adult sons'

PTSD symptoms. However, findings surrounding transmission of PTSD symptoms are mixed: A study examining intergenerational correlates of PTSD in veteran samples found no correlation between Vietnam veterans' ratings of PTSD and ratings of posttraumatic stress symptoms among their offspring ages 14 through 34 (Davidson & Mellor, 2001).

Though broader in scope, a large-sample study on the effects of parental PTSD is noteworthy within the literature of intergenerational trauma effects. Data from a nationally representative sample of civilian men and women with PTSD (from any trauma type) showed that parental PTSD is associated with self-reports of poorer quality parent-child relationships and more parental aggression toward children (Lauterbach et al., 2007). Investigators found that parental numbing was particularly predictive of aggression toward children.

As mentioned, the above familial studies employed combinations of retrospective methods and adult reporting on both parent and child variables. The psychiatric functioning of children during developmental stages remains unclear. **The seminal literature on Nazi Holocaust survivors and Vietnam veterans has established psychosocial correlates of PTSD that suggest impairments in parenting, family, and child functioning.**

Why study the military population?

PTSD is one of the most common psychiatric disorders among U.S. combatants who are deployed to international conflicts. The largest investigation on the psychological effects of war was the National Vietnam Veterans Readjustment Study (NVVRS; Kulka, Schlenger, Fairbank, et al., 1990). Sixty-four percent of Vietnam Theater Veterans endorsed lifetime trauma exposure, and 30% of males and 27% of

females met lifetime criteria of PTSD. Prevalence rates are nearly four times higher than those in civilian samples (U.S. population prevalence of 7%). Yet, findings regarding the mental health of *children* of military families are mixed. “Military family syndrome”—a phenomenon purporting high risk of psychiatric illness in families of armed services personnel—has been challenged empirically. Broadly speaking, there are no differences in psychopathology rates between child dependents in the military and those in civilian populations (Morrison, 1981; Jensen, Watanabe, Richters, Cortes, Roper, & Liu, 1995). Psychological profiles obtained of children whose fathers were deployed in Desert Storm demonstrated that while sadness was common, those responses were normative and did not reach clinical levels (Rosen, Teitelbaum, & Westhuis, 1993). The disconfirmation of a military family syndrome should not lead to the conclusion that offspring of military servicemen are resilient to mental illness. Rather, a tighter focus is needed in this area of research, based on the literature relating combat PTSD to interpersonal dysfunction:

Investigators should examine the functioning of children of military parents who have already developed combat PTSD, in addition to the mechanisms implicated in the transmission of symptoms during early periods in the lifespan. Children in these families may experience particular vulnerabilities due to their parents’ illness, distinct from children of military servicemen returning without mental illness. Current, ongoing military-based research is beginning to take this direction with returning OIF/OEF veterans. One survey-based study asked 168 U.S. veterans with psychiatric symptoms to rate their children’s responses after the parent’s reintegration and found that 21.8% of parents rated their children as “not warm/afraid” towards them (Sayers, Farrow, Ross, Beswick, Sippel, Kane, & Oslin, 2007). The approach of examining youth already

identified as vulnerable to mental illness is fundamental in exploring the experiential and biochemical risk markers for psychological impairment during sensitive periods in the lifespan. Furthermore, there has been a growing recognition for the need to include fathers in the investigation of child psychopathology (Cassano, Adrian, Veits, & Zeman, 2006). As military-related PTSD research generates male participants, the proposed study would contribute to bridging the gender gap in developmental research on child psychopathology. Finally, combat exposure is a primary interest of this proposal not only because it poses a high risk for developing PTSD compared to other traumatic events, but also because this trauma ostensibly afflicts a parent outside the home environment. Risk and resilience processes in children, therefore, can be examined with minimization of shared trauma exposure between parents and children. Relative to other trauma studies, the incidence of child maltreatment and domestic violence is expected to be attenuated in the proposed study by limiting parental trauma to combat-PTSD (child trauma may nonetheless be present and will be measured accordingly; See Methods).

The uniqueness of OIF/OEF

The recent U.S.-involved war conflicts differ from previous wars (e.g., Operation Desert Storm) in terms of wartime duration, number of deployments, media coverage, and battlefield technology. As such, investigators are cautioned against generalizing direct and indirect effects of historical war events onto ongoing operations (Chartrand, & Siegel, 2007). Returning OIF/OEF veterans report stressors that span combat exposure, biological and radiological weapons exposure, distressing living conditions, and the unpredictability of deployment length (Reeves, 2007). Furthermore, there has been tremendous growth in our knowledge about the psychological consequences of combat

over the last two decades. For instance, the data on combatants returning from Vietnam lacked even a label with which to characterize symptoms. Currently, among OIF/OEF veterans receiving mental health diagnoses at VA facilities, 52% met for criteria for PTSD, which remains the single most common mental disorder in this population (Seal, et al., 2007). The Iraq and Afghanistan Veterans of America reported that at least 45,521 Iraq and Afghanistan veterans had sought treatment at a VA center for PTSD or acute stress since February of 2006, and that estimates of OIF/OEF rates of PTSD are higher than estimates of Vietnam veterans. Indeed, re-assessment of OIF/OEF soldiers after 6 months of initial screening revealed a substantial increase of PTSD rates, a trend not previously documented with other conflicts (11.8 to 16.7% in Milliken, Auchterlonie, & Hoge, 2007). Though it remains uncertain what accounted for the increase, these rates suggest that initial surveys given by the Department of Defense (DoD) and VA to OIF/OEF soldiers immediately on return from deployment may underestimate their mental health burden and that the months following their returning home may be particularly crucial in regards to identification of psychiatric illness in this cohort. Nonetheless, the high incidence of PTSD in U.S. OIF/OEF soldiers presents an imminent need for evaluating the presence of mental health risks to children in these families:

Family environment matters.

Intergenerational studies interested in the impact of parental psychiatric illness on children should identify, and, if possible, measure the effects of mediating variables in the child's family environment, given that familial transmission of symptoms likely operates via a complex multi-factor process. The role of parenting and family environment in the etiology of anxiety, for example, has recently been established as a

key piece in the interaction of factors in developmental models of child anxiety disorders (Ginsburg, Siqueland, Masia-Warner, & Hedtke, 2004). Measuring family processes is not without challenges—numerous environmental factors are likely to influence parenting behaviors, such as unemployment, socioeconomic status, bereavement, and low social support (Manassis & Bradley, 1994). Thus, the effects of parenting and family environment on child functioning may be confounded by multiple environmental influences. Nonetheless, the identification and measurement of family/parenting constructs in anxiety research has informed and improved the precision of predictive models of childhood anxiety disorders (Ginsburg et al, 2004).

Among the most measured family dimensions are cohesion, conflict, affective expressiveness, communication, adaptability, and control, which are primarily captured via self report forms or observational paradigms (Ginsburg et al., 2004). The current study focused on the parenting dimensions that have previously been identified in families of anxious and depressed youth (Bernstein & Garfinkel, 1988; Woodside, Swinson, Kuch, & Heinmaa, 1996; Kashani, Lourdes, Jones, & Reid, 1999; Bernstein, Warren, Massie, & Thuras, 1999). In particular, the constructs of family cohesion, flexibility, and communication are considered components important in understanding the role of family functioning in the development and maintenance of child behavior problems. According to the Circumplex Model of Marital and Family Systems, these three dimensions are central to the relational system within families (Olson, Sprenkle, & Russell, 1979). Families that fall on extreme ends of each dimension are considered to have unbalanced behavioral styles. Figure 4 depicts two dimensions of the Circumplex Model—Adaptability and Cohesion—and the array of family styles represented by the

varying degrees on each dimension. For instance, *cohesion* is defined as the emotional bonding between family members; disengaged and enmeshed refer to the extreme ends of this dimension, which are considered problematic family behaviors. Adaptability refers to the extent to which the family system is flexible and able to change. Extremely low flexibility (i.e. rigid) and extremely high flexibility (chaotic) are considered problematic family styles, whereas centered or balanced levels of flexibility are indicative of adaptive family functioning (Olson & Gorall, 2003). Parental control and discipline are key behaviors in determining level of family flexibility. Finally, *communication* (not graphically included), is considered a facilitating dimension in the Circumplex Model, a critical component in a families' ability to move along the dimensions of cohesion and flexibility in order to meet developmental or situational demands (Olson & Gorall, 2003). Communication refers to family members' listening skills, speaking skills, self-disclosure, respect and regard (Olson & Gorall, 2003).

Although not an exhaustive list of family functioning constructs, the dimensions of cohesion (disengaged vs. enmeshed) flexibility (rigid vs. chaotic), and communication (positive vs. negative) have been utilized in the child and adolescent literature exploring family correlates of early behavioral problems. Research has shown that adolescents with symptoms of depression and physiological symptoms of anxiety report low cohesion and low adaptability, suggesting that disengaged and rigid family functioning is related to early onset depression and somatic anxiety (Bernstein et al., 1999). Moreover, youths with depressive disorders are more likely to rate their families as lower in adaptability when compared to anxious youth (Kashani et al., 1999). Children with anxiety and depression are also more likely to describe their families as more enmeshed, yet also

disengaged from outside activities when compared to control groups (Stark, Humphrey, Crook, & Lewis, 1990). It remains unclear whether anxiety and depression in youth precede disruptions in family functioning, or whether parental psychological functioning has a distinct role in shaping these family dimensions. To summarize, while it has been established that certain deficits and excesses in families are implicated in child anxiety and depression, it remains unclear whether a more integrated model of parent psychopathology, family functioning, and child symptoms better captures the intergenerational transmission of psychopathology.

The present study measured relationships at the family and dyadic level, drawing from the literature that has identified correlates between family functioning and child anxiety and depression. Thus, low adaptability (rigid) and low cohesion (disengaged) in the family were hypothesized as environmental risk factors of early phenotypes of psychiatric illness. A possible explanation is that unbalanced family functioning may hinder the development of coping competence in youth. Likewise, balanced families on dimensions of flexibility and cohesion may be indicative of protective mechanisms; it is plausible that harmony in the home buffers the detrimental effects of posttraumatic parenting. Additionally, as described above, studies have demonstrated disruptions in the father-child relationships in some veteran samples (Ruscio et al., 2002; Samper et al., 2004). The proposed study will explore this further by capturing key dimensions of dyadic functioning as well as family functioning (see Measures) in order to examine whether parental illness (i.e. PTSD) predicts unbalanced family styles and disrupted parent-child relationships, which are hypothesized to operate as risk factors for early psychiatric symptoms in youth.

Why study PTSD in OIF/OEF Families?

Clinicians and researchers agree that certain features characterize combatants who have returned from the War on Terror with PTSD. The symptomatology of PTSD from war-zone exposure includes hypervigilance, elevated startle response, increased irritability, sleep disturbance, increased use of substances, avoidance of close relationships, and impulsivity. To summarize, the study design is intended to examine relationships among parent, offspring, and family variables using an integrated model that can be theorized based on the current trauma literature (see Figure 3). As graphically represented in the model, this family study of combat PTSD allows one to explore intergenerational effects of trauma when: (1) the caregiver has higher risk for PTSD than that found in the general population; (2) the caregiver endured a stressful event (e.g., combat) which occurred independently of a child's home environment; (3) the caregiver's stressful events are characterized as interpersonal/human-caused and operate at a relational level; (4) offspring are at developmental periods of negotiating early-life risk and protective factors, and (5) trajectories for varying psychological syndromes are beginning to branch, though are not yet deterministic of categorical endpoints; psychiatric illness is better measured via behavioral phenotypic traits and biological markers.

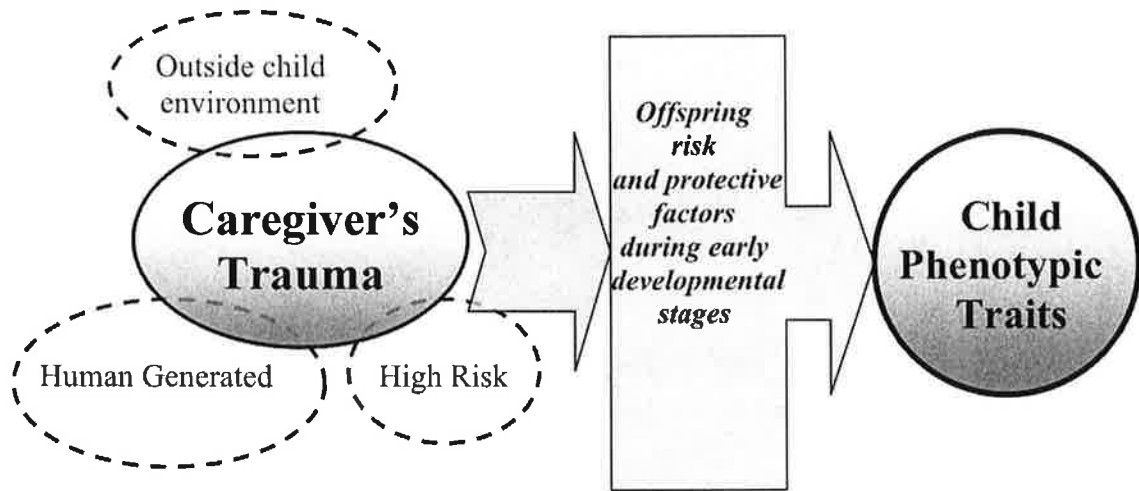


Figure 3: Intergenerational Trauma Model

Methods

The present project is a pilot study examining cross-sectional relationships among adult PTSD, family functioning, and child psychopathology. Clinical data on parent-child dyads were gathered for approximately 24 months at the Anxiety and Traumatic Stress Disorders Research Program in the Department of Psychiatry at the University of California, San Diego.

Participants

Recruitment. Study participants were recruited from referral (VA Medical Center), online social networking sites, and the local military community. The study coordinator conducted site visits, provided informative talks, circulated flyers, posted announcements, and received referrals from health providers at the medical center. The study coordinator also managed online advertisements using *google.com*, *yahoo.com*, and *facebook.com* fee-based advertisement programs. All flyers, advertisements, and referrals referred to “A Family Study for OIF/OEF Veterans and Active Duty Personnel.” Efforts were made to recruit active duty servicemen and male veterans with OIF/OEF deployment history and a range of PTSD symptoms, from none to clinically significant.

U.S. Department of Veterans Affairs, San Diego Healthcare System (VASDHS). The VASDHS San Diego Medical Center in La Jolla and the VASDHS Mission Valley Clinic constituted two primary recruitment sites for the project via referral by clinicians. The VASDHS provides comprehensive health care services to U.S. veterans, and is equipped with mental health services as well as an OIF/OEF Care Management Program which staffs VA Liaisons for healthcare, case managers, and transition patient advocates. As of March of 2008, over 9,000 veterans had been enrolled

in the OIF/OEF Case Management Program with over 1,000 who were identified with PTSD. Providers involved in the OIF/OEF Case Management Program as well as from the Posttraumatic Stress Disorder Clinic (Mission Valley) submitted referrals to the proposed study (directly to PI). In addition, to aid in the recruitment process, the San Diego VA OIF/OEF Research Liaison served to bridge communication/collaboration between UCSD Psychiatry and OIF/OEF Case Management services. The VA Research Liaison functions to inform and guide veterans who have physical and mental illnesses to available research programs. As such, the VA Research Liaison facilitated the referral of appropriate veteran participants to the present study.

Social Networking Websites: The second primary recruitment method constituted online fee-based advertising using *google.com*, *yahoo.com*, *craigslist.com*, and *facebook.com*. These sites were managed based on geographical location, keywords used in search engines, and other characteristics of web users accessing these sites. The study site coordinator's email and phone number was used for inquiries generated by web-based advertising. All follow-up contact was administered via telephone (See below under "Screening".) Each web advertisement received IRB approval for online circulation.

Subject Inclusion and Exclusion Inclusion Criteria. Due to the preliminary nature of the present study, participant inclusion criteria are broad and exclusion criteria minimal. Military service requirements had a direct impact on selection process by predetermining an initial pool of subjects at screening (e.g., at least 18 years of age, fluency in English, unremarkable medical health status). The following inclusion and

exclusion factors were selected to maintain generalizability and maximize subjects' completion of study procedures.

Inclusion criteria. (1) Male veterans or active duty personnel who have experienced at least one deployment during the Operation Iraqi and Operation Enduring Freedom conflicts; (2) between ages of 21 to 55; (3) are fluent in English; and (4) have at least one biological child living with them between the ages of 6 and 17 inclusive. Fathers must be able to provide informed, written consent. Children who are developmentally able (age 7 or older) must provide written assent.

Exclusion criteria. Fathers who: (1) do not have a telephone number or easy access to one; (2) endorse alcohol or non-alcohol substance dependence in the past month; (3) endorse lifetime psychotic symptoms occurring outside of mood and anxiety disorders; and (4) have previously received a diagnosis of traumatic brain injury (TBI). Youths were excluded, along with the respective parent participant, if they: (1) suffered from an unstable medical illness; (2) have been diagnosed with a significant developmental disability, (i.e. mental retardation); (3) have been removed from the home due to neglect or maltreatment; or (4) cannot attend or undergo an evaluative visit at the research center. Parents or children with current or lifetime history of psychopharmacological or psychotherapeutic treatment will not be excluded. Because comorbid substance abuse is common in this population, alcohol and non-alcohol substance use were carefully assessed (see Measures), and current use or abuse did not deem participants ineligible for study. All families who were excluded from the study were referred outside of the study to VASDHS and NMC mental health services for appropriate care if they were not already enrolled. Fathers excluded due to child's

ineligibility were given additional referrals to community counseling centers, Rady Children's Hospital of San Diego, Outpatient Psychiatry, and the Child and Adolescent Mental Health Services at Naval Medical Center, San Diego if they were not already enrolled.

Enrollment Predictions. The present study was the first to investigate psychiatric risk factors in children of OIF/OEF active duty and veterans. However, demographic data from epidemiological studies on OIF/OEF veterans seen at VA health care facilities demonstrated that the majority of this population is male (87%), under age 30 (54%), Caucasian (69%), and married/divorced/separated (53%; Seal et al., 2007). Data regarding the number and the age range of children of treatment-seeking OIF/OEF veterans is scarce, but one study found over half (56.7%) screened in primary care have offspring with the mean number at 2 (Sayers et al., 2007). Based on rates of treatment-seeking OIF/OEF combat veterans, it was estimated that 13% of study participants would meet PTSD criteria (Seal et al., 2007). Recruitment efforts mentioned above were intended to oversample this target group. Recruitment efforts were maintained until approximately 50% of the projected sample included fathers that met at least the minimum criteria necessary for PTSD diagnosis. Thereafter, advertisement geared toward healthy subjects were maintained if not already achieved by this time.

Procedure

Screening. Participants underwent an initial screening procedure (with informed verbal consent), which took place over the phone with a research staff member at the UCSD Anxiety and Traumatic Stress Disorders Research Program. The purpose of the phone screen procedure was to provide the subject with a descriptive of the protocol and

verify key entry inclusion/exclusion criteria (i.e. language, age of parent and offspring, and military service/deployment history). Once these entry criteria are met, the participant was asked to arrange one to two visits at the UCSD Anxiety and Traumatic Stress Disorders Research Program. If the father had more than one offspring between 6 and 12 years old, the child closest in age to 10 will be selected for study. To encourage participation, families were allowed to select which child in the study age range they would like to have assessed. If entry criteria were not met, the participant was provided referral information for psychological services for adults and youths.

Evaluation Visits. The PI coordinated study visits, provided the consent process, administered each clinical interview, and oversaw completion of self-report measures. Each case was supervised by a psychiatrist with a Master's Degree in Public Health (MBS); the project team also included two licensed clinical psychologists (DAC;HR), two doctoral students in clinical psychology, and two undergraduate research assistants. Each visit was followed by a meeting among team members to discuss each case and resolve clinical discrepancies. A previous family project conducted within our research program utilized similar assessment methods on parent-child dyads (Chavira et al., 2007). Based on that protocol, each visit was estimated to take 3 to 4 hours.

Due to the nature of the parent interview (e.g., recalling traumatic events and assessing impairment/distress), children were not present during their father's assessment. During the parent interview, children were provided play items in an adjacent room and monitored by a team member. During free-play, children's spontaneous descriptions of their fathers' interactional behavior with them were recorded. This information was later used as quasi-qualitative of self-report functioning among youths.

Written Consent, Clinical Assessment, Self-Report and Child-Report. Once written consent was obtained by fathers and assent was given by youths, fathers were asked to complete a demographic information form including age, ethnicity, employment history, social/familial history, and deployment details (number of deployments, duration overseas, and return dates). Fathers completed a short battery of self report forms, a family functioning measure, and child symptom measures (see Measures), followed by a 1-hour semi-structured clinical interview administered by the study PI. During the diagnostic interview, the child participant was monitored in an adjacent room. Following the father's clinical interview, children were provided self-report forms, family functioning measures (if over age 12), and a brief clinical interview for PTSD (see Measures). Additionally, during free play, qualitative data regarding the child's experience of his/her father's return from deployment was obtained and documented. Following the assessment procedures, families were given referral packets and a gift card of \$50.00 to a retail store.

Child abuse reporting. The consent form included a clearly written statement on the mandatory reporting of any suspected or known act resulting in imminent risk of serious physical or psychological harm, death, sexual abuse or exploitation of a youth under the age of 18 by a caretaker responsible for that child's welfare. According to the child abuse protocol, during any phase of the study, research staff will report such incidents to the study principal investigator via telephone, who will submit the report in writing to San Diego County Child Protective Services (CPS). Psychiatric crises that necessitate an immediate response should be communicated to the psychiatrist on the

team. These procedures were logged and the case reported within 24 hours of learning of any circumstance meeting the above definition of child abuse.

Measures

Parent Psychopathology. Each parent participant was administered the Mini International Neuropsychiatric Interview 6.0.0 with M.I.N.I. Screen 5.0.0 (M.I.N.I.; Sheehan et al., 1998), a structured diagnostic interview used to assess current DSM-IV Axis I Disorders. The M.I.N.I. Screen was used with the disorder modules K (Psychotic Disorders and Mood Disorder with Psychotic Features) and P (Antisocial Personality Disorder) for a comprehensive psychiatric screening. Items endorsed on the M.I.N.I. Screen guided the interviewer to select modules in the M.I.N.I., thereby minimizing time spent on each interview. The M.I.N.I. module H (PTSD) was administered regardless of participants' response to the M.I.N.I. Screen PTSD probe (see PTSD section below). Each interview was later discussed during consultation meetings with the research team. Present diagnoses (i.e. mood, substance, and anxiety disorders in addition to PTSD) were included in descriptive findings on parent data.

Parent Combat PTSD diagnosis and severity. Each parent participant was administered the PTSD module of the M.I.N.I. (Sheehan et al., 1998). As recommended in Brunet et al. (2001) and Wright et al. (2007), the M.I.N.I. PTSD module was modified to better capture the diagnosis among military and combat-exposed males, who may under-endorse fear responses and impairment following combat trauma. Therefore, neither Criterion A2 (an emotional response of fear, helplessness, or horror) nor the impairment criterion of the M.I.N.I. PTSD module were required for the diagnosis of

PTSD in the sample. As stated above, the M.I.N.I. data was used for descriptive purposes.

Fathers also completed the PTSD Checklist-Military Version (PCL-M; Weathers, Litz, Herman, Huska, & Keane, 1993), a 17-item self-report form that measures current PTSD symptoms based on DSM-IV PTSD symptom clusters, i.e. re-experiencing, avoidance/numbing, and hypervigilance. The PCL-M is recommended by the U.S. Department of Veteran's Affairs National Center for PTSD for use with active servicemembers and veterans. The form is intended to be used for screening of PTSD, diagnosing PTSD, and monitoring PTSD symptom change over the course of treatment. The PCL-M is specific to military populations in that it asks about symptoms in response to "stressful military experiences." Each item is rated on a 5-point Likert-type scale (*not at all to extremely*). A "total symptom severity score" (range of 17-85) is obtained by summing the scores of all 17 items. The advantages of the PCL-M include its brevity, strong psychometric properties with combat veteran samples, and its dimensional scoring (total symptom severity score). Cut-off scores for diagnosis of PTSD have been recommended, with a fairly wide range from 28 to 50 (e.g., a diagnostic cut-off of 44 has been widely used as recommended by Blanchard, Jones-Alexander, Buckley, & Forneris, 1996). One study recommends the cut-off of 28 on the PCL-M for determining PTSD in active servicemembers from OIF/OEF combat (Bliese et al., 2008). In this study, PCL-M scores were analyzed on a continuum of PTSD symptom severity (with higher scores indicating increased severity of PTSD symptoms) in order to evaluate the proposed prediction model (see Analytic Plan).

Finally, select measures from the Deployment Risk and Resilience Inventory (DRRI; King, King, Vogt, Knight, & Samper, 2006) were provided to parent participants to assess pre and post-deployment factors relevant to the well-being of military personnel and veterans who have been exposed to war-zone experiences. The DRRI comprises 14 self-report measures; any one or more of the DRRI measures may be used individually or as a set, and each measure identifies a particular deployment-related factor that either places veterans at risk for post-deployment symptomatology or that serves as a protective function. Each section takes approximately 1- 4 minutes to complete, with responses in the format of a Likert scale (i.e. *never to many times*) or dichotomous items (i.e., *yes/no*). The DRRI is considered an ecologically valid measure of deployment stressors because it characterizes more contemporary deployment experiences relevant to modern conflicts, i.e. Gulf War I and beyond (King et al., 2006). A four-phase psychometric study on Gulf War I veterans evidenced validity for each measure as representing the risk and resilience factors that have implications for mental and physical health, functioning and general adjustment following deployment (King et al., 2006). The current project employed the following sections of the DRRI: (1) *Section A: Prior Stressors* assesses exposure to traumatic events and stressful life events before deployment (i.e. “I experienced the death of someone close to me.”); (2) *Section B: Childhood Family Environment* assesses the quality of early life in the servicemen’s family of origin in terms of cohesion, accord, and closeness among family members (i.e. “Family members were affectionate with each other.”); (3) *Section H: Perceived Threat* assesses the servicemembers’ fear of their own safety in the war zone, reflecting an emotional or cognitive appraisal of situations (i.e. “I thought I would never survive.”); (4) *Section I: Combat Experiences* assesses the number

of stereotypical warfare experiences during deployment (i.e. “I went on combat patrols or missions.”); (5) *Section J: Aftermath of Battle* assesses exposure to or observing the consequences of combat (i.e. “I was exposed to the sight, sound, or smell of dying men and women”); (6) *Section K: NBC Exposures* assesses the servicemembers’ exposure to an array of nuclear, biological, and chemical agents while serving in the war zone (i.e. “I was exposed to depleted uranium in munitions”); (7) *Section L: Post-Deployment Social Support* assesses the extent to which family, friends, coworkers, and community provide emotional support and instrumental assistance (i.e. “There are people to whom I can talk about my deployment experiences.”); and (8) *Section M: Post-Deployment Stressors* assesses servicemen’s exposure to stressful life events following deployment (i.e. “Since returning home, I have been robbed or had my house broken into.”).

Scoring each DRRI section differs by scale. Section A (“Prior Stressors”) has 15 items with a dichotomous response format (0=*No*; 1=*Yes*). The possible range is from 0 to 17, with higher scores indicative of more exposure to pre-deployment stressors. Section B (“Childhood Family Environment”) has 15 items with a 5-point Likert scale response format (1=*Almost none of the time*; 5=*Almost all of the time*). The possible range is 15 to 75 with higher scores indicative of greater cohesion, accord, and closeness among family members. Section H (“Perceived Threat”) has 15 items scored on a 5-point Likertscale (1=*Strongly disagree*; 5=*Strongly agree*). Possible range is 15 to 75, with higher scores indicating more perceived threat to one’s own safety/survival during deployment. Section I (“Combat experiences”) has 15 items with a dichotomous response format (0=*No*; 1=*Yes*). The possible range is from 0 to 15, with higher scores indicating greater exposure to combat during deployment. Section J (“Aftermath of Battle”) has 15

items and is scored on a dichotomous response format (with a possible range of 0 to 15). Higher scores in this section indicate greater exposure to the consequences of combat. Section K (“NBC Exposures”) has 20 items with a polytomous response format (0=*No*; 1=*Don’t know*; 2=*Yes*). The section’s range is from 0 to 40, with higher scores indicating greater perceived exposures to NBC’s. Section L (“Post-deployment Social Support”) has 15 items scored on a 5-point Likert scale (1=*Strongly disagree*; 5=*Strongly agree*) with a range of 15 to 75. Higher scores indicate greater perceived social support. Finally, Section M (“Post-deployment Stressors”) have 17 items that have a dichotomous response format (0=*No*; 1=*Yes*), with a possible range of 0 to 17. Higher scores indicate more exposure to life stressors after returning from deployment.

Collectively, all sections should take no longer than 25 minutes to complete. The DRRI was included in the primary analysis measuring relationships between characteristics of fathers’ deployment and child symptoms. Additionally, the DRRI data provides a rich, descriptive picture of pre-war stressors, types of stressors experienced during deployment, and post-war support and/or stressors during reintegration.

Parent depression. Based on the high comorbidity between PTSD and depression, the adult battery included a brief measure of depression. Fathers completed the Patient Health Questionnaire for Depression (PHQ-9; Spitzer et al., 1999) a 9-item scale that has been widely used to measure adult depressive symptoms and has been validated in military samples (Hoge et al., 2004). Each item on the PHQ-9 has four response options (*not at all* to *nearly every day*) which add up to a total score from 0 (no depression) to 27 (severe depression). Paternal depression has been identified as a potential confounding variable when examining relationships between combat-PTSD in fathers and child

functioning (Ruscio et al., 2002; Samper et al., 2004). Therefore, the PHQ-9 was used in the present study as a dimensional indicator of depression in the hypothesized prediction model (see Analytic Plan).

Parent substance use. Parent participants completed the Alcohol Use Disorders Identification Test Alcohol Consumption Questions (AUDIT-C; Bush, Kivlahan, McDonell, Fihn, & Bradley, 1998), a well-validated 3-item instrument querying the frequency and quantity of alcohol consumed (i.e. *never to four or more times a week*). The AUDIT-C has been used to identify hazardous drinking or current alcohol use disorders. Similarly, parent participants were asked to complete the 10-item Drug Abuse Screening Test (DAST-10; Skinner 1982) to query use of non-alcoholic substances. The DAST-10 is a self-report instrument commonly used for clinical screening of problems related to drug abuse. Combined, the AUDIT-C and the DAST-10 should take no more than ten minutes to complete. These brief, continuous scales provided indices of alcohol and drug use, which will be utilized in secondary analyses (see Analytic Plan).

Family Functioning.

Family Flexibility and Family Cohesion. Fathers were asked to complete a self-report assessment which will measure two dimensions of their family functioning considered to be fundamental attributes to healthy/unhealthy family styles (Olson et al., 1979). The Family Adaptability and Cohesion Scales (FACES-IV; Olson, Gorall, & Tiesel, 2002; Olson, Portner, & Bell, 1982) is a brief measure containing 20 items describing family behavior (e.g., “Family members like to spend free time with each other”). Each item is rated on a 5-point Likert scale (i.e. *almost never to almost always*), which are summed to provide indices across the dimensions of Family Cohesion (i.e.

high score indicates enmeshment; low score indicates disengagement) and Family Adaptability (i.e. high score indicates rigidity; low score indicates chaos). Figure 4 shows the resulting family types which are derived from the Cohesion and Adaptability scores. The FACES-IV has been found to be a reliable and valid measure of these dimensions and indicated for both research and clinical use (Olson & Gorall, 2003). The FACES-IV Family Version (e.g., “Family members ask each other for help”) were completed by fathers in the study sample. Each version takes no longer than 5 minutes to complete. The FACES Cohesion and FACES Adaptability Indices were included as moderator variables (See Data Analysis Plan).

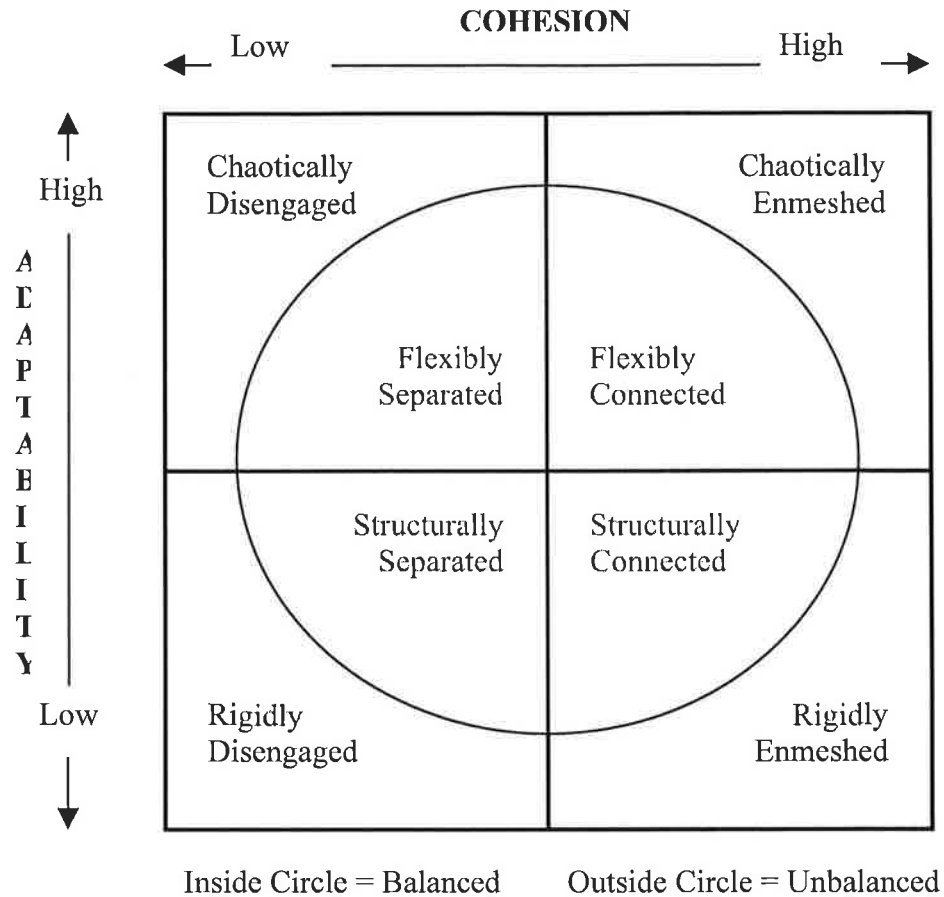


Figure 4: The Circumplex Model: Types of Marital and Family Systems

Parent-Child Relationship Functioning. Based on the work demonstrating disruptions in the father-child relationships in other veteran samples (Ruscio et al., 2002; Samper et al., 2004), family functioning was examined at the level of parent-child relationships in the proposed sample. The Brief Family Assessment Measure (BFAM-III; Skinner, Steinhauer, & Sitarenios, 2000) is a shortened version of a family measure (FAM) developed to capture the seven key dimensions of family processes: task accomplishment, role performance, communication, affective expression, involvement, control, values and norms. The Dyadic Relationship Scale focuses on behaviors between

pairs and provides an overall rating of functioning along with an index for each construct mentioned above. The BFAM General Scale contains 14 items and can be used as an overall index of family functioning; the BFAM Dyadic Relationship Scale yields an overall index of parent-child functioning as reported by the child participant. The BFAM can be completed by children who are at least 10 years of age; however, the measure can be read to children ages 7 and older. The BFAM should take no longer than 10 minutes for each child participant to complete. The FAM has been demonstrated to correlate highly with the FACES Cohesion scale, but has low correlation to the FACES Adaptability scale (Jacob, 1995). Thus, the BFAM Dyadic Relationship Scale scores was included as a Family Functioning mediator variable (see Analytic Plan).

Child Outcome Measures. Each of the following constructs (in bold) was measured as indicated and yields indices of psychological functioning in youth participants. Measures were chosen such the study would include both parent-report and child self-report, as a multi-informant approach is recommended when assessing youth (Comer & Kendall, 2004).

Internalizing Symptoms. Fathers reported on their child's internalizing behaviors using the Child Behavior Checklist-Parent Form; CBCL School Age version designed for 6-18 year olds (Achenbach & Edelbrock, 1991). Re-normed in 2001, the Child Behavior Checklist/6-18 (CBCL School Age form) obtains reports from parents regarding a child's competencies and behavioral and emotional problems (Achenbach, Demenci, & Rescorla, 2003). The CBCL School Age form consists of 118 statements which parents are asked to rate the extent it describes their child within the past 6 months (i.e. *not true to very true or often true*). Ratings were used to derive indices across 8

syndrome scales, 6 DSM-oriented scales, and an Externalizing, Internalizing, and Total Problems Scales. For descriptive purposes, internalizing behaviors can be measured by using the CBCL Syndrome Subscales, i.e., anxious/depressed, withdrawn/depressed, and somatic complaints. In addition, the DSM-Oriented Scales provide indices of functioning across psychiatric problems, i.e. Affective Problems and Anxiety Problems. These subscales provided descriptive data on child behavioral and emotional functioning. Finally, externalizing subscores on scales such as oppositional, conduct, and overall externalizing problems were explored as outcome variables.

Depression. The Children's Depression Inventory (CDI; Kovacs, 1981) is a self-report instrument designed to measure the core symptoms of depression in children and adolescents ages 6 to 17 years old. The CDI contains 27 items spanning cognitive, behavioral and affective symptoms of depression. For each item, children are asked to endorse one of three descriptive statements about themselves over the past two weeks (items scored as 0, 1, or 2). Instructions and items on the CDI are written at the first grade level. However, administration of the measure will be supervised by the study P.I. in order to ensure reading comprehension and completion of the instrument. The measure should take no longer than 15 minutes to complete. Scores on the CDI were used to derive a Total Score and five subscales: Negative Mood, Interpersonal Difficulties, Negative Self Esteem, Ineffectiveness, and Anhedonia. The CDI Total Score were used to as a dimensional outcome measure of youth depression, and was included as an outcome variable.

Anxiety. The Multidimensional Anxiety Scale for Children (MASC; March, Parker, Sullivan, Stallings, & Conners, 1997) is a self-report instrument that measures the

major dimensions of anxiety problems in children and adolescents ages 8 to 19 years old. The MASC contains 39 items that children rate on a 4-point Likert-type scale.

Administration of the measure will be supervised by the study PI in order to ensure reading comprehension and completion of the instrument (Children in the sample ages 6 and 7 will be read the items). Administration of the MASC should take no longer than 15 minutes. Ratings are used to derive a Total Anxiety Index as well as four subscales indicating key aspects of anxiety: Physical Symptoms Scale, Social Anxiety Scale, Harm Avoidance Scale, and Separation/Panic Scale. The Total Anxiety Index was used in the present study as an outcome measure of youth anxiety symptoms.

Child PTSD symptomatology. The University of California, Los Angeles (UCLA) PTSD Reaction Index for DSM-IV (UPID; Steinberg, Brymer, Decker, & Pynoos, 2004) was used to assess children for exposure to traumatic events and for DSM-IV PTSD symptoms. The UCLA PTSD Index for DSM-IV (UPID) was designed as a quick and efficient screen for PTSD in children and adolescents who may have experienced a traumatic event. The UPID Child Version is worded for school-age children between the ages of 7 and 12 and can be administered verbally in a 1-on-1 format where the evaluator reads the instructions and questions to the children. The UPID Child Version contains a lifetime trauma screen, followed by twenty items assessing the frequency of post-traumatic stress symptoms based on the DSM-IV (intrusion, avoidance, and arousal). Each DSM-IV symptom item asks children to rate the frequency of each problem during the past month (i.e. *none of the time* to *most of the time*). Two items on the measure specifically query the youth's experiences of maltreatment and witnessing domestic violence. The measure should take no longer than 20 minutes to administer. For the

present study, the UPID will measure child PTSD symptomatology on a continuous scale. The UPID was included in primary analytic models as an outcome variable; additionally, UPID scores for each child participant identified children at risk for secondary traumatic stress and potentially identify youths who have a history of maltreatment (see Child Abuse Reporting).

Child cognitive functioning. Given the scope of the proposal and the projected assessment burden on child participants given the above measures, an explicit measure of cognitive functioning was not employed. However, based on research that demonstrates cognitive performance in young children as a predictor of posttraumatic stress symptoms in adolescents (Breslau, Lucia, & Alvarado, 2006), fathers in the study were asked whether their child was held back a grade or has received special education services. Children with a history of special education or failing a grade were flagged and explored in data screening and cleaning phases to ensure their education status had no effect on child outcomes.

Data Analysis Plan

Multiple Regression/correlation analysis (MRC): Regression procedures were implemented to explore the predicted interrelations between the psychological functioning of fathers and child internalizing symptoms (See Figure 1). Regression was considered an optimal procedure due to the scales of the variables collected and the sample size. Given the number of variables observed and the sample size, multiple independent models were tested and post-hoc alpha corrections were not implemented to control for these multiple comparisons. As stated above, this pilot study may serve to

inform and guide larger studies which should implement alpha corrections such as Bonferroni adjustments based on the number of comparisons made in the study.

Aims

The following describes each of the study's aim, hypothesis, and statistical model used to test each hypothesis:

Exploratory Aim 1: Characterize the psychological functioning of youths of fathers with combat PTSD across observed variables from clinical assessment.

Specific Aim 1: Determine the strength of the relationship between combat-related PTSD in fathers and youth psychological functioning.

Hypothesis 1: Increased posttraumatic stress symptoms in fathers will be predictive of increased internalized symptoms in children, i.e., constructs of anxiety, depression, somatization, withdrawn symptoms, and PTSD (Figure 1).

Specific Aim 2: Examine the role of family functioning on the relationship between combat-related PTSD in fathers and offspring psychopathology.

Hypothesis 2: Unbalanced styles of family functioning will mediate the relationship between paternal PTSD and internalizing symptoms in children, i.e., constructs of anxiety, depression, somatization, withdrawn symptoms, and PTSD (Figure 1).

Results

Preliminary Data Screening

Raw scores on the measures used in the above analyses were initially screened to detect problems with missing data, outliers, and multicollinearity. A correlation matrix of independent predictors, the PCL-M and DRRI subscales, is found in Table 1.

Table 1: Spearman correlation coefficients of independent predictors, N = 21

Measure	PCL-M	DRRI-H	DRRI-I	DRRI-J	DRRI-K	DRRI-L	DRRI-M
PCL-M	--	.37	.47	.46	.22	-.02	.29
DRRI-H	.37	--	.48	.42	.51	-.42	.41
DRRI-I	.47	.81	--	.90	.63	.09	.44
DRRI-J	.46	.42	.90	--	.57	.07	.54
DRRI-K	.22	.51	.63	.57	--	-.12	.46
DRRI-L	-.02	-.42	.09	.07	-.12	--	-.44
DRRI-M	.29	.41	.44	.54	.46	-.44	--

Notes:

PCL-M= PTSD Checklist for Military Samples; DRRI=Deployment Risk and Resiliency Inventory; H=Perceived Threat; I=Combat Experiences; J=Aftermath of Battle; K=Exposure to Nuclear, Biological, and Chemical Weapons; L=Post-deployment Social Support; M=Post-deployment Stressors.

Outliers, or data values that deviated from the majority of the dataset, were detected using the standardized score approach. Specifically, scores in the dataset from the predictor variables (the PCL-M and DRRI subscales) were explored for univariate outliers. Considering sample size, cases were considered outliers if their standard score was ± 2.5 or beyond. Based on this screening process, no cases were omitted from the dataset before analyses were performed. For instance, for the PCL-M, no outliers were detected ($z_p = -1.43$ to 2.44). Similarly, no outliers were detected in the DRRI-H or DRRI-L ($z_H = -1.99$ to 1.63 ; $z_L = -1.43$ to 1.96). Two outliers were detected in the data for DRRI-I (maximum $z_I = 3.0$) and DRRI-J (maximum $z_J = 3.0$); these were the same two cases and reflected elevated scores on the measures of combat exposure and battle aftermath, as reported by fathers. They were not removed from the sample considering overall sample size.

Sample Descriptives

Sixty-five potential subjects were contacted via telephone or email to be considered for study during the 12-month recruitment phase of the study, which occurred between October of 2009 and November of 2010. Of these, 57 subjects gave verbal consent and were administered telephone screens as part of the initial screening process described above in "Methods." A total of 34 subjects met inclusion/exclusion criteria and were offered in-person evaluations. Thus, 23 dyads were not considered eligible for the following reasons: Father was deployed to another conflict outside of OIF/OEF such as the Gulf War or Vietnam War ($n=2$); Father was not deployed outside of the U.S. or did not deploy to a combat zone ($n=8$); Child participants were outside of the study's age range ($n=7$); Adult participant did not have any biological children ($n=5$); Child

participant lived out of the state (n=1). Of the eligible participants, 21 were enrolled into the study. Thus, a total of 13 eligible subjects were not enrolled for the following reasons: Family member such as spouse or child did not wish to be enrolled (n=3); Combatant is still serving in Iraq or Afghanistan and cannot come in for evaluation (n=2); Participant did not show or did not return follow-up calls (n=8).

The final sample was generated by all recruitment sources which included internet advertising (n=11); referrals from the VA Medical Center (n=5); Community Flyers (n=3); Local Veteran's Center (n=1); and newspaper ad (n=1). Over fifty percent of the sample was generated from online social networking sites: *facebook.com* (n=7); *google.com* (n=1); *craigslist.com* (n=2); and the Soldier's Project Web Newsletter (n=1).

Parent participants. All parent participants were male combatants who were deployed between 2001 and 2010 to Iraq and/or Afghanistan. The average age of fathers was 35.2 years. These participants consisted of U.S. veterans, active duty, or retired servicemen. The number of total deployments ranged from one to seven; the average number of deployments during the OIF/OEF war period was 3.1. Nineteen of the 21 subjects reported that their last deployment was to Iraq; two were deployed to Afghanistan. The average duration of the last deployment was 9.2 months, and the average time since returning from deployment was 25.5 months. In terms of ethnic status, the majority of participants were Caucasian (15 subjects; 71.4% of the sample). Four participants were Hispanic/Latino (4% of the sample), one was Asian (4.8%), and one was "Other" (4.8%). Nearly half of the sample reported having three or more children (47.6%), with 38.1% having two children in the home, and 14.3% having only

one child in the home. Demographic and deployment data of parent participants in the final sample are shown in Table 2.

Table 2: Demographic information of fathers in final sample, N=21

	Number	Percent
Marital Status		
Married	14	66.7
Cohabiting (not married)	1	4.8
Divorced/Separated	6	28.6
Total	21	100
Ethnic Group		
Caucasian	15	71.4
African-American	0	0
Latino/Hispanic	4	19.0
Asian/Pacific Islander	1	4.8
Other	1	4.8
Total	21	100
Number Children		
One child	3	14.3
Two children	8	38.1
Three or more children	10	47.6
Total	21	100
Service Branch		
Air Force	1	4.8
Army	5	23.8
Marines	7	33.3
Navy	7	33.3
Contracted	1	4.8
Total	21	100
Location of deployment		
Iraq	19	90.5
Afghanistan	2	9.5
Total	21	100
Number of deployments		
One deployment	5	23.8
Two deployments	2	9.5
Three or more deployments	13	61.9
Unknown	1	4.8
Total	21	100

Table 2, continued: Demographic information of fathers in final sample, N=21

	Number	Percent
Current military status	12	57.1
Active duty	2	9.5
Reserves	3	14.3
Retired	0	0
Veteran	1	4.8
Separated	3	14.3
Other	21	100
Total		

Clinical profiles of fathers. Fathers were considered eligible for study if they had reported deployment to Iraq and/or Afghanistan since 2001 and exposure to combat during that time. At time of assessment, of the 21 fathers, only 6 participants did not meet diagnostic criteria for PTSD. Two participants who did not meet for PTSD met diagnostic criteria for Major Depressive Disorder. The average PCL-M was among resilient fathers was 27.7 which is considered under the clinical cut-off for diagnosis of PTSD in (Bliese et al., 2008).

Fifteen fathers met diagnostic criteria for PTSD based on clinical interview (see Methods). Of these participants, nine met criteria for Major Depressive Disorder and four met for Generalized Anxiety Disorder. One father met for Substance Abuse. The average PCL-M score among fathers with PTSD was 51.5 which was above all cut-off scores for diagnosis of PTSD recommended by the National Center of PTSD (Bliese et al., 2008).

Child participants. The average number of children in each household was 2.48. If the parent participant had more than one biological child living at home, the child closest to age 10 was chosen for study, unless the parent participant expressed a preference for a child to be evaluated. This occurred at least three times per the

documentation of phone screens. Children ranged from age 6 to 17. The average age of children was 9.8. Ten child participants were male and eleven were female.

Deployment

The number and duration of deployments by fathers was examined to rule out deployment factors as a predictor of parent or child symptomatology. Neither the number of deployments or total duration of deployments was associated with any of our broad indices of child psychopathology (all p 's > 0.14)."

PTSD in fathers as a predictor of child symptoms

Combat-related PTSD in fathers was examined as the core aim of this study in determining predictors of child symptoms. Simple linear regression analyses were performed to test the relationship between fathers' post-traumatic stress symptoms (as measured by the PCL-M) and various child symptoms including depression (subscales of the CDI and CBCL), anxiety (subscales of the MASC and CBCL), and PTSD (UPID and subscales of the CBCL). Additionally, combat-related PTSD was examined as a predictor of other problems in youths such as externalizing symptoms as measured by subscales of the CBCL.

Results from simple linear regression analyses (Table 3) showed that post-traumatic stress symptoms in fathers was not a significant predictor of overall child depression at the $\alpha = 0.05$ level ($t(19) = 0.900$, $p = 0.383$). Results from simple linear regression analyses (Table 3) also showed that post-traumatic stress symptoms in fathers was not a significant predictor of overall child anxiety at the $\alpha = 0.05$ level ($t(19) = 0.446$, $p = 0.663$). When examining PTSD in fathers as a predictor of child PTSD symptoms, the relationship was not statistically significant either using the UPID ($t(19) = -0.142$, $p =$

0.889) or the CBCL DSM-Oriented Scale of PTSD ($t(19) = 0.520, p = 0.610$). Effects sizes are also shown in Table 3.

Table 3: Fathers' Post-traumatic Stress as a Predictor of Youth Outcomes

	B	β	t	p-value	R ²
CDI	.10	.23	.90	.38	-.01
MASC	.15	.12	.45	.66	-.06
UPID	-.04	-.04	-.14	.89	-.07
CBCL Internalizing	.01	.02	.08	.94	-.06
CBCL Externalizing	.04	.10	.40	.69	-.05

Notes:

1. CDI= Child Depression Inventory; MASC = Multidimensional Anxiety Scale for Children; UPID = UCLA PTSD Index for DSM-IV; CBCL = Child Behavior Checklist; B=Unstandardized coefficient; β = Standardized coefficient; t=t-test statistic; R²= Adjusted R Square

2. Adjusted R-squared values may be negative

Results also showed that post-traumatic stress symptoms in fathers was not a significant predictor of child internalizing symptoms as measured by the CBCL Total Internalizing Problems ($t(19) = 0.080, p = 0.937$). Post-traumatic stress symptoms in fathers were not a significant predictor of child externalizing symptoms as measured by the CBCL Total Externalizing Problems ($t(19) = 0.403, p = 0.692$).

To summarize, post-traumatic stress symptoms in fathers was not found to be statistically predictive of child symptoms across internalizing and externalizing symptoms as measured by child self-report or parent report.

Fathers' deployment experiences as a predictor of child symptoms

Characteristics of fathers' deployment experiences were examined as possible predictors of child functioning across internalizing and externalizing symptoms. Predictive variables were obtained from the Deployment Risk and Resilience Inventory (DRRI) and include fathers' perceived threat during combat; direct combat exposure; aftermath of battle; exposure to nuclear, biological, and chemical weapons (NBC's); post-deployment social support; and post-deployment life stressors.

Perceived threat. Total scores on the DRRI Section H ("Perceived Threat During Deployment") for this sample ranged from 22 to 68 with a mean of 47.2 (12.7). Results from simple linear regression analyses showed that fathers' perceived threat during combat was not a significant predictor of overall child depression ($t(19) = 0.63, p = 0.54$) or overall child anxiety ($t(19) = 1.02, p = 0.33$). When examining perceived threat as a predictor of child PTSD symptoms, the relationship was not statistically significant either using the UPID ($t(19) = -0.08, p = 0.94$) or the CBCL DSM-Oriented Scale of PTSD ($t(19) = 1.10, p = 0.29$).

Table 4: Fathers' Perceived Threat as a Predictor of Youth Outcomes

	B	β	t	p-value	R ²
CDI	.08	.17	.63	.54	-.04
MASC	.37	.27	1.02	.33	.003
UPID	-.03	-.02	-.08	.94	-.01
CBCL Internalizing	.04	.12	.48	.64	-.04
CBCL Externalizing	-.03	-.06	-.23	.82	-.06

Notes:

1. CDI= Child Depression Inventory; MASC = Multidimensional Anxiety Scale for Children; UPID = UCLA PTSD Index for DSM-IV; CBCL = Child Behavior Checklist; B=Unstandardized coefficient; β = Standardized coefficient; t=t-test statistic; R²= Adjusted R Square.

2. Adjusted R-squared values may be negative

Results also showed that fathers' perceived threat during deployment was not a significant predictor of child internalizing symptoms as measured by the CBCL Total Internalizing Problems ($t(19) = 0.48, p = 0.64$). Additionally, fathers' perceived threat during deployment was examined in predictive models of child externalizing outcomes. Results showed that fathers' perceived threat was not a significant predictor of child externalizing symptoms as measured by the CBCL Total Externalizing Problems ($t(19) = -0.23, p = 0.82$).

To summarize, fathers' perceived threat during their deployment was not found to be statistically predictive of child symptoms across internalizing and externalizing symptoms as measured by child self-report or parent report.

Combat exposure. Total scores in this sample ranged from 0 to 14 on the DRRI Section measuring combat exposure during deployment. Results from simple linear regression analyses (Table 5) showed that fathers' combat exposure during deployment was not a significant predictor of overall child depression at the $\alpha = 0.05$ level ($t(19) = 0.21, p = 0.84$).

Table 5: Fathers' Combat Exposure as a Predictor of Youth Outcomes

	B	β	t	p-value	R ²
CDI Total	.001	.05	.21	.84	-.06
MASC Total	.01	.61	3.39	.003**	.34
Physical Symptoms	.01	.21	.96	.35	-.004
Harm Avoidance	.01	.41	1.96	.07	.13
Social Anxiety	.01	.36	1.70	.11	.09
Separation/Panic	.01	.57	2.99	.008**	.28
UPID Total	-.01	-.15	-.67	.51	-.03
CBCL Internalizing	.01	.61	3.36	.003**	.34
Anxious/Depressed	.01	.67	3.96	.001**	.42
Anxiety Problems	.004	.58	3.07	.006**	.30
Somatic Syndrome	.001	.20	.90	.38	-.01
Affective Problems	.002	.23	1.02	.32	.002
Withdrawn/Depressed	.002	.31	1.42	.17	.05
Posttraumatic Stress	.01	.61	3.39	.003**	.34
CBCL Externalizing	.02	.58	3.10	.006**	.30
Aggressive	.01	.67	3.95	.001**	.42
Rulebreaking	.01	.52	2.65	.016*	.23
Oppositional	.004	.52	2.64	.016*	.23
Conduct Problems	.01	.45	2.19	.04*	.16

Table 5, continued: Fathers' Combat Exposure as a Predictor of Youth Outcomes

Notes:

1. CDI= Child Depression Inventory; MASC = Multidimensional Anxiety Scale for Children; UPID = UCLA PTSD Index for DSM-IV; CBCL= Child Behavior Checklist; B=Unstandardized coefficient; β = Standardized coefficient; t =t-test statistic; R^2 = Adjusted R Square.

2. Adjusted R-squared values may be negative

3. *Significant at the $p < 0.05$ level.

4. **Significant at the $p < 0.01$ level.

Results from simple linear regression analyses (Table 5) showed that fathers' combat exposure during deployment was found to be a significant predictor of overall child anxiety at the $\alpha = 0.05$ level ($t(19) = 2.28$, $p = 0.03$; Adjusted $R^2 = 17\%$). When examining anxiety subscales, combat exposure was not a significant predictor of subtypes of child anxiety such as physical symptoms ($t(19) = .96$, $p = 0.35$); social anxiety ($t(19) = 1.7$, $p = 0.11$); and harm avoidance ($t(19) = 1.96$, $p = 0.07$). However, fathers' combat exposure was found to be a significant predictor of the subtype separation/panic symptoms at the $\alpha = 0.05$ level ($t(19) = 2.99$, $p = 0.008$; Adjusted $R^2 = 28\%$).

When examining fathers' combat exposure as a predictor of child PTSD symptoms, the relationship was not statistically significant using the UPID as a measure of child PTSD symptoms ($t(19) = -0.67$, $p = 0.51$). However, fathers' combat exposure during deployment was found to be a significant predictor of child PTSD symptoms using the CBCL DSM-Oriented Scale of PTSD ($t(19) = 3.39$, $p = 0.003$; Adjusted $R^2 = 34\%$).

Results also showed that fathers' combat exposure during deployment was found to be a significant predictor of total child internalizing symptoms (CBCL Internalizing Problems) at the $\alpha = 0.05$ level ($t(19) = 3.36$, $p = 0.003$; Adjusted $R^2 = 34\%$). Furthermore, fathers' combat exposure was found to be a significant predictor of child internalizing symptoms as measured by the CBCL Anxious/Depressed Syndrome Scale at the $\alpha = 0.05$ level ($t(19) = 3.96$, $p = 0.001$; Adjusted $R^2 = 42\%$) and by the CBCL DSM-Oriented Scale of Anxiety Problems at the $\alpha = 0.05$ level ($t(19) = 3.07$, $p = 0.006$; Adjusted $R^2 = 30\%$). Fathers' combat exposure during deployment was not a significant predictor of child internalizing symptoms as measured by the CBCL Withdrawn/Depressed Syndrome Scale, the Somatic Syndrome Scale, and the DSM-Oriented Scale of Affective Problems as seen in Table 5.

Finally, fathers' combat exposure during deployment was examined in predictive models of child externalizing outcomes. Results showed that fathers' combat exposure was a significant predictor of child externalizing symptoms as measured by the CBCL Total Externalizing Problems Scale at the $\alpha = 0.05$ level ($t(19) = 3.10$, $p = 0.006$; Adjusted $R^2 = 30\%$). In addition, results showed that fathers' combat exposure was a significant predictor of youth problems as measured on the Rulebreaking Syndrome Scale T-Score ($t(19) = 2.65$, $p = 0.016$; Adjusted $R^2 = 23\%$), the Aggressive Syndrome ($t(19) = 3.95$, $p = 0.001$; Adjusted $R^2 = 42\%$), the DSM-Oriented Scale of Oppositional Problems ($t(19) = 2.64$, $p = 0.016$; Adjusted $R^2 = 23\%$), and the DSM-Oriented Scale of Conduct Problems T-Score ($t(19) = 2.19$, $p = 0.04$; Adjusted $R^2 = 16\%$).

To summarize, fathers' combat exposure during their deployment was found to be statistically predictive of child internalizing symptoms such as overall anxiety and PTSD

symptoms, as well as externalizing symptoms such as rulebreaking, aggressive, oppositional, and conduct problems. Fathers' combat exposure, however, was not found to predict child depression, withdrawn, and somatization symptoms.

Aftermath of battle. Total scores in this sample ranged from 0 to 15 on the DRRI Section measuring level of exposure to battle aftermath. Results from simple linear regression analyses (Table 6) showed that fathers' experiences following battle (such as seeing wounded and dead bodies) was not a significant predictor of overall child depression at the $\alpha = 0.05$ level ($t(19) = 0.23$, $p = 0.823$). However, aftermath of battle was found to be a significant predictor of overall child anxiety at the $\alpha = 0.05$ level ($t(19) = 2.28$, $p = 0.034$; Adjusted $R^2 = 17\%$). Battle aftermath was found to be a significant predictor of the subtype separation/panic symptoms at the $\alpha = 0.05$ level ($t(19) = 2.99$, $p = 0.008$; Adjusted $R^2 = 28\%$). However, aftermath of battle was not a significant predictor of subtypes of child anxiety such as physical symptoms, social anxiety, and harm avoidance (Table 6).

Table 6: Fathers' Reports of Battle Aftermath as a Predictor of Youth Outcomes

	B	β	t	p-value	R ²
CDI Total	.001	.05	.23	.82	-.05
MASC Total	.03	.46	2.28	.034*	.17
Physical Symptoms	.01	.21	.96	.35	-.004
Harm Avoidance	.01	.41	1.96	.06	.13
Social Anxiety	.01	.36	1.69	.11	.09
Separation/Panic	.01	.57	2.99	.008**	.28
UPID Total	-.01	-.15	-.67	.51	-.03
CBCL Internalizing	.01	.61	3.35	.003**	.34
Anxious/Depressed	.01	.67	3.94	.001**	.42
Anxiety Problems	.004	.58	3.06	.006**	.30
Somatic Syndrome	.001	.20	.90	.38	-.01
Affective Problems	.002	.23	1.02	.32	.002
Withdrawn/Depressed	.002	.31	1.42	.17	.05
Posttraumatic Stress	.01	.61	3.38	.003**	.34
CBCL Externalizing	.02	.58	3.09	.006**	.30
Aggressive	.01	.67	3.94	.001**	.42
Rulebreaking	.01	.52	2.63	.016*	.23
Oppositional	.004	.52	2.64	.016*	.23
Conduct Problems	.01	.45	2.18	.042*	.16

Table 6, continued: Fathers' Reports of Battle Aftermath as a Predictor of Youth Outcomes

Notes:

1. CDI= Child Depression Inventory; MASC = Multidimensional Anxiety Scale for Children; UPID = UCLA PTSD Index for DSM-IV; CBCL= Child Behavior Checklist; B=Unstandardized coefficient; β = Standardized coefficient; t=t-test statistic; R^2 = Adjusted R Square

2. Adjusted R-squared values may be negative

3. *Significant at the $p < 0.05$ level.

4. **Significant at the $p < 0.01$ level.

When examining fathers' experiences following battle as a predictor of child PTSD symptoms, the relationship was not statistically significant using the UPID as a measure of child PTSD symptoms ($t(19) = -0.673, p = 0.509$). However, aftermath of battle was found to be a significant predictor of child PTSD symptoms using the CBCL DSM-Oriented Scale of PTSD ($t(19) = 3.38, p = 0.003$; Adjusted $R^2 = 34\%$).

Results also showed that fathers' reported experiences after combat was found to be a significant predictor of total child internalizing symptoms (CBCL Internalizing Problems) at the $\alpha = 0.05$ level ($t(19) = 3.35, p = 0.003$; Adjusted $R^2 = 34\%$).

Examination of internalizing subscales revealed that fathers' experiences after combat was significantly predictive of scores on the CBCL Anxious/Depressed Syndrome Scale at the $\alpha = 0.05$ level ($t(19) = 3.94, p = 0.001$; Adjusted $R^2 = 42\%$). Similarly, fathers' reports of experiences after combat was found to be a significant predictor of child internalizing symptoms as measured by the CBCL DSM-Oriented Scale of Anxiety Problems at the $\alpha = 0.05$ level ($t(19) = 3.06, p = 0.006$; Adjusted $R^2 = 30\%$). Fathers' reports of battle aftermath during deployment was not a significant predictor of child

internalizing symptoms as measured by the CBCL Withdrawn/Depressed Syndrome Scale, the Somatic Syndrome Scale, and the DSM-Oriented Scale of Affective Problems (Table 6).

Finally, fathers' reports of battle aftermath during deployment was examined in predictive models of child externalizing outcomes. Results showed that aftermath of battle was a significant predictor of child externalizing symptoms as measured by the CBCL Total Externalizing Problems Scale ($t(19) = 3.09, p = 0.006$; Adjusted $R^2 = 30\%$), the Rulebreaking Syndrome Scale T-Score ($t(19) = 2.63, p = 0.016$; Adjusted $R^2 = 23\%$), the Aggressive Syndrome Scale ($t(19) = 3.94, p = 0.001$; Adjusted $R^2 = 42\%$), the DSM-Oriented Scale of Oppositional Problems ($t(19) = 2.64, p = 0.016$; Adjusted $R^2 = 23\%$), and the DSM-Oriented Scale of Conduct Problems T-Score ($t(19) = 2.18, p = 0.042$; Adjusted $R^2 = 16\%$).

To summarize, fathers' self-reports of their experiences following battle was found to be statistically predictive of child internalizing symptoms such as overall anxiety and PTSD symptoms, as well as externalizing symptoms such as rulebreaking, aggressive, oppositional, and conduct problems. Fathers' reported experiences following battle, however, did not predict child depression, withdrawn, and somatization symptoms.

NBC exposures. Scores in this sample ranged from 0 to 33 on the DRRI measure of exposure to nuclear, biological, and chemical weapons. Results from simple linear regression (Table 7) analyses showed that fathers' reports of being exposed to nuclear, biological, and chemical weapons during deployment was not a significant predictor of overall child depression at the $\alpha = 0.05$ level ($t(19) = 0.20, p = 0.845$). However, fathers' NBC exposures during deployment was found to be a significant predictor of overall

child anxiety at the $\alpha = 0.05$ level ($t(19) = 2.27$, $p = 0.035$; Adjusted $R^2 = 17\%$).

Examining child anxiety subscales revealed that fathers' NBC exposure was found to be a significant predictor of the subtype separation/panic symptoms at the $\alpha = 0.05$ level ($t(19) = 2.70$, $p = 0.016$; Adjusted $R^2 = 28\%$). However, NBC exposure was not a significant predictor of subtypes of child anxiety such as physical symptoms, social anxiety, and harm avoidance (Table 7).

Table 7: Fathers' Exposure to Nuclear, Biological, and Chemical Weapons as a Predictor of Youth Outcomes

	B	β	t	p-value	R ²
CDI Total	.001	.05	.20	.85	-.06
MASC Total	.03	.46	2.27	.04*	.17
Physical Symptoms	.01	.21	.85	.41	-.02
Harm Avoidance	.01	.42	1.8	.09	.12
Social Anxiety	.01	.36	1.5	.15	.07
Separation/Panic	.01	.57	2.70	.02*	.28
UPID Total	-.01	-.15	-.66	.52	-.03
CBCL Internalizing	.01	.61	3.36	.003**	.34
Anxious/Depressed	.01	.67	3.97	.001**	.43
Anxiety Problems	.004	.58	3.11	.006**	.30
Somatic Syndrome	.001	.20	.89	.39	-.01
Affective Problems	.002	.23	1.03	.32	.003
Withdrawn/Depressed	.002	.31	1.42	.17	.05
Posttraumatic Stress	.01	.61	3.39	.003**	.34
CBCL Externalizing	.02	.57	3.05	.007**	.29
Aggressive	.01	.67	3.90	.001**	.42
Rulebreaking	.01	.51	2.60	.02*	.22
Oppositional	.004	.51	2.60	.018*	.22
Conduct Problems	.01	.44	2.15	.044*	.15

Table 7, continued: Fathers' Exposure to Nuclear, Biological, and Chemical Weapons as a Predictor of Youth Outcomes

Notes:

1. CDI= Child Depression Inventory; MASC = Multidimensional Anxiety Scale for Children; UPID = UCLA PTSD Index for DSM-IV; CBCL=Child Behavior Checklist; B=Unstandardized coefficient; β = Standardized coefficient; t =t-test statistic; R^2 = Adjusted R Square

2. Adjusted R-squared values may be negative

3. *Significant at the $p < 0.05$ level.

4. **Significant at the $p < 0.01$ level

When examining fathers' NBC exposure as a predictor of child PTSD symptoms, the relationship was not statistically significant using the UPID as a measure of child PTSD symptoms ($t(19) = -0.66, p = 0.517$). However, fathers' NBC exposure during deployment was found to be a significant predictor of child PTSD symptoms using the CBCL DSM-Oriented Scale of PTSD ($t(19) = 3.39, p = 0.003$; Adjusted $R^2 = 34\%$).

Results also showed that fathers' NBC exposure during deployment was found to be a significant predictor of total child internalizing symptoms (CBCL Internalizing Problems) at the $\alpha = 0.05$ level ($t(19) = 3.36, p = 0.003$; Adjusted $R^2 = 34\%$).

Examination of child internalizing subscales revealed that degree of fathers' NBC exposures was a significant predictor of child anxiety as measured by the CBCL Anxious/Depressed Syndrome Scale ($t(19) = 3.97, p = 0.001$; Adjusted $R^2 = 43\%$) and the CBCL DSM-Oriented Scale of Anxiety Problems ($t(19) = 3.11, p = 0.006$; Adjusted $R^2 = 30\%$). In addition, Fathers' NBC exposure during deployment was not a significant predictor of child internalizing symptoms as measured by the CBCL

Withdrawn/Depressed Syndrome Scale, the Somatic Syndrome Scale, and the DSM-Oriented Scale of Affective Problems (Table 7).

Finally, fathers' NBC exposures during deployment was examined in predictive models of child externalizing outcomes. Results showed that fathers' NBC exposure was a significant predictor of child externalizing symptoms as measured by the CBCL Total Externalizing Problems Scale ($t(19) = 3.05, p = 0.007$; Adjusted $R^2 = 29\%$), the Rulebreaking Syndrome Scale T-Score ($t(19) = 2.60, p = 0.018$; Adjusted $R^2 = 22\%$), the Aggressive Syndrome Scale ($t(19) = 3.90, p = 0.001$; Adjusted $R^2 = 42\%$), the DSM-Oriented Scale of Oppositional Problems ($t(19) = 2.60, p = 0.018$; Adjusted $R^2 = 22\%$), and the DSM-Oriented Scale of Conduct Problems T-Score at the $\alpha = 0.05$ level ($t(19) = 2.15, p = 0.044$; Adjusted $R^2 = 15\%$).

To summarize, fathers' reports of exposure to nuclear, biological, and chemical weapons during their deployment was found to be statistically predictive of child internalizing symptoms such as overall anxiety and PTSD symptoms as well as externalizing symptoms such as rulebreaking, aggressive, oppositional, and conduct problems. Fathers' reports of NBC exposure, however, was not found to predict child depression, withdrawn, and somatization symptoms.

Post-deployment social support. Scores in this sample ranged from 36 to 75 on the DRRI measure of post-deployment social support. Results from simple linear regression analyses (Table 8) showed that fathers' self-reports of their social support following deployment was not a significant predictor of overall child depression ($t(19) = 0.04, p = 0.97$) or overall child anxiety ($t(19) = -1.30, p = 0.21$) at the $\alpha = 0.05$ level. When examining social support as a predictor of child PTSD symptoms, the relationship

was not statistically significant either using the UPID ($t(19) = 0.32, p = 0.75$) or the CBCL DSM-Oriented Scale of PTSD ($t(19) = -0.87, p = 0.39$).

Table 8: Fathers' Post-Deployment Social Support as a Predictor of Youth Outcomes

	B	β	t	p-value	R ²
CDI	.01	.01	.04	.97	-.05
MASC	-.45	-.29	-1.30	.21	.03
UPID	.09	.07	.32	.75	-.05
CBCL Internalizing	-.05	-.10	-0.43	.67	-.04
CBCL Externalizing	-.05	-.07	-0.32	.75	-.05

Notes:

1. CDI= Child Depression Inventory; MASC = Multidimensional Anxiety Scale for Children; UPID = UCLA PTSD Index for DSM-IV; CBCL = Child Behavior Checklist; B=Unstandardized coefficient; β = Standardized coefficient; t=t-test statistic; R²= Adjusted R Square.

2. Adjusted R-squared values may be negative

Results also showed that fathers' social support following deployment was not a significant predictor of child internalizing symptoms as measured by the CBCL Total Internalizing Problems ($t(19) = -0.43, p = 0.67$), or child externalizing symptoms as measured by the CBCL Total Externalizing Problems ($t(19) = -0.32, p = 0.75$).

To summarize, fathers' reports of social support following their deployment was not found to be statistically predictive of child symptoms across internalizing and externalizing symptoms as measured by child self-report or parent report.

Post-deployment life stressors. Results from simple linear regression analyses (Table 9) showed that fathers' reports of life stressors following deployment was not a

significant predictor of overall child depression ($t(19) = 0.23, p = 0.82$). Results from simple linear regression analyses (Table 9) showed that fathers' reports of life stressors following deployment was found to be a significant predictor of overall child anxiety at the $\alpha = 0.05$ level ($t(19) = 2.27, p = 0.035$; Adjusted $R^2 = 17\%$). Examination of anxiety subscales showed that fathers' self-reported post-deployment stressors was found to be a significant predictor of the subtype separation/panic symptoms at the $\alpha = 0.05$ level ($t(19) = 2.99, p = 0.007$; Adjusted $R^2 = 28\%$). However, post-deployment life stressors was not a significant predictor of subtypes of child anxiety such as physical symptoms, social anxiety, and harm avoidance (Table 9).

Table 9: Fathers' Post-deployment Stress as a Predictor of Youth Outcomes

	B	β	t	p-value	R ²
CDI Total	.001	.05	.23	.82	-.05
MASC Total	.03	.46	2.27	.04*	.17
Physical Symptoms	.01	.22	.96	.35	-.004
Harm Avoidance	.01	.41	1.94	.07	.12
Social Anxiety	.01	.36	1.69	.11	.09
Separation/Panic	.01	.57	2.99	.007**	.29
UPID Total	-.01	-.15	-.66	.52	-.03
CBCL Internalizing	.01	.61	3.35	.003**	.34
Anxious/Depressed	.01	.67	3.95	.001**	.42
Anxiety Problems	.004	.58	3.08	.006**	.30
Somatic Syndrome	.001	.20	.90	.38	-.01
Affective Problems	.002	.23	1.01	.33	.001
Withdrawn/Depressed	.002	.31	1.41	.18	.05
Posttraumatic Stress	.01	.61	3.39	.003**	.34
CBCL Externalizing	.02	.58	3.10	.006**	.30
Aggressive	.01	.67	3.95	.001**	.42
Rulebreaking	.01	.52	2.64	.02*	.23
Oppositional	.004	.52	2.64	.02*	.23
Conduct Problems	.01	.45	2.19	.04*	.16

Table 9, continued: Fathers' Post-deployment Stress as a Predictor of Youth Outcomes

Notes:

1. CDI= Child Depression Inventory; MASC = Multidimensional Anxiety Scale for Children; UPID = UCLA PTSD Index for DSM-IV; CBCL=Child Behavior Checklist; B=Unstandardized coefficient; β = Standardized coefficient; t=t-test statistic; R^2 = Adjusted R Square

2. Adjusted R-squared values may be negative

3. *Significant at the $p < 0.05$ level.

4. **Significant at the $p < 0.01$ level.

When examining fathers' reports of stressors following deployment as a predictor of child PTSD symptoms, the relationship was not statistically significant using the UPID as a measure of child PTSD symptoms ($t(19) = -0.66, p = 0.515$). However, fathers' life stressors following deployment was found to be a significant predictor of child PTSD symptoms using the CBCL DSM-Oriented Scale of PTSD ($t(19) = 3.39, p = 0.003$; Adjusted $R^2 = 34\%$).

Results also showed that fathers' reports of life stressors following deployment was found to be a significant predictor of total child internalizing symptoms (CBCL Internalizing Problems) at the $\alpha = 0.05$ level ($t(19) = 3.35, p = 0.003$; Adjusted $R^2 = 34\%$). Examination of internalizing subscales showed that fathers' post-deployment stress was a significant predictor of child internalizing symptoms as measured by the CBCL Anxious/Depressed Syndrome Scale ($t(19) = 3.95, p = 0.001$; Adjusted $R^2 = 42\%$) and the CBCL DSM-Oriented Scale of Anxiety Problems ($t(19) = 3.08, p = 0.006$; Adjusted $R^2 = 30\%$). Fathers' post-deployment life stressors following deployment was not a significant predictor of child internalizing symptoms as measured by the CBCL

Withdrawn/Depressed Syndrome Scale, the Somatic Syndrome Scale, and the DSM-Oriented Scale of Affective Problems (Table 9).

Finally, fathers' reports of life stressors following deployment was examined in predictive models of child externalizing outcomes. Results showed that fathers' post-deployment stressors was a significant predictor of child externalizing symptoms as measured by the CBCL Total Externalizing Problems Scale at the $\alpha = 0.05$ level ($t(19) = 3.10$, $p = 0.006$; Adjusted $R^2 = 30\%$). Examination of externalizing subscale scores revealed that fathers' post-deployment stressors was a significant predictor of youth problems as measured on the Rulebreaking Syndrome Scale T-Score ($t(19) = 2.64$, $p = 0.016$; Adjusted $R^2 = 23\%$), the Aggressive Syndrome Scale ($t(19) = 3.95$, $p = 0.001$; Adjusted $R^2 = 42\%$), the DSM-Oriented Scale of Oppositional Problems ($t(19) = 2.64$, $p = 0.016$; Adjusted $R^2 = 23\%$), and the DSM-Oriented Scale of Conduct Problems T-Score ($t(19) = 2.19$, $p = 0.041$; Adjusted $R^2 = 16\%$).

To summarize, fathers' reports of life stressors following their deployment was found to be statistically predictive of child internalizing symptoms such as overall anxiety, and PTSD symptoms, as well as externalizing symptoms such as rulebreaking, aggressive, oppositional, and conduct problems. Fathers' reports of post-deployment stressors, however, was not found to predict child depression, withdrawn, and somatization symptoms.

Home environment as a mediator

Given that no significant relationships were found between fathers' symptoms and child symptoms, the mediation model testing the impact of family functioning on the association between paternal PTSD and internalizing symptoms in youths was not tested.

However, given the findings that fathers' reported combat experiences and aftermath of battle (as derived from the DRRI measure) were predictive of child symptoms, these variables were tested in the proposed mediation model that *unbalanced styles* of family functioning will significantly impact these relationships. The family *cohesion* and the family *adaptability* scores from the FACES were tested as mediator variables in separate models.

Results from multiple regression analyses showed that family balanced cohesion scores was not independently predictive of child overall anxiety ($t(19) = -0.799$, $p = 0.435$); additionally, the interaction between fathers' combat experiences and family balanced cohesion was not predictive of child overall anxiety ($t(19) = 0.747$, $p = 0.465$). Thus, family cohesion did not appear to moderate the predictive relationship between fathers' combat experiences and child anxiety in this sample.

Results from multiple regression analyses showed that family balanced flexibility (adaptability) was not independently predictive of child overall anxiety ($t(19) = -1.437$, $p = 0.168$). Additionally, the interaction between fathers' combat experiences and family flexibility was not predictive of child overall anxiety ($t(19) = 0.634$, $p = 0.535$). Thus, family flexibility did not appear to moderate the predictive relationship between fathers' combat experiences and child anxiety in this sample.

Results from multiple regression analyses showed that the interaction between fathers' reports of battle aftermath (e.g., seeing wounded or dead bodies) and family balanced cohesion was not predictive of overall child anxiety ($t(19) = 0.920$, $p = 0.370$). Additionally, the interaction between fathers' reports of battle aftermath and family flexibility (adaptability) was not predictive of overall child anxiety ($t(19) = 0.590$, $p =$

0.53). Thus, family cohesion and adaptability do not have an impact on the predictive relationship between fathers' reports of battle aftermath and child anxiety.

Discussion

This dissertation, a pilot study of 42 subjects, aimed to explore the relationships between combat related PTSD in fathers who have served in Iraq and Afghanistan and psychopathology in their biological offspring. The discrepancy between the number of observed measures and number of subjects reflects the original research plan of this study. The sample size initially projected for this study was 224 subjects, or 112 father-child dyads. This projected sample would allow for multivariate analyses as well as consideration of child's age group and gender. Due to the challenging nature of executing a study that would recruit and enroll military parents and their school-aged youths, the projected sample was not recruited in a 2-year period (see Future Directions). The final sample included 21 fathers who have returned from OIF/OEF deployment in the last 10 years and their child between the ages of 6 and 17. Results from descriptive analyses showed that, in this sample, youths of fathers with higher levels of PTSD were not significantly more anxious or depressed than youths of fathers with low-to-no PTSD symptoms. Additionally, internalizing scores observed among youths did not trend toward clinical ranges on these child measures. Therefore, youths of fathers across low to high levels of combat-related PTSD appear to be functioning relatively well and may be resilient to intergenerational effects of paternal combat stress.

Upon further exploration of predictive variables, results of this study showed that certain key characteristics of fathers' deployment experiences were associated with several areas of functioning among youths. Specifically, fathers' reports of combat exposure, aftermath of battle, exposure to NBC's, and post-deployment life stressors were predictive of child externalizing symptoms such as overall anxiety, separation/panic

symptoms, and PTSD but not internalizing symptoms such as depression, withdrawn, and somatic symptoms. These findings are based both on parent report and youth report of child functioning. Furthermore, combat exposure, aftermath of battle, exposure to NBC's, and post-deployment life stressors were predictive of child externalizing symptoms such as rulebreaking, aggressive, oppositional, and conduct problems. These findings suggest that the *experiences* of fathers during combat appear to have a significant impact on youth functioning rather than the fathers' symptomatology. The process or mechanism by which fathers' deployment experiences impact child functioning remains unclear but raises many questions regarding the intergenerational impact of PTSD and its associated experiences. For instance, elevated rates of exposure to the aftermath of battle—seeing wounded and dead bodies and related combat trauma—were associated with increased problems in youths in this sample. It is possible some facets of post-traumatic stress responses that were not measured in this study (e.g., lack of communication, survivor's guilt, anger) might be predictive of maladaptive parenting which may impact child functioning. For instance, in a Vietnam Veteran study, Stein (1995) found an association between fathers' trauma imagery (descriptions of combat trauma) and their adult sons' PTSD symptoms. Thus, additional characteristics of deployment experiences, such as the *content* of the trauma remembered and *how* those memories are communicated may play an important role in the intergenerational impact of parental PTSD.

A surprising finding was that level of fathers' combat exposure, but not perceived threat during combat, was predictive of child symptoms. This finding is inconsistent with previous intergenerational studies of trauma because perceived threat (i.e. the extent one believes he/she will be harmed or die) is a necessary component of PTSD and therefore

found to be associated with both parent and child distress in the literature. Research on military samples has demonstrated differential contributions of war-zone stressors to PTSD symptomatology; findings show that perceived threat of bodily harm or death serves as a major mediator variable accounting for the association between the more objective combat experiences and PTSD symptom severity (King et al., 1995). This was not found in the present study: Fathers in this dissertation reported a wide range of perceived threat (with scores ranging from 22 to 68 on a measure that had a maximum of 75), yet these scores were not associated with child distress on any youth measure. The data are consistent within this sample because *level of PTSD in fathers* was also not found to be associated with any youth outcomes, and therefore, level of perceived threat should not necessarily predict child symptoms. If fathers' symptoms of PTSD as well as perceived threat of harm did not predict child outcomes, it remains unclear why other facets of fathers' combat experiences—such as level of combat exposure—during war were associated with child psychopathology. One explanation may be in how participants report their traumatic experiences. Cognitive-processing research has shown that combatants often have a shift in their world view following military-related trauma. For instance, they may adopt new beliefs about their world and themselves. They may believe that their world is unsafe, that others cannot be trusted, or that they will always be prone to danger. Conversely, they may internalize their experiences following war-related trauma and form beliefs of blame and guilt. These exaggerated and often irrational beliefs drive their behaviors and feelings, and also may have had an impact on how fathers answer questions specific to risk and resiliency. For instance, the combatants that report high exposure to traumatic war-zone experiences such as exposure to NBC's,

direct combat, and battle aftermath, may report lower levels of perceived danger than expected because “it was part of the job.”

In this sample, fathers’ post-deployment life stressors were independently predictive of child internalizing and externalizing problems. A possible explanation is that both the parent and child experience the same stressful events (e.g., home robbery, natural disaster, divorce), thereby increasing risk for youth problems. Youths with problem behavior may also exacerbate parenting stress which was not measured in the study, but may be reflected in the other “post-deployment” stressors endorsed by fathers. Further examination of these stressors/losses is warranted to explore whether the stressors responsible for parent-child distress are home/family related (e.g., divorce) or parent-focused (e.g., car accident, loss of job).

As stated above, research with military populations has demonstrated differential contributions of war-zone experiences and stressors to PTSD symptomatology—including self-reports of everyday discomforts (King et al., 1995). Specifically, perceived threat with regard to nuclear, biological, or chemical weaponry has been cited as an overwhelming concern of many combatants deployed to more recent war-zones such as the Gulf War (Malone et al., 1996). Within research examining the experiences of combatants during deployment, distress and hardships related to daily life far from home, long work days, acclimation to extreme climates, and other difficult living conditions is receiving more attention as possible dimensions of risk for post-traumatic stress disorder. King et al. (1995) has coined the phrase “malevolent environment” as the kind of lower magnitude stressor that may be associated with greater vulnerability to stress reactions. These dimensions of additional distress pertaining to combatants’ lifestyles during

deployment may have implications for long-term well-being of military personnel and veterans.

Research that uses multiple informants has demonstrated abundant parent-child discrepancies of clinical reports of youths (De Los Reyes & Kazdin, 2005). A strength of this pilot study is the consistent agreement found between parent-and child report. Specifically, fathers' level deployment experiences were found to predict youth self-report of anxiety (MASC) as well as parent-report of youth anxiety (CBCL Anxious Subscale) in this study sample. Similarly, neither youth reports of their own depression (CDI) nor parents' reports of child depression (CBCL Withdrawn/Depressed) were associated with fathers' deployment experiences. These converging relationships suggest similar responses on parent- and self-report of youth distress. This consistency, furthermore, may rule out the explanation that fathers with PTSD perceive their child's behavior differently than fathers without PTSD. That is, consistency between parent and child report provide evidence for actual distress experienced by youths rather than reflections of the parent's increased anxiety, changed worldview, or heightened vigilance. This finding has important implications for clinical practice because informant discrepancies are associated with poorer treatment response and poor parental participation in child's therapy (Ferdinand et al., 2004). The level of parent-child agreement found in the study sample may be an asset to military families and may guide mental health care practices for military personnel and their families.

This pilot study focused on internalizing symptoms (e.g., anxiety, depression, and posttraumatic stress). Surprisingly, anxiety, PTSD, *and* externalizing symptoms (rule-breaking behaviors, conduct problems, and aggression) were found to be predicted by

fathers' self-reported deployment experiences whereas depression symptoms in youths were *not* found to be associated with fathers' deployment experiences. First, the level of depression in the sample was low, perhaps because the mean age of the youth sample was ten years old; depression is likely to develop in adolescence whereas anxiety problems emerge earlier in development. In addition, in the trauma literature, at least one study found parental PTSD to be associated with child externalizing symptoms (child hostility and violent behavior as found in Glenn et al., 2002). The relationship between externalizing symptoms among youths and father's deployment experiences in the study sample may be a result of children's anger, aggression and hostility toward the parent with multiple absences from the home (as increased combat exposure is associated with number of deployments). However, research also suggests high levels of anger and violence in returning veterans (Beckham, Moore, & Reynolds, 2000), suggesting another framework for understanding parenting with PTSD. Additional research examining why combatants with more exposure to combat, NBC's, and battle aftermath should be conducted to explain elevations in externalizing symptoms in youths. In addition, intergenerational models of PTSD will therefore need to implement externalizing assessment of youths to further clarify the association between fathers' self reported PTSD and youth conduct problems.

A third set of analyses explored whether a moderating variable such as home environment affects relationships between parent characteristics and child functioning. No interaction terms were statistically significant when examining the impact of family environment on the association between fathers' deployment experiences and youth symptoms. Specifically, family adaptability and cohesion was not predictive of child

functioning independently or in interaction models. Similarly, nearly all characteristics of family functioning were not found to be significantly different across levels of PTSD in fathers.

Qualitative Findings

During the youth clinical interview as well as free-play, children and adolescents in the study described their interactions with their fathers. These were not coded but recorded and later examined post-hoc for content. Some examples include:

“When I’m in my room at night I’m scared that my dad might come in and eat me.”

-Six-year old boy of father with PTSD

“Sometimes I’m scared of my dad. Is he bipolar maybe? He changes from happy to really angry very fast.”

-Thirteen-year old girl of father with PTSD

“I have nightmares that my dad might get hurt...I’m scared he won’t come home after he leaves the house.”

-Seven-year old girl of father with PTSD

This pilot project was aimed at identifying youths who may be in need of services, as defined by the instruments currently available to measure anxiety, depression, and PTSD. However, upon review of the qualitative information gathered from youths (e.g., descriptions of recurrent fears of fathers’ violence, nightmares, or distancing), additional questions are raised about our ability to capture distress in offspring of military

servicemembers. If youths are having nightmares, fears, and worries about their fathers' deployment, how might we measure such fears? Do their responses denote distress or adjustment problems? How might they be better measured or captured? Further qualitative assessment and deliberate coding of these responses may elucidate whether the fears are transient or maladaptive.

Limitations

Several limitations and recommendations are strongly highlighted here given the above findings of this pilot study of the intergenerational effects of combat-related PTSD. Due to the small sample size (42 participants or 21 parent-offspring dyads), the results to this pilot study are considered preliminary and the study design should be replicated with a sample up to ten times the current sample size. A larger sample allows for use of multivariate prediction models as well as tests of covariates such as gender, age group, and other characteristics of youths in the sample. In addition, it should be noted that participants in the current study responded to advertisements in the community or were referred from VA medical providers. Thus, results may be impacted by a self-selection bias, e.g., fathers enrolled in the study may have been those who were undergoing psychotherapy, psychopharmacotherapy, or have a history of utilizing mental health services. Similarly, the design of the study offered parents the ability to select the child to include in the study if the household consisted of more than one offspring in the age-range *and* the parent was specifically seeking assessment for a child when they made initial contact. This occurred at least three times per the documentation of phone screens, and may have had an impact on the data due to selection bias; fathers' may have already identified academic, emotional, or oppositional problems in the child they preferred for study. Finally, the predictor variables established by this study are strongly correlated; the shared variance among DRRI components such as fathers' combat exposure, nuclear/biological/chemical weapon exposure, and experiencing the aftermath of violent battle may account for the similar coefficient scores and effect sizes in prediction models of child functioning (Table 2). Because these combat experiences "hang together," a

broader construct may be more indicative and relevant in making a meaningful connection between fathers' deployment experiences and their child's functioning.

All the measures used in the study are validated for female U.S. servicemembers, including the DRRI and the PCL-M. A major limitation of the pilot study presented here is the lack of maternal perspectives in the form of parent-report of child functioning. Additional extensions of this design might include female combatants returning from Iraq and Afghanistan who may report on their own and their child's functioning post-reintegration.

To summarize, the findings from this pilot project may serve as a guide for larger studies examining the intergenerational effects of combat-related PTSD in that it points to the importance of fathers' perceived combat experiences during their deployment rather than the severity of their post-traumatic stress symptoms.

Future Directions

After nearly 10 years since the start of the “War on Terror,” over 2 million U.S. servicemembers have been sent to Iraq and/or Afghanistan. An estimated 700,000 children have had at least one parent who has been deployed to either or both conflict (Global Security, 2011). Throughout this decade, there has been a growing concern about how the current conflicts and associated deployments affect the long-term social, emotional and behavioral outcomes of children in these military families. In order to start answering this question specific to the mental health of fathers, the empirical purpose of this pilot study was to characterize the psychological functioning of youths whose dads have returned from Iraq or Afghanistan with PTSD stemming from combat trauma. The focus of this study was to obtain a snapshot of how children are functioning in terms of anxiety symptoms, potential posttraumatic stress symptoms, and depression, when parented by someone who has recent onset of combat PTSD. A theoretical aim was to extend intergenerational model of anxiety and depression to posttraumatic stress disorder.

As stated above, the original projected sample was not achieved due to several procedural and system-level barriers. For instance, recruitment was disallowed at the Veteran’s Affairs Medical Center (VA) due to the inclusion of children in the study. Recruitment at the VA was limited to second-hand referral by providers (psychologists, psychiatrists, and social workers) who were informed of the study. Veteran’s organizations (e.g., Vet Centers) were reluctant to disseminate flyers due to concerns that veterans would undergo distressing and demanding surveys as part of a data-driven program, and/or undergo evaluation with no treatment follow-up. Despite efforts to

present the assessment and referral materials at Vet Centers, no participants were recruited this way. The primary source of recruitment was from web-based advertisements (e.g., Facebook, Google, and Craig's List), which proved to be a novel yet efficient way to reach out to the population of young U.S. combatants with families. In fact, several servicemembers and their spouses requested assessment as part of the study with the understanding that "the psychological information will not be shared with the VA or the military." Thus, the independence of the study proved to be both limiting and advantageous. It should also be noted that several military fathers contacted the study coordinator through phone or e-mail from their stations in Iraq, requesting assessment under the concern that their combat involvement or their absence may be affecting the mental health of their offspring. Although they were not included in the study, the level of interest in research from servicemembers still deployed speaks to the need to develop protocols that utilize online recruitment.

In summary, although the pilot-study found some statistically significant relationships between fathers' deployment experiences and youth emotional functioning, the potential contribution to the trauma literature is found in the realized procedural barriers with this population and carving out new ways to study them. Undergoing family research with U.S. servicemembers confirmed that there are challenges in identifying mental health problems in youths in this population, and that there are obstacles to clinical research when working with military families.

The culture of research in developmental psychopathology has moved beyond single-level analysis and toward the study of mechanisms spanning biological, psychological, and social-contextual aspects of normal and abnormal behavior (Cicchetti,

2006). Child anxiety research has now established that a substantial portion of childhood anxiety is likely explained by genetic contributions (as reviewed by McLeod, Wood, & Weisz, 2007). Likewise, the etiology of PTSD is widely conceptualized as the interplay of biological systems, regulatory mechanisms, and environmental-psychosocial input (Shalev & Segman, 2007), yet genetic factors are largely neglected in the trauma research (Koenen, 2007). A recent review of PTSD in veterans (Galovski & Lyons, 2004) suggested that more research in the genetic contributions to the illness is needed in order to increase our knowledge about risk among their offspring. PTSD heredity studies indeed suggest that a parent-child transmission of PTSD exists, that PTSD risk has a strong genetic component, and that its predisposition is polygenic (Stein, Jang, Taylor, Vernon & Livesley, 2002; Ozer, Best, Lipsey, & Weiss, 2003; Broekman, Olf, & Boer, 2007). Given the complexity of the etiology of PTSD, guidelines for future genetic methodologies that further the scientific knowledge of PTSD have been recommended by experts in the neurobiology of the disorder and are summarized as follows: (1) Investigators are advised to perform genetic analyses on surrogate *traits* associated with the psychiatric illness rather than the illness itself (Radant, Tsuang, Peskind, McFall, Raskind, 2001); (2) Protocols should include developmentally informed research, i.e., stage patterns and trajectories, by studying child samples (Koenen, Nugent, & Amstadter, 2008); (3) Factors that relate to trauma exposures are those that may modify genetic effects, i.e. through interactions (Nugent, Amstadter, Koenen, 2008); (4) Gene association analyses must address the issue of population stratification (allele differences due to ancestry rather than disease) by using sophisticated procedures to estimate ancestral proportions (Koenen, 2007); and (5) PTSD genetic studies must utilize precise

measurement of the environment, including comprehensive trauma assessment (Koenen et al., 2008). Guided by these recommendations, future extensions of this study should examine genetic vulnerability at the biochemical level, in addition to non-genetic familial factors, as predictors of psychopathological *traits* (or phenotypic traits) in children that may lead to traumatic stress disorders later in the life course.

The rationale for an OIF/OEF family study of PTSD lies in the markedly high prevalence of posttraumatic stress disorder among OIF/OEF servicemen returning from combat (Seal et al., 2007; Milliken et al., 2007). Combat PTSD has evidenced to be a disabling psychiatric condition affecting the functioning of young and middle-life adults in the U.S., yet little is known about the psychological functioning of the nearly 700,000 youths in families headed by parent who has served in Iraq or Afghanistan. Large sampling of the population of OIF/OEF service members that have returned home would allow for rich data on fathers with varying levels of PTSD, thus enabling the study of the effects of trauma on familial relationships. Scientific extensions of this current study directly address the national priority advocated by the American Psychological Association Presidential Task Force on Military Deployment Services for Youth, Families and Service Members in identifying the psychological risks and mental health-related service needs of military members and their families during and after deployment(s).

REFERENCES

- Achenbach, T. M., & Edelbrock, C. (1991). *Manual for the Child Behavior Checklist*. Burlington: University of Vermont, Department of Psychiatry.
- Achenbach TM, Demenci L, Rescorla, LA. (2003). DSM-oriented and empirically based approaches to constructing scales from the same item pools. *Journal of Clinical Child and Adolescent Psychology*, 32, 328-340.
- American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders (4th ed.)*. Washington, D.C: American Psychiatric Association.
- Baldwin, B. (1989). A primer in the use and interpretation of structural equation models. *Measurement and Evaluation in Counseling and Development*, 22, 100-112.
- Beckham, J. C., Moore, S. D., & Reynolds, V. Interpersonal hostility and violence in Vietnam combat veterans with chronic posttraumatic stress disorder: A review of theoretical models and empirical evidence. *Aggression and Violent Behavior*, 5, 451-466.
- Bentler, P. M., & Chou, C. P., (1987). Practical issues in structural modeling. *Sociological Methods and Research*, 16, 78-117.
- Bentler, P. M., & Weeks, D. G. (1979) Interrelations among models for the analysis of moment structures. *Multivariate Behavioral Research*, 14, 169-185.
- Bentler, P. M., & Weeks, D. G. (1980). Linear structural equations with latent variables. *Psychometrika*, 45, 289-308.
- Bernstein, G. A., & Garfinkel, B. D. (1988). Pedigrees, functioning, and psychopathology of school phobic children. *Journal of the American Academy of Child and Adolescent Psychiatry*, 27, 70-74.
- Bernstein, G. A., Warren, S. L., Massie, E., D., & Thuras, P. D. (1999). Family dimensions in anxious-depressed school refusers. *Journal of Anxiety Disorders*, 13, 513-528.
- Binder, E. B., Bradley, R. G., Liu, W., Epstein, M. P., Deveau, T. C., Mercer, K. B., et al. (2008). Association of FKBP5 polymorphisms and childhood abuse with risk of posttraumatic stress disorder symptoms in adults. *Journal of the American Medical Association*, 299, 1291-1305.
- Blanchard, E. B., Jones-Alexander, J., Buckley, T. C., & Forneris, C. A. (1996). Psychometric properties of the PTSD Checklist (PCL). *Behaviour Research and Therapy*, 34, 669-673.

- Bliese, P. D., Wright, K. M., Adler, A. B., Cabrera, O., Castrol, C. A., & Hoge, C. W. (2008). Validating the primary care posttraumatic stress disorder screen and the posttraumatic stress disorder checklist with soldiers returning from combat. *Journal of Consulting and Clinical Psychology, 76*, 272-281.
- Breslau, N. (2001). The epidemiology of posttraumatic stress disorder: what is the extent of the problem? *Journal of Clinical Psychiatry, 62*, 16-22.
- Breslau, N., Chilcoat, H. D., Kessler, R. C., Peterson, E. L., & Lucia, V.C. (1999). Vulnerability to assaultive violence: Further specification of the sex difference in post-traumatic stress disorder. *Psychological Medicine, 29*, 813-821.
- Breslau, N., Lucia, V. C., & Alvarado, G. F. (2006). Intelligence and other predisposing factors in exposure to trauma and posttraumatic stress disorder. *Archives of General Psychiatry, 63*, 1238-1245.
- Brewin, C. R., Andrews, B., & Valentine, J. D. (2000). Meta-analysis of risk factors for posttraumatic stress disorder in trauma-exposed adults. *Journal of Consulting and Clinical Psychology, 68*, 748-766.
- Broekman, B. F., & Boer, F. (2007). The genetic background to PTSD. *Neuroscience and Biobehavioral Reviews, 31*, 348-362.
- Brunet, A., Weiss, D. S., Metzler, T. J., Best, S. R., Neylan, T. C., Rogers, C., et al. (2001). The Peritraumatic Distress Inventory: A proposed measure of PTSD criterion A2. *American Journal of Psychiatry, 158*, 1480-1485.
- Bush, K., Kivlahan, D. R., McDonell, M. B., Fihn, S. D., & Bradley, K. A. (1998). The AUDIT Alcohol Consumption Questions (AUDIT-C): An effective brief screening test for problem drinking. *Archives of Internal Medicine, 158*, 1789- 1795.
- Byrne, B. M. (2006). *Structural Equation Modeling with EQS: Basic Concepts, Applications, and Programming. (2nd ed)*. Mahwah, NJ: Lawrence Erlbaum Associated, Inc.
- Caspi, A., Sugden, K., Moffitt, T. E., Taylor, A., Craig, I. W., Harrington, H. et al. (2003). Influence of life stress on depression: moderation by a polymorphism in the 5-HTT gene. *Science, 301*, 386-389.
- Cassano, M., Adrian, M., Veits, G., & Zeman, J. (2006). The inclusion of fathers in the empirical investigation of child psychopathology: an update. *Journal of Clinical Child and Adolescent Psychology, 35*, 583-589.
- Carson, J. L., & Parke, R. D. (1996). Reciprocal negative affect in parent-child

- interactions and children's peer competency. *Child Development*, 67, 2217-2226.
- Chartrand, M. M., & Siegel, B. (2007). At war in Iraq and Afghanistan: children in military families. *Ambulatory Pediatrics*, 7, 1-2.
- Charuvastra, A., & Cloitre, M. (2008). Social bonds and posttraumatic stress disorder. *Annual Review of Psychology*, 59, 20.1-20.28.
- Chavira, D. A., Shipon-Blum, E., Hitchcock, C., Cohan, S., & Stein, M. B. (2007). Selective mutism and social anxiety disorder: All in the family? *Journal of the American Academy of Child and Adolescent Psychiatry*, 46, 1464-1472.
- Chavira D. A., Stein M. B., Bailey K., Stein, M. (2004). Child anxiety in primary care: Prevalent but untreated. *Depression and Anxiety*, 20, 155-164.
- Cicchetti, D. (2006). Developmental psychopathology. In D. Cicchetti & D. J. Cohen (Eds.), *Developmental Psychopathology, Vol 1*, (pp. 1-23). New York: Wiley & Sons, Inc.
- Comer, J. S., & Kendall, P. C. (2004). A symptom-level examination of parent-child agreement in the diagnosis of anxious youths. *Journal of the American Academy of Child and Adolescent Psychiatry*, 43, 878-886.
- Costello, E. J. & Angold, A. (1988). Scales to assess child and adolescent depression: checklists, screens and nets. *Journal of the American Academy of Child and Adolescent Psychiatry*, 27, 726-737
- Cozza, S. J., Chun, R. S., & Polo, J. A. (2005). Military families and children during Operation Iraqi Freedom. *Psychiatric Quarterly*, 76, 371-378.
- Davidson, A. C., & Mellor, D. J. (2001). The adjustment of children of Australian Vietnam veterans: Is there evidence for the transgenerational transmission of the effects of war-related trauma? *Australian and New Zealand Journal of Psychiatry*, 35, 345-351.
- De Los Reyes, A., & Kazdin, A. E. (2005). Informant discrepancies in the assessment of childhood psychopathology: A critical review, theoretical framework, and recommendations for further study. *Psychological Bulletin*, 131, 483-509.
- Dijanic, P. I., Peraica, T., Grubisic-Ilic, M., Rak, D., Jambrosic, S. A., & Kozaric, K. D. (2007). Psychiatric heredity and posttraumatic stress disorder: Survey study of war veterans. *Croatian Medical Journal*, 48, 146-156.
- Duman, R. S. (2004). Role of neurotrophic factors in the etiology and treatment of mood disorders. *Neuromolecular Medicine*, 5, 11-26.

- Farley, L. M., DeMaso, D. R., D'Angelo, E., Kinnamon, C. Bastardi, H., Hill, C. E., et al. (2007). Parenting stress and parental posttraumatic stress disorder in families after pediatric heart transplantation. *Journal of Heart and Lung Transplantation, 26*, 120-126.
- Ferdinand, R. F., van der Ende, J., & Verhulst, F. C. (2004). Parent-adolescent disagreement regarding psychopathology in adolescents from the general population as a risk factor for adverse outcome. *Journal of Abnormal Psychology, 113*, 198-206.
- Fox, N. A., Nichols, K. E., Henderson, H. A., Rubin, K., Schmidt, L., Hamer, D. et al. (2005). Evidence for a gene-environment interaction in predicting behavioral inhibition in middle childhood. *Psychological Science, 16*, 921-926.
- Frans, O., Rimmo, P. A., Aberg, L., & Fredrikson, M. (2005). Trauma exposure and posttraumatic stress disorder in the general population. *Acta Psychiatrica Scandinavica, 111*, 291-299.
- Galovsky, T., & Lyons, J. A. Psychological sequelae of combat violence: a review of the impact of PTSD on the veteran's family and possible interventions. *Aggression and Violent Behavior, 9*, 477-501.
- Ginsburg, G. S., Siqueland, L., Masia-Warner, C., & Hedtke, K. A. (2004). Anxiety disorders in children: family matters. *Cognitive and behavioral practice, 11*, 28-43.
- Glenn, D. M., Beckham, J. C., Feldman, M. E., Kirby, A. C., Hertzberg, M. A., & Moore, S. D. (2002). Violence and hostility among families of Vietnam veterans with combat-related posttraumatic stress disorder. *Violence and Victims, 17*, 473-489.
- Hettema, J. M., Neale, M. C., & Kendler, K. S. (2001). A review and meta-analysis of the genetic epidemiology of anxiety disorders. *American Journal of Psychiatry, 158*, 1568-1578.
- Hoge, C. W., Castro, C. A., Messer, S. C., McGurk, D., Cotting, D. I., & Koffman, R. L. (2004). Combat duty in Iraq and Afghanistan, mental health problems, and barriers to care. *New England Journal of Medicine, 351*, 13-22.
- Jacob, T. (1995). The role of the time frame in the assessment of family functioning. *Journal of Marital and Family Therapy, 21*, 281-286.
- Jensen, P. S., Watanabe, H. K., Richters, J. E., Cortes, R., Roper, M., & Liu, S. (1995). Prevalence of mental disorder in military children and adolescents: Findings from a two-stage community survey. *Journal of the American Academy of Child and Adolescent Psychiatry, 34*, 1514-1524.
- Jordan, B. K., Marmar, C. R., Fairbank, J. A., Schlenger, W. E., Kulka, R. A., Hough, R.

- L., et al. (1992). Problems in families of male Vietnam veterans with posttraumatic stress disorder. *Journal of Consulting and Clinical Psychology, 60*, 916-926.
- Kashani, J. H., Lourdes, S., Jones, M. R., & Reid, J. C. (1999). Perceived family characteristics differences between depressed and anxious children and adolescents. *Journal of Affective Disorders, 52*, 269-274.
- Kaufman, J., Yang, B., Douglas-Palumberi, H., Grasso, D., Lipschitz, D., Houshyar, S., et al. (2006). Brain-derived neurotrophic factor-5-HTTLPR gene interactions and environmental modifiers of depression in children. *Biological Psychiatry, 59*, 673-680.
- Keane, T. M., Marshall, A. D., & Taft, C. T. (2006). Posttraumatic stress disorder: etiology, epidemiology, and treatment outcome. *Annual Review of Clinical Psychology, 2*, 161-197.
- Kessler, R. C. (1995). The national comorbidity survey: preliminary results and future directions. *International Journal of Methods in Psychiatric Research, 5*, 139-151.
- Kessler, R. C., Berglund, P., Demler, O., Jin, R., & Walters, E. E. (2005) Lifetime prevalence and age-of-onset distributions of DSM-IV disorders in the National Comorbidity Survey Replication. *Archives of General Psychiatry, 62*, 592-602.
- Kessler, R. C., & Merikangas, K. R. (2004). The National Comorbidity Survey Replication (NCS-R): Background and aims. *International Journal of Methods in Psychiatric Research, 13*, 60-68.
- Kessler, R. C., McGonagle, K. A., Zhao, S., Nelson, C. B., Hughes, M., et al. (1994). Lifetime and 12-month prevalence of DSM-III-R psychiatric disorders in the United States. Results from the National Comorbidity Survey. *Archives of General Psychiatry, 51*, 8-19.
- Kessler, R. C., Sonnega, A., Bromet, E., Hughes, M., & Nelson, C. B. (1995). Posttraumatic stress disorder in the National Comorbidity Survey. *Archives of General Psychiatry, 52*, 1048-60.
- Kilpatrick, D. G., Koenen, K. C., Ruggiero, K. J., Acierno, R., Galea, S., Resnick, H. S., et al. (2007). The serotonin transporter genotype and social support and moderation of posttraumatic stress disorder and depression in hurricane-exposed adults. *American Journal of Psychiatry, 164*, 1693-1699).
- King, L. A., King, D. W., Vogt, D. S., Knight, J., & Samper, R. E. (2006). Deployment Risk and Resilience Inventory: A collection of measures for studying deployment-related experiences of military personnel and veterans. *Military Psychology, 18*, 89-120.

- King, D. W., Taft, C. T., King, L. A., Hammond, C., & Stone, E. R. (2006). Directionality of the association between social support and posttraumatic stress disorder: a longitudinal investigation. *Journal of Applied Social Psychology, 36*, 2980-2992.
- Klem, L. (1995). Path analysis. In L. G. Grimm & P. R. Yarnold (Eds.), *Reading and understanding multivariate statistics* (pp. 65-97). Washington, DC: American Psychological Association.
- Koenen, K. C., Nugent, N. R., & Amstadter, A. B. (2008). Gene-environment interaction in posttraumatic stress disorder: review, strategy, and new directions for future research. *European Archives of Psychiatry and Clinical Neuroscience, 258*, 82-96.
- Koenen, K. C., Saxe, G., Purcell S., et al. (2005). Polymorphisms in FKBP5 are associated with peritraumatic dissociation in medically injured children. *Molecular Psychiatry, 10*, 1058-1059.
- Kovacs, M. (1981). Rating scales to assess depression in school-aged children. *Acta Paedopsychiatrica, 46*, 305-315.
- Kulka, R. A., Schlenger, W. E., Fairbank, J. A., Hough, R. L., & Jordan, B. K. (1990). *Trauma and the Vietnam War Generation: Report on the findings from the National Vietnam Veterans Readjustment Study*. New York: Brunner/Mazel.
- Lang, U. E., Hellweg, R., & Gallinat, J. (2004). BDNF serum concentrations in healthy volunteers are associated with depression-related personality traits. *Neuropsychopharmacology, 29*, 795-798.
- Lang, U. E., Hellweg, R., Kalus, P., Bajbouj, M., Lenzen, K. P., Sander, T., et al. (2005). Association of a functional BDNF polymorphism and anxiety-related personality traits. *Psychopharmacology, 180*, 95-99.
- Lauterbach, D., Bak, C., Reiland, S., Mason, S., Lute, M. R., Earls, L. (2007). Quality of parental relationships among persons with a lifetime history of posttraumatic stress disorder. *Journal of Traumatic Stress, 20*, 161-172.
- Malone, J. D., Page-Dobson, B., Ohl, C., DiGiovanni, C., Cunñion, S., & Roy, M. J. (1996). Possibilities for unexplained chronic illnesses among Reserve units deployed in Operation Desert Shield/Desert Storm. *Southern Medical Journal, 89*, 1147-1155.
- Manassis, K., & Bradley, S. J. (1994). The development of childhood anxiety disorders: toward an integrated model. *Journal of Applied Developmental Psychology, 15*, 345-366.

- March, J. S., Parker, J. D., Sullivan, K., Stallings, P., & Conners, C. K. (1997). The Multidimensional Anxiety Scale for Children (MASC): factor structure, reliability, and validity. *Journal of the American Academy of Child and Adolescent Psychiatry*, *36*, 554-565.
- Martins, C., & Gaffan, E. A. (2000). Effects of early maternal depression on patterns of infant-mother attachment: A meta-analytic investigation. *Journal of Child Psychology and Psychiatry*, *41*, 737-746.
- Meyer, L. S., Gamst, G. C., & Guarino, A. J. (2006). Causal modeling: Path analysis and structural equation modeling. In L. S. Meyer, G. C. Gamst, & Guarino (Eds.), *Applied multivariate research: Design and interpretation* (pp.585-602). Newbury Park, CA: Sage Press.
- Milliken, C. S., Auchterloine, J. L., & Hoge, C. W. (2007). Longitudinal assessment of mental health problems among active and reserve component soldiers returning from the Iraq War. *Journal of the American Medical Association*, *298*, 2141-2148.
- Moffitt, T. E., Caspi, A., & Rutter, M. (2005). Strategy for investigating interactions between measured genes and measured environments. *Archives of General Psychiatry*, *62*, 473-481.
- Morrison, J. (1981). Rethinking the Military Family Syndrome. *American Journal of Psychiatry*, *138*, 354-357.
- Mueller, R. O. (1997). Structural equation modeling: Back to basics. *Structural Equation Modeling*, *4*, 353-369.
- Murray, L., Fiori-Cowley, A., Hooper, R., & Cooper, P. (1996). The impact of postnatal depression and associated adversity on early mother-infant interactions and later infant outcome. *Child Development*, *67*, 2512-2526).
- Nugent, N. R., Amstadter, A. B., & Koenen, K. C. (2008). Genetics of post-traumatic stress disorder: informing clinical conceptualizations and promoting future research. *American Journal of Medical Genetics Part C (Seminars in Medical Genetics)*, *148C*, 127-132.
- Olson, D. H., & Gorall, D. M. (2003). Circumplex model of marital and family systems. In F. Walsh (Ed.), *Normal Family Processes (3rd Ed.)*, (pp. 514-547). New York: Guilford.
- Olson, D. H., Gorall, D. M., & Tiesel, J. (2002). *Family inventories package*. Minneapolis: Life Innovations.

- Olson, D. H., Portner, J., & Bell, R. (1982). Family adaptability and cohesion evaluation scales. In D. H. Olson, H. I. McCubbin, H. L. Barnes, A. Larsen, M. Muxen, & M. Wilson (Eds.), *Family inventories*. St. Paul: University of Minnesota, Department of Family Social Science.
- Olson, D. H., Sprenkle, D. H., & Russell, C. S. (1979). Circumplex model of marital and family systems: I. Cohesion and adaptability dimensions, family types, and clinical applications. *Family Process, 18*, 3-27.
- Ostberg, M., & Hagekull, B. (2000). A structural modeling approach to the understanding of parenting stress. *Journal of Clinical Child Psychology, 29*, 615-625.
- Ozer, E. J., Best, S. R., Lipsey, T. L., & Weiss, D. S. (2003). Predictors of posttraumatic stress disorder and symptoms in adults: a meta-analysis. *Psychological Bulletin, 129*, 52-73.
- Pilowsky, D. J., Wickramaratne, P. J., Rush, A. J., Hughes, C. W., Garber, J., Malloy, E., et al. (2006). Children of currently depressed mothers: a STAR*D ancillary study. *Journal of Clinical Psychiatry, 67*, 126-36.
- Radant, A., Tsuang, D., Peskind, E. R., McFall, M., & Raskind, W. (2001). Biological markers and diagnostic accuracy in the genetics of posttraumatic disorder. *Psychiatry Research, 102*, 203-214.
- Reeves, R. R. (2007). Diagnosis and management of posttraumatic stress disorder in returning veterans. *Journal of American Osteopathic Association, 107*, 181-190.
- Renaud, E. F. (2008). The attachment characteristics of combat veterans with PTSD. *Traumatology, 14*, 1-12.
- Riggs, D. S., Byrne, C. A., Weathers, F. W., & Litz, B. T. (1998). The quality of the intimate relationships of Vietnam veterans: problems associated with posttraumatic stress disorder. *Journal of Traumatic Stress, 11*, 87-101.
- Rosen, L. N., Teitelbaum, J. M., & Westhuis, D. J. (1993). Children's reactions to the Desert Storm deployment: Initial findings from a survey of Army families. *Military Medicine, 158*, 465-469.
- Ruscio, A. M., Weathers, F. W., King, L. A., & King, D. W. (2002). Male war-zone veterans' perceived relationships with their children: The importance of emotional numbing. *Journal of Traumatic Stress, 15*, 351-357.
- Samper, R. E., Taft, C. T., King, D. W., & King, L. A. (2004). Posttraumatic stress disorder symptoms and parenting satisfaction among a national sample of male Vietnam veterans. *Journal of Traumatic Stress, 17*, 311-315.

- Sayers, S. L., Farrow, V., Ross, J., Sippel, L., Kane, V., & Olsen, D. W. (2007, November). The importance of family readjustment problems among Iraq and Afghanistan Veterans referred for behavioral health evaluation. Paper presented at the 41st Annual ABCT Convention: Philadelphia.
- Scharf, M. (2007). Long-term effects of trauma: Psychosocial functioning of the second and third generation of Holocaust survivors. *Development and Psychopathology, 19*, 603-622.
- Scheeringa, M. S., & Zeanah, C. H. (2001). A relational perspective on PTSD in early childhood. *Journal of Traumatic Stress, 14*, 799-815.
- Schnurr, P. P., & Jankowski, M. K. (1999). Physical health and posttraumatic stress disorder: review and synthesis. *Seminars in Clinical Neuropsychiatry, 4*, 295-304.
- Seal, K. H., Bertenthal, D., Miner, C. R., Sen, S., & Marmar, C. (2007). Bringing the war back home: mental health disorders among 103, 788 U.S. veterans returning from Iraq and Afghanistan seen at Department of Veterans Affairs facilities. *Archives of Internal Medicine, 167*, 476-482.
- Shalev, A. Y., & Segman, R. H. (2007). Commentary: biological findings in PTSD—too much or too little? *Progress in Brain Research, 167*, 187-199.
- Sheehan, D. V., Lecrubier, Y., Sheehan, K. H., Amorim, P., Janavs, J., Weiller, E. (1998). The Mini-International Neuropsychiatric Interview (M.I.N.I.): the development and validation of a structured diagnostic interview for DSM-IV and ICD-10. *Journal of Clinical Psychiatry, 59*, 22-33.
- Skinner, H. A. (1982). The Drug Abuse Screening Test. *Addictive Behaviors, 7*, 363-371.
- Skinner, H. A., Steinhauer, P. D., & Sitarenios, G. (2000). Family Assessment Measure and process model of family functioning. *Journal of Family Therapy, 22*, 190-210.
- Solomon, Z., Mikulincer, M., Freid, B., & Wosner, Y. (1987). Family characteristics and posttraumatic stress disorder: a follow-up of Israeli combat stress reaction casualties. *Family Process, 26*, 393-394.
- Spitzer, R. L., Kroenke, K., & Williams, J. B. W., and the Patient Health Questionnaire Primary Care Study Group. (1999). Validation and utility of a self-report version of PRIME-MD: The PHQ Primary Care Study. *Journal of American Medical Association, 282*, 1737-1744.
- Stark, K. D., Humphrey, L. L., Crook, L., & Lewis, L. (1990). Perceived family environments of depressed and anxious children: child's and maternal figure's

- perspectives. *Journal of Abnormal Child Psychology*, 18, 527-547.
- Stein, D. H. (1995). Intergenerational effects of PTSD: A hypothesis concerning mode of transmission. *Dissertation Abstracts International: Section B: The Sciences and Engineering*, 55, 4134-4134.
- Stein, M. B., Jang, K. L., Taylor, S., Vernon, P. A., & Livesley, W. J. (2002). Genetic and environmental influences on trauma exposure and posttraumatic stress disorder symptoms: A twin study. *American Journal of Psychiatry*, 159, 1675-1681.
- Stein, M. B., McQuaid, J. R., Pedrelli, P., Lenox, R., & McCahill, M. E. (2000). Posttraumatic stress disorder in the primary care medical setting. *General Hospital Psychiatry*, 22, 261-269.
- Stein, M. B., Schork, N. J., Gelernter, J. (2008). Gene-by-environment (serotonin transporter and childhood maltreatment) interaction for anxiety sensitivity, an intermediate phenotype for anxiety disorders. *Neuropsychopharmacology*, 33, 312-319.
- Steinberg, A. M., Brymer, M. J., Decker, K. B., & Pynoos, R. S. (2004). The University of California at Los Angeles Posttraumatic Stress Disorder Reaction Index. *Current Psychiatry Reports*, 6, 96-100.
- Stephens, M. B., Harrison, J. J., Wilson, C., Ringler, R. L., & Robinson, C. (2003). Are children of military parents more fit than children of civilian parents? *Family Medicine*, 35, 404-407.
- Storr, C. L., Ialongo, N. S., Anthony, J. C., & Breslau, N. (2007). Childhood antecedents of exposure to traumatic events and posttraumatic stress disorder. *American Journal of Psychiatry*, 164, 119-125).
- Thompson, B. (2000). Ten commandments of structural equation modeling. In L. G. Grimm & P. R. Yarnold (Eds.), *Reading and understanding more multivariate statistics* (pp. 261-283). Washington, DC: American Psychological Association.
- Weathers, F. W., Litz, B. T., Herman, D. S., Huska, J. A., & Keane, T. M. (1993, October). *The PTSD Checklist (PCL): Reliability, validity, and diagnostic utility*. Paper presented at the annual meeting of the International Society for Traumatic Stress Studies, San Antonio, TX.
- Weissman, M. M., Pilowsky, D. J., Wickramaratne, P. J., Talati, A., Wisniewski, S. R., Fava, M., et al. (2006). Remissions in maternal depression and child psychopathology: a STAR*D-child report. *Journal of the American Medical Association*, 295, 1389-1398.

- Weissman, M. M., Warner, V., Wickramaratne, P., Moreau, D. & Olfson, M. (1997). Offspring of depressed parents: 10 years later. *Archives of General Psychiatry*, *54*, 932-940.
- Woodside, D. B., Swinson, R. P., Kuch, K., & Heinmaa, M. (1996). Family functioning in anxiety and eating disorders B: a comparative study. *Comprehensive Psychiatry*, *37*, 139-143.
- Wright, K. M., Bliese, P. D., Thomas, J. L., Adler, A. B., Eckford, R. D., & Hoge, C. W. (2007). Contrasting approaches to psychological screening with U.S. Combat Soldiers. *Journal of Traumatic Stress*, *20*, 965-975.
- Yehuda, R., Halligan, S. L., & Bierer, L. M. (2001). Relationship of parental trauma exposure and PTSD to PTSD, depressive and anxiety disorders in offspring. *Journal of Psychiatric Research*, *35*, 261-270.
- Yehuda, R., Halligan, S. L., & Grossman, R. (2001). Childhood trauma and risk for PTSD: Relationship to intergenerational effects of trauma, parental PTSD, and cortisol excretion. *Development and Psychopathology*, *13*, 733-753.
- Zulueta, C. F. (2007). Mass violence and mental health: attachment and trauma. *International Review of Psychiatry*, *19*, 221-233.