



Theses and Dissertations

---

2021-04-06

## Relational and Mental Health Outcomes of Trauma and Disaster: The Medicating Role of Grit

Lacey A. Bagley  
*Brigham Young University*

Follow this and additional works at: <https://scholarsarchive.byu.edu/etd>



Part of the [Family, Life Course, and Society Commons](#)

---

### BYU ScholarsArchive Citation

Bagley, Lacey A., "Relational and Mental Health Outcomes of Trauma and Disaster: The Medicating Role of Grit" (2021). *Theses and Dissertations*. 9424.  
<https://scholarsarchive.byu.edu/etd/9424>

This Dissertation is brought to you for free and open access by BYU ScholarsArchive. It has been accepted for inclusion in Theses and Dissertations by an authorized administrator of BYU ScholarsArchive. For more information, please contact [ellen\\_amatangelo@byu.edu](mailto:ellen_amatangelo@byu.edu).

Relational and Mental Health Outcomes of Trauma and Disaster:  
The Mediating Role of Grit

Lacey A. Bagley

A dissertation submitted to the faculty of  
Brigham Young University  
in partial fulfillment of the requirements for the degree of  
Doctor of Philosophy

Alyssa Banford Witting, Chair  
Lee N. Johnson  
Dean M. Busby  
Quintin A. Hunt

School of Family Life  
Brigham Young University

Copyright © 2021 Lacey A. Bagley

All Rights Reserved

## ABSTRACT

### **Relational and Mental Health Outcomes of Trauma and Disaster: The Mediating Role of Grit**

Lacey A. Bagley  
School of Family Life, Brigham Young University  
Doctor of Philosophy

Current literature focusing on those exposed to disaster includes calls for more studies with populations who have regular exposure to extreme weather events. The current study reported on a secondary data analysis with a sample of 240 heterosexual couples living in or near coastal regions in the southeast US, who were at risk of experiencing disaster events during the 2019 hurricane season (June-December). An actor-partner interdependence model was fit to the dyadic data via path analysis to test the mediating effect of grit on the relationship dyadic coping (mental health and attachment behaviors) and disaster-related losses, accounting for trauma history. Negative, indirect actor effects suggested women's trauma history is associated with their own attachment behaviors, through lower levels of grit. Direct effects were also found, women's higher levels of trauma history were associated with lower levels of grit for themselves and their husbands. Lastly, male and female partner's higher grit levels were associated with lower levels of male's mental health outcomes (e.g., post-traumatic stress symptoms). Clinical implications were provided for how couple and marriage therapists can best serve couples facing trauma history and disaster-related loss.

Keywords: disaster, trauma, grit, COR theory, couples

## **ACKNOWLEDGEMENTS**

To the brave women in academia, thank you. I am honored to be part of the rising generation you carried upon your shoulders. A special thank you to Dr. Alyssa Banford Witting, who mentored me with respect, honesty and trust and whose grace carried me across the finish line of my formal education. To my family, especially my husband, thank you for believing in me and cheering me on every step along the way. Finally, to my children, Dax and Lily, thank you for being the pride and joy of my life.

## TABLE OF CONTENTS

TITLE .....	i
ABSTRACT.....	ii
ACKNOWLEDGEMENTS.....	iii
TABLE OF CONTENTS.....	iv
LIST OF TABLES.....	vi
LIST OF FIGURES .....	vii
Relational and Mental Health Outcomes of Trauma and Disaster: The Mediating Role of Grit ..	1
Background and Significance.....	1
Theoretical Lens.....	2
Disaster and Attachment Behaviors .....	5
Disasters, Mental Health and Couples .....	7
Disaster and Grit.....	10
Present Study .....	13
Hypotheses.....	13
Methods.....	14
Procedures .....	14
Sample Description .....	15
Measures.....	16

Disaster-Related Loss .....	16
Trauma History .....	17
Grit.....	17
Attachment Behaviors .....	17
Post-traumatic Stress Symptoms .....	18
Analysis.....	18
Multivariate Model.....	18
Results.....	19
Actor and Partner Associations .....	19
Grit as an Intermediary Variable.....	20
Indirect Effects .....	21
Control: Age.....	22
Summary of Variation Explained by the Model .....	22
Discussion.....	22
Review of Findings .....	22
Clinical Implications .....	26
Limitations and Suggestions for Future Research.....	30
Conclusion .....	32
References.....	34
Appendix A: Tables and Figures .....	47

**LIST OF TABLES**

Table 1. Descriptive statistics .....	47
Table 2. Pearson correlations .....	48
Table 3. Total, Indirect, and Direct Effects .....	49

**LIST OF FIGURES**

Figure 1. Conceptual Model .....	50
Figure 2. APIM Model.....	51

## **Relational and Mental Health Outcomes of Trauma and Disaster: The Mediating Role of Grit**

### **Background and Significance**

Researchers note that disasters are increasing in both quantity and magnitude within the United States (Botey & Kulig, 2014). The National Oceanic and Atmospheric Administration reported that in the year 2019 in the United States, there were over eight, million-dollar disasters and over ten, billion-dollar weather and climate disasters, and they estimate that millions of people were affected by hurricanes in 2018-2019 (NOAA, 2021). Disasters, including extreme weather events, strike quickly and can adversely affect people mentally, emotionally, and physically (Benevolenza & DeRigne, 2019; Bonanno et al., 2010). Mental health outcomes following a disaster can include post-traumatic stress symptoms (PTSS), post-traumatic stress disorder (PTSD), depression symptoms, and general emotional distress (Holder et al., 2017).

Much is known about mental health outcomes in disaster affected populations, and about the compounding processes that appear to contribute to mental health distress; however, less is known about the relational consequences of disaster. Specifically, there are a few current studies that use dyadic data to look at couples' outcomes in the context of disaster, however the research focused on outcomes in relationships remains underdeveloped (see Banford Witting et al., 2021). Researchers have suggested that couple and family research is needed to study multiple points of view of a phenomenon, because there is empirical evidence of a mutual relationship between relational distress and individual health issues (Miller & Johnson, 2014). For example, research studies highlight the intercorrelation for couples' variables in the disaster context (Canevello et al., 2016a; Canevello et al., 2016b; Gallagher et al., 2017; Marshall et al., 2017; Monson et al., 2009). As the research in the area of natural disasters develops, new measures are available to

specifically ascertain the degree to which individuals report loss in various areas (LICCS; Banford Witting & Busby, *under review*). The current study is designed to meet the call issued by Miller and Johnson (2014) by including posttraumatic stress symptoms (PTSS) as a mental health outcome measure and the Brief Accessibility, Responsiveness and Engagement scale (Sandberg et al., 2012) as a relational health outcome to tap into couples' ability to connect with each other which has been suggested as a protective factor in resolving trauma history (Banford Witting & Busby, 2020). Disaster-related loss incurred during the 2019 hurricane season will be considered as a predictor variable alongside of trauma history.

Within existing disaster research, it has been documented that some people adapt to loss and trauma by either experiencing adverse mental health outcomes whereas others experience little to no symptoms (Stix, 2011). Further Stix (2011) reported that the people who have few symptoms have emotional resilience or even "true grit" (p. 29). Silverstein et al. (2018) hypothesizes that grit may even be connected to post-traumatic growth following difficult life events. Eskreis-Winkler et al.'s (2014) words impress the significance of studying the role of grit, so that improvement can be spurred in people's "life prospects and, ultimately, their well-being" (p. 11). As such, another aim of this study is to investigate the potential mediating role of grit between disaster loss, trauma history and mental and relational health outcome variables.

### **Theoretical Lens**

The Conservation of Resources Theory is proposed as the theoretical backdrop of the current study. The theory was developed over 30 years ago (Hobfoll, 1989) and has 2 main premises and 4 corollaries. Among the conceptual contributions of the theory is the primacy of loss in the stress process. Hobfoll (2012) describes how a piling on of resource loss can follow a disaster and refers to it as a cascading effect of resource loss – in which resource loss creates a

downward spiral as a result of mass disaster events and their resulting consequences. COR theory might suggest that disaster related losses could result in individual and relational distress. However, it is possible that grit may play an intermediary role helping to illuminate the process whereby loss associates with these outcomes.

According to Hobfoll (1989), the most basic premise of COR theory is that “people strive to retain, protect, and build resources and that what is threatening to them is the potential or actual loss of these valued resources” (p. 516). In the wake of a disaster, specific resources that may be lost include calmness, connectedness, safety, self and community efficacy, and hope (Hobfoll et al., 2007). When using COR theory as a framework for understanding loss during a disaster, we can see how “loss is central to the experience of disaster” for families (Caruana, 2010, p. 86). Caruana (2010) describes how loss post-disaster may include “loss of home, loved ones, independence, identity and a sense of the world as a safe place” (p. 86). Individually, any one of these outcomes would be difficult to experience. Additionally, Hobfoll (2012) describes a “cascading of events and their consequences” (p. 228). Some examples of this include the 2015 earthquakes in Nepal, where resource loss was associated with depression (Schwind et al., 2019). Likewise, Cao et al. (2013) found that during the Wenchuan earthquake in China, less financial loss was a significant predictor for positive family functioning. The framework of COR theory helps to contextualize the lived experience of cascading loss for the sample from this study, couples who were affected by varying degrees by the hurricane season of 2019 along the Southeast region of the United States.

For this study, along with looking directly at disaster-related losses for those exposed to a recent hurricane season, trauma history will be accounted for in an effort to help understand the relationship that trauma history in combination with disaster-related losses may have on couple

and mental health outcomes. When considering loss, trauma history may be part of the cascading loss of resources effect (Hobfoll, 2012). Researchers indicate that PTSS precedes resource loss, and, at other times, resource loss precedes PTSS (Vinokur et al., 2011, p. 14).

Banford Witting and Busby (2018) hypothesize that trauma may generate a framework of loss that impacts adult relationships in such a way that individuals have a reduction of resources to access within the couple relationship. So, those who have a history of trauma and disaster-related loss may experience more negative outcomes (because they experience more loss) than those without a history of trauma. With that said, people affected by disasters have a wide variety of outcomes, some short-term and others long-term meaning that many people do not experience significant difficulty or distress (Bonanno et al., 2010). Furthermore, well-functioning relationships may insulate individuals from experiencing the negative effects from natural disasters, as social resources have been shown to support well-being (Hobfoll et al., 1990). Hobfoll et al. (2016) account for this in the theory as well in the second corollary: “gain begets further gain” (p. 69). So, those who possess a high number of resources are able to wisely use their resources – leading to a gain cycle.

Attachment behaviors may be a process of resource investment wherein vulnerability and availability are leveraged in the trust one’s partner will provide the same. However, when couples experience more loss, they may be less likely to invest in attachment behaviors (being more accessible, responsive, and engaged), generating an inverse association between loss and attachment behaviors. Currently, little is known about this relationship. However, prior research in this area suggests that higher levels of childhood trauma associate with lower levels of attachment behaviors (Banford Witting & Busby, 2020).

Those affected by disasters may experience destabilization in their everyday functioning, affecting both their physical and mental health outcomes (Schultz & Galea, 2017). However, there is also a phenomenon among some populations of trauma survivors that is important to consider called posttraumatic growth (PTG). PTG is a stress response, wherein survivors manage difficult experiences from trauma in a way that leads to positive outcomes or growth (Schneider et al., 2018). Because people often respond with resiliency and strength to adversity, the current study is proposed to examine grit as a potential intermediary between disaster exposure and trauma experience (the outcomes). Hobfoll (2012) describes how there are some known factors that aid in boosting resiliency, like post-disaster responsiveness from formal government and aid organizations. However, there are some individual factors and also additional unknown factors that may also aid in boosting resiliency and emphasizes that these factors need to be explored further (Hobfoll, 2012). Snyder et al. (2020) provides one explanation, in noting how personal and environmental resources can be used to offset lost resources.

### **Disaster and Attachment Behaviors**

Attachment is a core component of couple relationships and has been framed by Sandberg et al. (2012) behaviorally to include components of accessibility, responsiveness, and engagement. Novak et al. (2016) defined each of these components. Accessibility means a partner is emotional availability when their partner is distressed, responsiveness refers to a partner's ability to respond when their partner is distressed – in a soothing and comforting manner, and engagement references the bonding moments that occur when requests for closeness are met. Researchers examining attachment behaviors using the BARE (the Brief Accessibility, Responsiveness, and Engagement scale) as a mediator, find it useful in predicting couple outcomes like marital satisfaction (Sandberg et al., 2012). A focus of the current study is an

examination of attachment behaviors as an outcome, adding to a previous focus on individual mental health symptoms like depression (e.g. Novak et al., 2016; Sandberg et al., 2016; and Vestal, 2017).

Outcomes from Novak et al. (2016) find there to be gender differences between husbands and wives, in heterosexual relationships. The study's conclusive findings were that both partners experienced less depression when women experienced more marital satisfaction – drawing the conclusion that when their partners are more accessible, responsive, and engaged female partners interpreted this as an increased level of care and concern. Additionally, a study from Banford Witting and Busby (2020) found there to be significant associations between prior childhood trauma and trauma resolution, or, 'coming to terms' – for both partners, and indirect effects through attachment behaviors. Prior research has established the relevance of attachment behaviors in relation to trauma and mental health, the current study will add to this knowledge through examining associations between disaster-related loss, trauma history and attachment behaviors alongside PTSS as outcomes.

The proposed study is one of the first to examine attachment-behaviors as an outcome (instead of a mediator), in the context of trauma history or disaster-related loss. Using attachment behaviors in this way may allow us to learn what helps couples to display accessibility, responsiveness and engagement which is important because these characteristics are connected to other positive outcomes for couples (Sandberg et al., 2017). Additionally, there may be important intervening variables to examine in understanding how disaster-related loss and trauma history may predict variability in couple processes and mental health outcomes. For instance, the partners in trauma affected couples may or may not have the same development in various personality traits, like grit (perseverance and long-term commitment; Duckworth et al.,

2007). Examining grit as a mediator in this study is interesting because prior research suggests it could potentially relate to engagement in romantic relationships and to coping well in the context of traumatic stress (Novak et al., 2016; Ruhlmann et al., 2018).

### **Disasters, Mental Health and Couples**

Those who live on or near coastal regions in the US are at risk of experiencing hurricanes each season, June-December, yearly. This compounding, ongoing disaster risk may aggregate to poor mental health outcomes over time and affect individuals for years following disaster events (Jacobs & Harville, 2015). Specific to PTSS, researchers have found that proximity to the extreme weather events increases mental distress and the risk for PTSS (Gissurardottir et al., 2019). As such, there is a need for ongoing disaster research with populations who have regular exposure to extreme weather or other potential disasters (including those along the coastline in the US). The current study is proposed to examine mental and relational health outcomes with couples living in this area.

Furthermore, the immediate impact of a disaster is made more complex by additional complications. In examining potential compounding stressors accompanying disasters, Schwind et al. (2019) found that specific mental health outcomes correlated with resource loss and/or personal harm. Additionally, Caruana (2010) found that those affected by disasters often experience ongoing stressors that may intensify the outcomes from a disaster such as “unemployment and its resulting financial worries, bureaucratic processes involved in accessing disaster relief, government support or insurance monies, and the inconveniences of living in temporary accommodation away from social networks” (p. 83).

Beyond logistical difficulties which tend to aggravate initial disaster impact, other related consequences can create ongoing distress. For instance, the toll of disasters is seen in a variety of

outcomes, including increased rates of “depression, anxiety, PTSD, substance abuse, domestic violence, divorce, murder, and suicide” (Vestal, 2017). Interestingly, scholars note the prevalence of PTSD may ultimately be lower than PTSS focused prior research suggests; in fact, the severity of PTSD may be overestimated and closer to an occurrence rate of around 30% (Bonanno et al., 2010). As such, it is important that forthcoming disaster research examine both risk and resilience factors, and a greater diversity of outcomes along with mental health distress (Bonanno et al., 2010).

Current known studies that include couples’ data in the context of disaster conclude that relationships can be both a place where risk factors might be amplified in the context of disaster or where protective factors are fostered (e.g. Canevello et al., 2016a; Canevello et al., 2016b; Gallagher et al., 2017; Marshall et al., 2017; Monson et al., 2009). Specifically, when considering how risk factors affect relationship outcomes following a disaster, Monson et al. (2009) found that couples who shared negative and hopeless beliefs experienced more traumatic stress following the event. Conversely, researchers concluded that couples who provide support to one another following a traumatic event help to buffer relationship quality – protecting their relationship, especially for men (Marshall et al., 2017). As there are reports of both positive and negative effects from disaster-related loss and trauma history on couples, further examination of the literature may provide an understanding of the mechanisms which may contribute to couple outcomes.

When couples mutually experience the traumas associated with natural disasters, they may experience distress and/or positive changes like personal growth. Canevello et al. (2016a) noted that PTG occurs at different rates and couples need time in order to “sync up” or for their interpersonal responsiveness processes to impact their growth measures (e.g. the Posttraumatic

Growth Inventory-Short Form; Cann et al., 2010). Further, Canevello and colleagues describe how this syncing up process may be due to relational mechanisms wherein the partner who experiences growth can help the other partner through responsiveness (caring for, validating, and showing understanding to them; Canevello et al., 2016a). They encourage further studies to examine the role of responsiveness in couples' outcomes. Consequently, one aim of this study is to include an outcome construct that encompasses the idea of responsiveness, in addition to accessibility and engagement within the couple (BARE; Sandberg et al., 2012). Moreover, Gallagher et al. (2017) describe how attachment behaviors may be helpful to buffer against mental health distress in both partners; for their study, attachment behaviors were measured using the Experiences in Closer Relationships Scale (ECR-N; Olsson et al., 2010). As such, the current study is designed to build on this small sample of relational studies and examine attachment behaviors as well as PTSS in the context of disaster with couples to further develop what is understood about the association of disaster-related loss with attachment behaviors.

Because the proposed study specifically focuses on disaster-related loss that both partners reported on, it is important to note that we yet have limited information about outcomes from couples where both partners have reported experiencing a trauma (Nelson et al., 2002; Ruhlmann et al., 2018). Ruhlmann et al. (2018) conducted a pilot study and looked at posttraumatic reactions of couples, with multiple-trauma experiences. Ruhlmann et al. (2018) pointed out that PTSD may affect attachment behaviors by lowering partners' ability to reach out to one another. Furthermore, Nelson et al. (2002) have discussed couple patterns that can develop in the context of trauma such as pursuer-distancer processes. Thus, examining relational outcomes like attachment behaviors post-disaster may give us better insight into how couples may be affected. Highlighting dual-trauma couples is important as "trauma-induced stress in the couple dyad can

be compounded with both partners have experienced a traumatic event” (Ruhlmann et al., 2018, p. 28).

### **Disaster and Grit**

In a recent study, Tyler-Viola (2019) found grit to be a key personality trait helping to motivate nurses working in disaster affected areas to “endure challenges and be successful over time” (p. 201). Examples of grit include how well the nurses worked together under pressure with very little resources (like working with no electricity and rationing intravenous medication) during Hurricane Harvey. Their passion to take care of their patients and persevere over time fits with the definition of grit that Duckworth et al. (2007) presented: grit is an enduring personality characteristic that shows up in someone as “perseverance and passion for long-term goals” (Duckworth et al., 2007, p. 1087). Expanding on this definition, grit is also considered hard work through failures and adversity (Duckworth et al., 2007), also, having stamina, and following through on commitments (Duckworth, 2013).

When considering grit in the context of psychological outcomes, Blalock et al. (2015) find that individuals who have a high amount of grit and experience adverse life events are less likely to have suicidal ideation, in contrast with participants who had lower levels of grit. The study hypothesized one reason for this may be that people who are less gritty may favor short-term gains instead of focusing on long-term goals making it difficult for less gritty individuals to escape difficult outcomes from a negative life event. The current study is proposed to examine grit as a potential mediator between disaster-related losses (accounting for trauma history) and the outcomes of PTSS and attachment behaviors.

In terms of how grit may interrelate with couples’ outcomes, the trait of grit describes an individual’s ability to “show up” in a variety of contexts – one of which is the domain of

marriage (Eskreis-Winkler et al., 2014). This idea of showing up is similar to the attachment behavior described by Ruhlmann et al. (2018), of reaching out or seeking one another in times of stress. Likewise, showing up could be considered comparable with the description of engagement provided by Novak et al. (2016). In a study looking directly at grit and its relation to attachment styles in romantic relationships, researchers found that participants who had higher levels of insecure attachment reported having lower levels of grit (Waring, 2015). Further, Levy and Steele (2011) found those who had higher levels of grit also reported lower avoidance and anxiety in their current adult relationships, and likewise that those who reported have anxious and avoidant attachment styles have lower levels of grit. The explanation for the association for avoidant attachment styles was that the very definition of grit means to face challenges in an effort to overcome obstacles, which is not possible if your response is avoidance (Levy & Steele, 2011).

Eskreis-Winkler et al. (2014) discussed how gender plays an important role in understanding grit, finding that men who are grittier were more likely to remain married and that, for women, there was no association with marital status and grit. Researchers provide a possible explanation for this by saying that grit may predict marital status among men (and not women) because of the likelihood that men find it more difficult to stay married than women. In her original research, Duckworth (2007) suggests that grit may slightly grow with age, similarly, Duckworth (2007) states, to how the Big Five Conscientiousness' increases over the lifespan. Additionally, in studying the correlation of grit with mental health outcomes, researchers found there to be a negative correlation of grit with mental health outcomes (e.g., anxiety, depression and psychological well-being; Musumari et al., 2018; Salles et al., 2014). Musumari et al. (2018) suggest this correlation points to the potential impact of using interventions aimed at improving

grit to prevent negative mental health outcomes. Therefore, it is important that ongoing studies examine the role of grit in understanding how it associates with relational couple's outcomes as well.

While grit appears to be protective in many contexts, some research suggests a need to take a critical eye to how grit is used when working with different populations, variables, and/or analysis approaches (Credé et al., 2016). Specifically, some researchers suggest that the original work using grit may have misused analysis processes, so much so that the resulting interpretations about the strength and effect of grit may have been misunderstood by the audience(s) reading the results (Credé et al., 2016). An example of this, points to how most of the research on grit states how being grittier is beneficial, however Lucas et al. (2015) found that grittier individuals' persistence may work against them at times. The authors reported that grittier individuals are less likely to give up even when they are failing – calling this effect a “costly performance” (Lucas et al., 2015, p. 20). COR theory explains this reaction within the context of loss by describing how those who have few resources do all that they can to protect what they have – leading one to adopt a “defensive posture” (Hobfoll, 2016). In the context of a couple relationship, when partners are affected by the stressor of a disaster and one (or both) partners take a defensive posture and shore up their own resources they may not be able to participate in attachment behaviors like responding to or engaging with their partner.

In sum, current research suggests that the grittier someone is, the better they fare in difficult life events. However, higher grit levels may also work against someone facing difficulties. The proposed study is the first of its kind, as it looks at the potentially intervening role of grit in the association between disaster-related loss and attachment behaviors in couples as well as mental health outcomes. Because of the mixed findings around this trait, the proposed

study is designed to examine grit as a mediator as this may allow for the revealing of complexity in the role of grit by modeling associations between grit and the predictor and outcome variables. It may be that disaster-related loss could have a deleterious effect on grit which may manifest in inverse associations with mental and relational health outcomes. Conversely, it is possible that disaster-related loss could spur the unveiling of a gritty response which proves potentially helpful, yielding a positive association with mental and relational health.

### **Present Study**

The current study aims to examine variation in posttraumatic stress symptoms and attachment behaviors in couples as predicted by variation in disaster-related loss and trauma history. Secondly, the study is designed to assess the potentially intermediary role of grit between the predictor and outcome variables. Figure 1 represents the conceptual model of the study. Gendered findings have been mixed in the extant literature. As such, the analyses will also include a test of differences in paths by gender of the partners to explore potential differences in this sample.

### **Hypotheses**

1. There will be a significant and positive associations in the regression paths between the predictors and outcomes bypassing the mediator – from trauma history and disaster-related loss on posttraumatic stress symptoms (PTSS) for both men and women.
2. There will be a significant, inverse association between higher levels of trauma history and higher levels of disaster-related loss and lower attachment behavior scores for both men and women.
3. Higher levels of trauma history and more disaster-related loss will be associated inversely with grit. In turn, it is hypothesized that grit will have a positive association

with attachment behaviors. However, because of the mixed findings in the literature, the actor and partner associations between the predictor variables and grit as well as grit and the outcomes are stated as tentative.

4. There will be significant, positive indirect effects from trauma history and disaster-related loss to posttraumatic stress symptoms as well as attachment behaviors through grit, wherein those with more trauma history and disaster-related loss will have higher levels of PTSS and lower attachment behaviors.

## **Methods**

### **Procedures**

Approval for the study was secured from the Institutional Review Board at the authors' institution prior to data collection. The sample was recruited using a panelist company, Forthright (which is a platform of the company Bovitz), that specializes in recruiting and distributing surveys to registered panelists. Panelists registered with the company complete surveys for financial incentives. For this sample, registered panelists and their partners were given a survey electronically through a digital survey software. Data were collected at two different time points. The first wave of data was collected in June through July 2019, preceding hurricane season. From this first wave, we used the measure of trauma history and demographic information for this study, while all of the other study variables were taken from the second wave of data collection. The second wave of data were collected after the 2019 hurricane season, from December 2019 through January 2020. As a cash incentive, individual participants were provided with a \$5 USD incentive for completing the survey which they could collect in various forms including cash value, gift cards, or a donation to a charity of their choice.

### **Sample Description**

The current study a sample comprised of 240 heterosexual couples, wherein both members of the couple reported on their disaster-related loss with the 2019 hurricane season. The inclusion criteria included the requirement of couples reporting they both lived together (males reporting an average of 24.86 years with their partner and females reporting an average of 25.06 years with their partner), were over the age of 18 years old, and were living in a state routinely affected by annual hurricane seasons along the southeast region of the United States. From the sample, about ~90% reported having at least mild disaster-related loss. Further, for participants who reported having disaster-related loss, 89.6% of males and 89.6% of females reported having mild exposure (a score between 1 and 2 on the LICCS), 8.6% of males and 7.0% of females reported having medium levels of exposure (a score between 2-3 on the LICCS), and 1.6% of males and 3.2% of females reported having high levels of exposure (a score of 3+ on the LICCS). Additionally, when reporting on trauma history 86.3% males and 80.0% females reported having no prior trauma history. For participants who reported having prior trauma history, those who reported having experienced 1 potentially traumatic event in their trauma history was 12.1% for males and 17.5% for females, those who reported having experienced 2 events of trauma history was 1.3% for males and 1.7 for females, and those who reported having experienced 3+ events of trauma history was 0.4% for males and 0.8% for females. The average age of male participants was 48.45 years and females 46.18 years. Relationship length was such that males reported an average length of 18.57 years and females 18.54 years. A majority of the participants identified as White (male 72.9%, female 74.3%) followed by Black or African American (male 13.8%, female 12.5%), Hispanic or Latino (male 5.8%, female 6.3%), Multiple (male 5.8%, female 4.6%), and Asian (male 1.70%, female 2.5%). Participants' education level

was such that female participants had a higher education level than male; no high school-high school diploma/GED (male 28.7%, female 20.0%), some college (male 20.0%, female 21.6%), Associate's degree (male 11.7%, female 12.1%), Bachelor's degree (male 26.7%, female 30.8%), Master's degree (male 10.0%, female 11.7%), and Professional or Doctoral degree (male 2.9%, female 3.3%).

## **Measures**

### *Disaster-Related Loss*

The Loss in Connection with Catastrophe Scale (LICCS; Banford Witting & Busby, *under review*) is used to assess a participant's exposure to the recent hurricane season and contains 4 subscales and 15 items to assess loss in 4 resource areas: objects, conditions, energies, and personal characteristics. Additionally, the scale includes a follow up item for each loss – asking the respondent if they believe the loss will be short- or long-term. Each item asks about a potential loss and participants were given five choices on a Likert scale; 1 being the lowest level of loss and 5 being the highest. Response options were customized (as needed) to assess the potential loss in question (e.g. range of dollar amount of estimated damage). The current study will utilize the mean score of the 15 Likert-scale items as an aggregate score of loss.

The object subscale (7 items) assesses losses such as damage to place of residence and other property, disruption from displacement, loss of photos, family heirlooms and other significant items, loss of transportation, and disruption from losses of public infrastructure. The conditions subscale (2 items) references potential losses relating to statuses that provide resources, specifically employment and the relationship with one's spouse or partner. The energies subscale (3 items) pinpoints losses relating to resources that allow one to acquire more resources, specifically, income, time, and important information. Finally, the personal

characteristics subscale (3 items) asks about losses in one's disposition toward life such as a sense of feeling safe, disruptions in mental or emotional health and one's general life outlook.

The Cronbach's alpha for the full scale demonstrated excellent reliability ( $\alpha = .93$  for males and  $\alpha = .92$  for females).

### *Trauma History*

To measure trauma history, the Trauma History Questionnaire was used (Hooper et al., 2011). The questions are presented following a brief description asking the participants to respond yes or no as to whether a variety of trauma history events have happened to them in their life. An example question is, "Has anyone ever attempted to rob you or actually robbed you (i.e., stolen your personal belongings)?" A sum of the yes responses is then used to create a total score. Commonly, problems with validity like this is found with measures comparable to the THQ, where a variety of life events are measured.

### *Grit*

To measure grit, a short grit scale (8 questions) was used (Grit-S; Duckworth & Quinn, 2009). Participants were given five choices on a Likert scale (1 = *very much like me* to 5 = *not like me at all*) and asked to respond to questions like "Setbacks don't discourage me", "I am a hard worker", and "I finish whatever I begin". A higher mean score indicates the participant displays more grit. The Cronbach's alpha demonstrated adequate reliability ( $\alpha = .78$  for males and  $\alpha = .77$  for females).

### *Attachment Behaviors*

The brief accessibility, responsiveness, and engagement scale (BARE; Sandberg et al., 2012) is a six-item self-report scale in which participants are given five choices on a Likert scale (1 = *never true* to 5 = *always true*) and asked to respond to questions like "I am rarely available

to my partner”, “I listen when my partner shares her/his deepest feelings”, and “I struggle to feel close and engaged in our relationship”. Higher mean scores indicate more accessibility, responsiveness, or engagement of the participant and/or their partner. The Cronbach’s alpha demonstrated excellent reliability ( $\alpha = .84$  for males and  $\alpha = .83$  for females).

### *Post-traumatic Stress Symptoms*

PTSS was assessed using the Impact of Events Scale-Revised (IES-R; Weiss & Marmar, 1997). Using 21 items from IES-R, the current study asked about various symptoms and the frequency at which that the participant experienced them over the past 2 weeks – relating to the respondent’s most recent stressful life event. Responses were answers on a 5-point Likert scale ranging from 1 = *not at all* to 5 = *extremely*. Examples of symptoms from the questions include “I had waves of strong feelings about it”, “I tried not to think about it”, and “I was jumpy and easily startled.” The Cronbach’s alpha demonstrated excellent reliability ( $\alpha = .96$  for males and  $\alpha = .96$  for females).

## **Analysis**

For study variables, descriptive statistics (including mean, median and standard deviation) are presented in Table 1. Univariate and bivariate analyses were conducted, and a summary of the distributional characteristics of the study variables are presented in Table 2. Initial analyses were conducted using SPSS (Version 27; IBM Corp., 2020).

### **Multivariate Model**

To address the primary research aims this study, an actor-partner interdependence model (APIM; Cook & Kenny, 2005) was fit to the data using path analysis to assess associations between trauma history and disaster-related loss, and the outcomes of PTSS and attachment behaviors for both male and female participants using Mplus (Version 8; Muthén & Muthén,

1998-2017). Intermediary paths were placed to connect the predictor variables with grit and in turn, to connect grit with outcome variables (see Figure 2). Both actor and partner effects were examined by allowing paths to be estimated within and between partners (Kenny et al., 2006). None of the partner effects were significant, for readability in the figure, they were not included in Figure 2.

Because of skew toward low distress in the PTSS measure and skew toward higher attachment behaviors in that measure, I utilized the MLR estimator which is robust to nonnormality (Zhong & Yuan, 2011) within Mplus (Version 8; Muthén & Muthén, 1998-2017) to estimate robust standard errors. Additionally, the MLR estimator utilizes maximum likelihood to estimate missing data. All study scales were calculated such that 80% of the items on any scale were required to be present to produce a score for participants. Table 1 shows the sample size for each scale for men and women and demonstrates a relatively low rate of missing data on the item and scale level.

## Results

To address the study's hypotheses, an actor partner interdependence model (APIM) was fit to the data to examine associations as well as direct and indirect actor and partner effects within couples. The model demonstrated good fit ( $\chi^2(31) = 61.03, p < .01, CFI = 0.955, TLI = 0.848, RMSEA = 0.06$ ; Hu & Bentler, 1999). See Figure 2 for a visual summary of the estimates.

### Actor and Partner Associations

A significant female actor effect was found between disaster-related loss and female PTSS, indicating that disaster-related loss had a positive association with PTSS ( $b = .60, p < .001$ ). This means that for every additional disaster-related loss that females reported, her PTSS was .6 point higher. This is important to note since the PTSS scale average scores range from 1-

5. Additionally, female trauma history had a significant, positive association with female PTSS ( $b = .12, p < .001$ ), so that for every additional trauma event in a female's trauma history, her PTSS was .12 point higher. There were no actor effects for female disaster-related loss and/or female trauma history on attachment behaviors. There were also no significant partner effects between disaster-related loss and/or trauma history on the male outcome variables.

Similarly, for men, a significant male actor effect was also found, indicating that disaster-related loss had a significant, positive association with PTSS ( $b = .85, p < .001$ ). This indicates that for every additional disaster-related loss point a male participant reported, his PTSS was .85 point higher. Additionally, male trauma history had a significant, positive association with male PTSS ( $b = .13, p < .001$ ). This means that for every additional event in male's trauma history, his PTSS was .13 point higher. There were no actor effects for male disaster-related loss and/or male trauma history on male attachment behaviors. There were also no significant partner effects between disaster-related loss, trauma history and the female outcome variables.

### **Grit as an Intermediary Variable**

Significant female actor and partner effects were noted, indicating that female trauma history had a significant, negative association with female grit levels ( $b = -.10, p < .01$ ) and her male partner's level of grit ( $b = -.07, p < .05$ ). Meaning that for every additional event in a female's trauma history, her grit was lower by .10 points and her male partner's grit was lower by .07 point. This is a relatively small association as the grit scale scores range from 1-5. There were no significant partner or actor effects for male disaster-related loss, male trauma history, and/or female disaster-related loss on either partner's grit levels.

Male participant's grit level had a significant, positive association with his own attachment behaviors ( $b = .34, p < .001$ ) and a significant, negative association with his own

PTSS ( $b = -.12, p < .05$ ). This can be interpreted to say that for every point male's grit level was higher, his attachment behaviors were higher by .34 point and his PTSS was lower by .12 point. Male partner's grit level had a significant, positive association with his female partner's attachment behaviors ( $b = .15, p < .05$ ). So, for every one-point male's grit level was higher, his female partner's attachment behaviors were .15 point higher. There were no significant, associations from male's grit levels with his female participant's PTSS.

Female grit levels had a significant, positive actor association with attachment behaviors ( $b = .40, p < .001$ ) or for every point female's grit level was higher, her attachment behaviors were .4 point higher. However, there were no significant, associations between female participant's grit and her PTSS. Female partner's grit level had a significant, positive association with her male partner's attachment behaviors ( $b = .18, p < .05$ ) and a significant, negative association with her male partner's PTSS ( $b = -.12, p < .05$ ). Meaning, for every point female's grit level was higher, her male partners attachment behavior was .18 point higher and his PTSS was .12 point lower.

### **Indirect Effects**

The effects discussed in this section are standardized, as such their magnitude difference from zero is interpretable. Female trauma history had a significant, negative indirect effect on female attachment behaviors ( $NIE = -.10, p < .01, 95\% \text{ CI } [-.16, -.03]$ ). Specifically, it had a negative indirect effect through female grit ( $NIE = -.08, p < .05, 95\% \text{ CI } [-.14, -.02]$ ). Female trauma history had had a negative, indirect effect on male attachment behaviors ( $NIE = -.08, p < .05, 95\% \text{ CI } [-.15, -.02]$ ), however, this effect did not appear to occur via grit. Female trauma history had had a positive, indirect effect on male PTSS ( $NIE = .04, p < .05, 95\% \text{ CI } [.01, .08]$ ),

but was not carried through a specific indirect effect via grit. See Table 3 for full results of direct, indirect and total effects.

### **Control: Age**

Prior research suggested grit is flexible (Musumari et al., 2018) and that one factor which may enhance grit is the passage of time through a higher age (Duckworth, 2007), so we included age as a predictor variable. It was found that for men there was a positive, significant association with male grit ( $b = .01, p < .05$ ) and for women there was a positive, significant association with female grit ( $b = .02, p < .001$ ). Meaning that for every year older men and women were, their grit was higher by .01 and .02 increase in grit, respectively. These associations are quite small; however, they were statistically significant which indicates a pattern.

### **Summary of Variation Explained by the Model**

R-squared values demonstrate the percent of variance which is explained by the model in each outcome variable. This study's model accounted for 39.6% variation in male PTSS and 33.1% of the variation in female PTSS, 23.0% of the variation in male attachment behaviors and 24.1% of the variation in female attachment behaviors, 8.9% of the variation in male grit and, finally, 10.1% of the variation in female grit.

## **Discussion**

### **Review of Findings**

The purpose of this study was to investigate dyadic associations between trauma history and disaster-related loss, with the outcomes of PTSS and attachment behaviors for both female and male participants; in addition, the mediating variable of grit was included in the model. In other words, this study was designed to examine how trauma history and disaster-related loss

may influence couples' attachment behaviors and posttraumatic stress symptoms and to determine if grit carries the effect of disaster-related loss and trauma history to the outcomes.

The first hypothesis was supported in that for men and women, higher levels of disaster-related loss as well as higher levels of trauma history associated with higher levels of PTSS. Especially important to note is the magnitude which was discussed in the results. For women, the unit change in PTSS was .60 and men was .85. As PTSS is scored on a scale from 1 to 5, this amount of change potentially means the difference of score from "a little bit" to "moderately" or "quite a bit" to "extremely". These findings are consistent with previous research, especially studies that highlight the lasting effects of natural disasters. For instance, Bonanno et al. (2010) reviewed several disaster studies and concluded that disasters may strike quickly and yet can take several years for those affected to recover from. Hobfoll (2012) described how disaster-related loss will relate to resource loss and ultimately distress, suggesting that these kinds of losses are wide-ranging and have a "multilevel impact... interacting and negatively weighing on the other" (p. 229). The current study findings were consistent with the research on loss, in that disaster-related loss and trauma history (also a loss) related to more distress (PTSS) for both men and women.

The data did not support the second hypothesis, that there would be a significant, inverse association between higher levels of trauma history as well as higher levels of disaster-related loss and lower levels of attachment behaviors. In fact, no significant associations were found between trauma history, disaster-related loss and attachment behaviors for men or women. This finding was surprising in that some scholars have found trauma history (i.e. childhood abuse and violence) to be associated with lower levels of attachment behaviors (Banford Witting & Busby, 2018). The lack of association is perhaps related to the relatively low incidence of disaster-

related loss and trauma history among the participants in this sample. However, given the association seen between disaster-related loss, trauma history and posttraumatic stress symptoms, other potential explanations need exploring. For instance, it could also indicate that couple-interaction-related outcomes such as attachment behaviors are somehow insulated from trauma history and disaster-related loss in a way that individual posttraumatic stress symptomology is not. We did note that outside the context of the model, disaster-related loss was correlated with lower levels of attachment behaviors within partners. As such, it may also be that examining these associations in the context of a multivariate APIM model where we accounted for partner interdependence gives a more nuanced and accurate picture. In other words, it will be important to continue studies in this area that incorporate data from couples and account for non-interdependence. In terms of theory, it may be again that couple distress is somehow insulated from loss in ways that individual distress may not be. Future inquiry in this area would be valuable to see how losses relate differentially to individual versus couple functioning when utilizing COR theory to view loss as the primary substance of stress.

It was also hypothesized that higher levels of trauma history and more disaster-related loss would be associated inversely with grit. Since there are mixed findings in the current literature about how grit can be both helpful and a hindrance (Lucas et al., 2015), this was an area of exploration in the current study. For women, a higher level of trauma history associated with lower levels of grit for themselves as well as for her male partner. However, there were no other associations with grit and the predictors for men and women. Grit did have significant, positive actor and partner associations with the outcomes of male and female attachment behaviors. Finally, there were significant, inverse actor associations between male grit and male PTSS along with female grit and male PTSS.

These findings are in line with the current literature which describes the association between grit and mental health outcomes, where those with higher levels of grit had a negative and significant relationship with suicidal ideation (Blalock et al., 2015). Further, Blalock et al. (2015) hypothesize that this relationship may exist for those with higher levels of grit, because they may not experience the same level of stress as those with lower levels of grit. COR theory (Hobfoll, 1989) frames the relationship between individuals and their environment as being transactional – in that individuals cognitively decide if they have the personal resources to handle stress events (Matthieu & Ivanoff, 2006). This decision then has a magnitude effect on an individual's emotional response which ultimately elicits a stress response to any given stressful situation. So, someone with higher levels of grit may be able to process their stressful situation in a way that leads to a lower intensity of emotions and, overall, a lower level of stress. With that said, in considering why the predictors did not have more of an affect or association with grit, it may be that grit is a fixed personality trait as Duckworth (2007) originally suggested, rather than a variable resource and hence, perhaps it cannot be easily changed by disaster-related loss or trauma history.

Finally, it was hypothesized that there would be significant, positive indirect effect from trauma history and disaster-loss to PTSS as well as attachment behaviors through grit. This last hypothesis received minimal support in that there was a negative, indirect effect from female trauma history to female attachment behaviors through grit. This suggests that the association between higher levels of trauma history and lower levels of attachment behaviors for women was conveyed in part through a detriment to female grit. In other words, higher levels of trauma history for females associated with lower levels of grit which in turn, associated with lower levels of her own attachment behaviors. King et al. (2020) found similar associations between

trauma and grit, in that the more childhood physical abuse participants reported, the lower their levels of grit were. These findings are interesting to note because in concert King et al.'s (2020) findings and Musumari et al. (2018) seem to provide evidence that grit may be malleable in both directions whereas early formations of grit tend to cast it as more fixed (e.g. Duckworth, 2007). Given that the field appears to be in some debate over the nature of grit, future work in this area is needed. One way to theoretically frame the current finding that higher levels of female trauma history associated with lower levels of female grit is by returning to COR theory. Trauma history can be framed within COR theory as a loss and, further, researchers showed that these losses can reduce an individual's resources and/or reserve of resources (Banford Witting & Busby, 2018). Researchers describe grit as a personal quality and share how in the face of losses, grittier individuals will "stay the course" or stay on their current trajectory (Duckworth, 2007, p. 1088), which includes marriage (Eskreis-Winkler et al., 2014). In the face of stress, individuals in a romantic relationship will respond with attachment behaviors (like engagement) by showing up for one another – reaching out or seeking one another (Eskreis-Winkler et al., 2014; Novak et al., 2016; Ruhlmann et al., 2018). So, a female partner with a higher level of trauma history, shown to have lower levels of grit, may struggle to participate in attachment behaviors, like engagement.

### **Clinical Implications**

For therapists and therapists-in-training, the findings of this study may be useful to consider when working with heterosexual couples who have mild disaster-related loss and some trauma history. Riggs (2014) highlights the importance of assessing trauma histories for both members in a couple to see how trauma-related symptoms may be affecting their relationship. It is important to note here that the experience of a disaster is incredibly varied meaning that each

individual, couple and family will have different losses and potentially traumatic experiences with a disaster. As such, it is not suggested that treating couples with disaster exposure is not a wholesale equivalent to treating couples with other types of traumatic event exposure because many who go through disasters are not affected with long term mental health difficulties (Bonanno et al., 2010). Thus, thorough assessment to examine what losses and experiences couples have had in facing a disaster is critical to appropriate intervention planning. Because of this important caveat, the suggestions given here should be considered general guidance based upon the findings with this sample.

Researchers emphasize the importance of marriage/couple therapy, specifically cognitive-behavioral conjoint therapy (CBCT), when at least one of the members of the couple is working to improve symptoms associated with PTSD and their relationship satisfaction overall (Monson et al., 2012). As such, CBCT may be an appropriate intervention to utilize with couples affected by trauma, depending on their distress level and disaster-related loss experiences. Clinicians who specialize marriage/couple therapy recommend emotionally focused therapy (EFT; Johnson, 2004) as an empirically supported model to help improve couple's outcomes (Greenman & Johnson, 2013) – especially when working to improve attachment behaviors within couplehood. So, clinicians interested in working with those affected by trauma history and disaster-related loss may find it helpful to work toward being specifically trained in and explore models like EFT or other models that enhance engagement with one's partner such as Gottman's Sound Marital House Theory (Gottman et al., 2002).

With regard to grit, it may be important for clinicians working specifically with women who have a history of trauma and who have a goal to connect with their partner in more meaningful ways (e.g., increasing attachment behaviors) to explore their level of grit (either

formally in a grit assessment or informally in a therapeutic interview). We noted in our study that lower levels of grit associated with lower levels of attachment behaviors. As such, it may be helpful to assess both grit and attachment behaviors with clients exposed to disaster-related loss and who have a history of trauma. An example of how to assess for grit level in a clinical setting includes having the therapist ask the client(s) questions related to the Grit-S (Duckworth & Quinn, 2009), such as: 1) do setbacks discourage you, 2) do you often finish projects after you begin them, and 3) do you set goals and pursue them or choose to pursue different goals? Together, the answers to these questions may start to orient the therapist to the client(s) grit level. In addition to careful assessment, interventions targeted to improve grit may influence attachment behaviors positively; the reverse is also potentially true as path analysis does not allow us to assume causation. As such, it was also suggested that therapy models targeted to improve attachment behaviors may be helpful.

COR theory states that improving access to resources can help offset loss, such as disaster-related loss (Banford Witting & Busby, 2018). Thinking of grit as a resource may be a helpful frame because researchers have found that grit may change and improve over one's lifetime (Harris & Murray, 2017), and interventions aimed at increasing grit would be helpful for improving mental health outcomes (Musumari et al., 2018). To start this process, a therapist may gather information about a client(s) resources and wholeness by using a chart like Satir's self-mandala (Lum, 2002). The self-mandala assesses eight domains of resources in a client's life: nutritional, physical, spiritual, interactional, emotional, sensual, intellectual, and contextual (Satir et al., 1991). If there are domains which are lacking resources, clinical work can start with increasing resources in these areas. Additionally, Perkins-Gough (2013) suggest that by using deliberate practice techniques, working on something even when the repetitive nature of working

hard can be mundane or boring, changes grit levels. Furthermore, the study proposed that grit levels can be changed by changing the beliefs about hard work, shifting focus from the boringness of a task to how to get the most out of one's day; this included having practice with the struggle of difficult tasks (Perkins-Gough, 2013). A clinical tactic which could be used to engage a client in this change of perspective is a strategic reframe which helps "redefine the problematic situation so that the existing values, beliefs and commitments of involved persons lead to a very different behavior" (Coyne & Biglan, 1984, p. 222). In strategic therapy, this is called a paradoxical intervention because the hope is that the client(s) will act in new ways (Coyne & Biglan, 1984) – which may lead them to continue working on projects long after the client(s) may become bored with the day to struggle with a task or goal.

Eskreis-Winkler et al.'s (2014) study locates grit within a psychological domain, finding there to be evidence for grit's effect on marital outcomes for couples where one or both partners have a history of trauma. Interventions used as part of Gottman's Sound Marital House Theory (Gottman et al., 2002) could be helpful here because they work on improving conflict management skills and in creating shared meaning within couples – ultimately focusing on mitigating the cascading distance and isolation that sometimes develops following trauma (Tell et al., 2006). A Gottman technique that may help couple's in the reconnection process is building Rituals of Connection – this intervention is used to increase couple's daily rituals and interactions with the goal of helping their relationship thrive (Gottman & Silver, 2015). Additionally, EFT interventions may be impactful as they are aimed at increasing attachment bonds both with the individual who with a trauma history and at the couple level (Johnson, 2002). For instance, EFT techniques that could be useful with couples and that could potentially enhance grit levels would be guiding client's in completing performance tasks in an effort to

increase their engagement in therapy and, eventually, to increase their engagement in their relationship (Zuccarini et al., 2013). Zuccarini et al. (2013) cautions that facilitating client's and couple's in this process may be made more difficult with client's how have experienced a trauma in their history.

### **Limitations and Suggestions for Future Research**

The conceptualization of disaster exposure is quite diverse in the field of disaster studies which is evidenced by a variety of measures to capture it; as such, building building consensus across the disaster research field on how to measure disaster exposure is challenging, but necessary (Chung et al., 2014; Chang et al., 2003; Harville et al., 2015; Norris et al., 1999; Shepherd et al., 2017; Smith, 1996). As such, the current study looked at disaster-related losses using the LICCS, which assesses loss across four domains – object, condition, energy and personal. While the use of theory-driven instrument is a strength of the study, at the same time, this instrument is also new and needs to be used with a variety of disasters to fully evaluate its sensitivity to variation in disaster exposure.

Furthermore, other potential limitations in conceptualization include the treatment and inclusion of grit in this study. Duckworth (2007) originally described grit as a personality trait and something that may slightly change as someone ages. Personality traits are typically considered to be fixed or enduring throughout one's lifespan (McCrae & Costa, 1994). However, King et al. (2020) found a connection between childhood physical abuse and lower grit, similar to the finding in this study between female trauma history and lower levels of female grit. Also, Perkins-Gough (2013) suggested interventions to improve grit, suggesting a potentially higher level of plasticity than some other personality characteristics. These disparities call into question the original description of grit as a personality trait. In other words, it seems to be unsettled

whether grit is a fixed personality trait or a dynamic characteristic which can be increased by therapeutic interventions or conversely damaged via trauma or stress. Further exploration of grit would be needed to understand the nature of this trait. Along with this, looking at mediators that are less personality trait-based and more behaviorally based (e.g., coping) might reveal useful intervention strategies with disaster affected couples. Additionally, the measure of grit that was used for this study, the Grit-S, is a measure of an individual's level of grit. Future research using dyadic data including partner measures of grit would be interesting because it would help in exploring how partners perceive one another's level of grit – which may go so far as to assess how one partner feels about their partner's level of grit (e.g., accepting, annoyed by, and/or neutral to).

This study focused on individual and couple outcomes from disaster-related loss during a mild hurricane season (2019). There is more work to be done in looking at the dynamic of couples nested within their communities. For example, after Hurricanes Irma and Maria hit Puerto Rico in 2017, the creation of community gardens served to support Puerto Rican's by increasing resources in a variety of domains (McIlvaine-Newsad et al., 2020). Specifically, researchers highlighted how the gardens served as an environmental resource by creating renewable energy and the gardens also became a social resource by strengthening intergenerational bonds and sparking social activism (McIlvaine-Newsad et al., 2020). COR theory describes resources like these as “caravans” (Hobfoll, 2011). What is important to understand about caravans is that they differ for those from different backgrounds (e.g. those from lower socio-economic or from disenfranchised communities have lower resources starting out) and when a major stress event occurs, those most vulnerable (lacking in resources) are more at risk for experiencing negative physical and mental health outcomes. Future research might

consider how community care (or lack thereof) affect populations who have experienced disaster-related loss.

Further, the limitations of this study include the skewed demographics of the sample, in that between 70-75% of the sample were White. Almost 15% of the sample were Black or African American which is a bit more representation that is typically seen in research and is closer to an accurate representation of the population at large (U.S. Census Bureau, 2021); however, generalizability is limited among other racially diverse groups. Additionally, the data were collected in an effort to capture the experience of those affected annually by the 2019 hurricane season and so the sample was focused along the southeast region of the United States; therefore, the sample may not generalize to those living in other regions of the United States. Further, measures of disaster-related loss used in this study are new. Overall, the sample reported low levels of PTSS and high levels of attachment behaviors, which makes detecting the prediction in variability difficult, despite adjusting for skew by utilizing a robust estimator in the analysis. Future research would benefit by working with more racially diverse couples, from different regions around the United States which may require additional data gathering techniques beyond the use of panelist companies. Females and males in the dataset were not highly traumatized, in that they did not have very intense disaster-related loss or trauma histories. A more diverse sample (in terms of exposure) might yield more nuanced findings among similar variables. Finally, studying a variety of other mental health outcomes would be useful in studying those affected by natural disasters.

### **Conclusion**

This study was designed to examine what association trauma history and disaster-related loss may have for couples' attachment behaviors and posttraumatic stress symptoms. Findings

supported prior research and general tenets of COR theory in that men and women with higher trauma history and disaster-related loss have higher levels of PTSS. Further, we found an indirect relationship effect from women's trauma history to women's attachment behaviors, through their grit. It may be that female grit is a personality resource that can be depleted in the face of losses like trauma history and disaster-related loss. Stress theories like COR theory can be used to describe the effect of loss on one's own personal resources and, ultimately, on couple outcomes like attachment behaviors as well as mental health outcomes like post-traumatic stress symptoms (PTSS). Clinicians working with couples who have a history of trauma and/or disaster-related loss can use interventions aimed increasing their grit to positively affect their mental health and couple outcomes.

### References

- Banford Witting, A. & Busby, D. (2018). The long arm of trauma during childhood: Associations with resources in couple relationships. *Journal of Marital and Family Therapy*, 45(3), 534–549. <https://doi.org/10.1111/jmft.12354>
- Banford Witting, A., & Busby, D. (*under review*). The Loss in Connection with Catastrophes (LICCS) Scale: The salience of resources in understanding individual and relational wellbeing.
- Banford Witting, A., & Busby, D.M. (2020). The residuum of childhood physical and sexual abuse: Coming to terms in couple relationships. *Journal of Interpersonal Violence*. <https://doi.org/10.1177/0886260520965972>
- Banford Witting, A., Bagley, L. A., Nelson, K., & Lindsay, T. (2021). Natural disasters and the relational study of the family: A 2-decade scoping review. *International Journal of Disaster Risk Reduction*, 52(1), 1–10. <https://doi.org/10.1016/j.ijdr.2020.101990>
- Benevolenza, M. A., & DeRigne, L. (2019). The impact of climate change and natural disasters on vulnerable populations: A systemic review of literature. *Journal of Human Behavior in the Social Environment*, 29(2), 266–281. <https://doi.org/10.1080/10911359.2018.1527739>
- Blalock, D. V., Young, K. C., & Kleiman, E. M. (2015). Stability amidst turmoil: Grit buffers the effects of negative life events on suicide ideation. *Psychiatry Research*, 228(3), 781–784. <http://dx.doi.org/10.1016/j.psychres.2015.04.041>

- Bonanno, G. A., Brewin, C. R., Kaniasty, K., & La Greca, A. M. (2010). Weighing the costs of disaster: Consequences, risks, and resilience in individuals, families, and communities. *Psychological Science in the Public Interest*, *11*(1), 1–49.  
<https://www.jstor.org/stable/41038732>
- Botey, A. P., & Kulig, J. C. (2014). Family functioning following wildfires: Recovering from the 2011 Slave Lake fires. *Journal of Child and Family Studies*, *23*(8), 1471–1483.  
<https://doi.org/10.1007/s10826-013-9802-6>
- Canevello, A., Michels, V., & Hilaire, N. (2016a). Supporting close others' growth after trauma: The role of responsiveness in romantic partners' mutual posttraumatic growth. *Psychological Trauma: Theory, Research, Practice, and Policy*, *8*(3), 334–342.  
<http://dx.doi.org/10.1037/tra0000084>
- Canevello, A., Michels, V., & Hilaire, N. (2016b). Posttraumatic growth: Spouses' relationship quality and psychological distress. *Journal of Loss and Trauma*, *21*(6), 548–559.  
<http://dx.doi.org/10.1080/15325024.2016.1159112>
- Cann, A., Calhoun, L. G., Tedeschi, R. G., Taku, K., Vishnevsky, T., Triplett, K. N., & Danhauer, S. C. (2010). A short form of the Posttraumatic Growth Inventory. *Anxiety, Stress, and Coping*, *23*, 127–137. <http://dx.doi.org/10.1080/10615800903094273>
- Cao, X., Jiang, X., Li, X., Lo, M-cJ., & Li, R. (2013). Family functioning and its predictors among disaster bereaved individuals in China: Eighteen months after the Wenchuan earthquake. *PLoS ONE*, *8*(4), e60738–e60738.  
<https://doi.org/10.1371/journal.pone.0060738>

- Caruana, C. (2010). Picking up the pieces: Family functioning in the aftermath of natural disaster. *Family Matters*, *84*(1), 79–88.  
<https://search.informit.com.au/documentSummary;dn=991914259297512;res=IELHSS>
- Chang, C., Lee, L., Connor, K. M., Davidson, J. R. T., Jeffries, K., & Lai, T. (2003). Posttraumatic distress and coping strategies among rescue workers after an earthquake. *The Journal of Nervous and Mental Disease*, *191*(6), 391–398. <http://dx.doi.org/10.1097/01.NMD.0000071588.73571.3D>
- Chung, M. C., Jalal, S., & Khan, N. U. (2014). Posttraumatic stress disorder and psychiatric comorbidity following the 2010 flood in Pakistan: Exposure characteristics, cognitive distortions, and emotional suppression. *Psychiatry*, *77*(3), 289–304.  
<http://dx.doi.org/10.1521/psyc.2014.77.3.289>
- Cook, W. L., & Kenny, D. A. (2005). The Actor-Partner Interdependence Model: A model of bi-directional effects in developmental studies. *International Journal of Behavioral Development*, *29*, 101–109. <http://dx.doi.org/10.1080/01650250444000405>
- Coyne, J. C., & Biglan, A. (1984). Paradoxical techniques in strategic family therapy: A behavioral analysis. *Journal of Behavioral Therapy and Experimental Psychiatry*, *15*(3), 221–227. [https://doi.org/10.1016/0005-7916\(84\)90029-6](https://doi.org/10.1016/0005-7916(84)90029-6)
- Credé, M., Tynan, M. C., & Harms, P. D. (2016). Much ado about grit: A meta-analytic synthesis of the grit literature. *Journal of Personality and Social Psychology*, *113*(3), 492–511. <http://dx.doi.org/10.1037/pspp0000102>
- Duckworth, A. L., Peterson, C., Matthews, M. D., & Kelly, D. R. (2007). Grit: Perseverance and passion for long term goals. *Journal of Personality and Social Psychology*, *92*(6), 1087–1101. <https://dx.doi.org/10.1037/0022-3514.92.6.1087>

- Duckworth, A. L., & Quinn, P. D. (2009). Development and validation of the Short Grit Scale (GRIT–S). *Journal of Personality Assessment, 91*(2), 166–174. <https://doi-org.erl.lib.byu.edu/10.1080/00223890802634290>
- Duckworth, A. L. (2013). The key to success? Grit. Retrieved from [https://www.ted.com/talks/angela\\_lee\\_duckworth\\_the\\_key\\_to\\_success\\_grit?languageen#t-9644](https://www.ted.com/talks/angela_lee_duckworth_the_key_to_success_grit?languageen#t-9644)
- Eskreis-Winkler, L., Shulman, E. P., Beal, S. A., & Duckworth, A. L. (2014). The grit effect: Predicting retention in the military, the workplace, school and marriage. *Frontiers in Psychology, 5*(1), 1–12. <https://doi.org/10.3389/fpsyg.2014.00036>
- Gallagher, H. C., Lusher, D., Gibbs, L., Pattison, P., Forbes, D., Block, K., & ... Bryant, R. A. (2017). Dyadic effects of attachment on mental health: Couples in a postdisaster context. *Journal of Family Psychology, 31*(2), 192–202. <http://dx.doi.org/10.1037/fam0000256>
- Gissurardottir, O. S., Hlodversdottir, H., Thordardottir, E. B., Petursdottir, G., & Hauksdottir, A. (2019). Mental health effects following the eruption in Eyjafjallajökull volcano in Iceland: A population-based study. *Scandinavian Journal of Public Health, 47*(1), 251–259. <https://doi-org.erl.lib.byu.edu/10.1177/1403494817751327>
- Gottman, J. M., Driver, J., & Tabares, A. (2002). Building the sound marital house: An empirically derived couple therapy. In A.S. Gurman & N.S. Jacobson (Eds.), *Clinical handbook of couple therapy* (pp. 373–399). New York: Guilford Press.
- Gottman, J. M., & Silver, N. (2015). *The seven principles for making marriage work: A practical guide from the country's foremost relationship expert*. New York, NY: Three Rivers Press.

- Greenman, P. S., & Johnson, S. M. (2013). Process research on Emotionally Focused Therapy (EFT) for couples: Linking theory to practice. *Family Process, 52*(1), 46–61.  
<https://doi.org/10.1111/famp.12015>
- Harris, J. L., & Murray, B. J. (2017). Educational grit and psychological trauma. *Developments in Business Simulation and Experiential Learning, 44*, 86–94.
- Harville, E. W., Jacobs, M., & Boynton-Jarrett, R. (2015). When is exposure to a natural disaster traumatic? Comparison of a Trauma Questionnaire and Disaster Exposure Inventory. *PLoS ONE, 10*(4): e0123632. <https://doi.org/10.1371/journal.pone.0123632>
- Hobfoll, S. E. (1989). Conservation of resources: A new attempt at conceptualizing stress. *American Psychologist, 44*(3), 513–524. <https://doi.org/10.1037/0003-066X.44.3.513>
- Hobfoll, S. E., Freedy, J., Lane, C., & Geller, P. (1990). Conservation of social resources: Social support resource theory. *Journal of Social and Personal Relationships, 7*(4), 465–478. <https://doi.org/10.1177/0265407590074004>
- Hobfoll, S. E., Watson, P., Bell, C. C., Bryant, R. A., Brymer, M. J., Friedman, M. J.,... Ursano, R. J. (2007). Five essential elements of immediate and mid-term mass trauma intervention: Empirical evidence. *Psychiatry, 70*(4), 283–315.  
<https://doi.org/10.1521/psyc.2007.70.4.283>
- Hobfoll, S. E. (2012). Conservation of resources and disaster in cultural context: The caravans and passageways for resources. *Psychiatry, 75*(3), 227–232.  
<https://doi.org/10.1521/psyc.2012.75.3.227>

- Hobfoll, S. E., Tirone, V., Holmgreen, L., & Gehard, J. (2016). Conservation of resources theory applied to major stress. In G. Fink (Ed.), *Stress: Concepts, cognition, emotion, and behavior* (pp. 65-71). <http://dx.doi.org/10.1016/B978-0-12-800951-2.00007-8>
- Holder, N., Suris, A., Holliday, R., & North, C. S. (2017). Principles of mental health intervention for survivors of major disasters. *Psychiatric Annals, 47*(3), 124–127. <https://doi.org/10.3928/00485713-20170202-01>
- Hooper, L. M., Stockton, P., Krupnick, J., & Green, B. L. (2011). The development, use, and psychometric properties of the Trauma History Questionnaire. *Journal of Loss and Trauma, 16*(3), 258–283. <https://doi.org/10.1080/15325024.2011.572035>
- Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling, 6*(1), 1–55. <https://doi.org/10.1080/10705519909540118>
- IBM Corp. (2020). *IBM SPSS statistics for Windows (27)*. Armonk, NY: IBM Corp.
- Jacobs, M. B., & Harville, E. W. (2015). Long-term mental health among low-income minority women following exposure to multiple natural disasters in early and late adolescence compared to adulthood. *Child Youth Care Forum, 44*(1), 511–525. <https://doi.org/10.1007/s10566-015-9311-4>
- Johnson, S. M. (2002). *Emotionally focused couple therapy with trauma survivors: Strengthening attachment bonds*. New York: Guilford Press.
- Johnson, S. (2004). *The practice of emotionally focused couples therapy* (2<sup>nd</sup> ed.). New York: Brunner-Routledge.
- Kenny, D. A., Kashy, D. A., & Cook, W. L. (2006). *Dyadic data analysis*. New York: Guilford Press.

- King, C. D., Hilton, B. T., Greenfield, S. F., McHugh, R. K., Griffin, M. L., Weiss, R. D., & Ressler, K. J. (2020). Anxiety sensitivity and grit as mediators between childhood abuse and relapse risk for substance use. *Child Abuse & Neglect, 107*: e104568.  
<https://doi.org/10.1016/j.chiabu.2020.104568>
- Levy, J. M., & Steele, H. (2011). Attachment and grit: Exploring possible contributions of attachment styles (from past and present life) to the adult personality construct of grit. *Journal of Social & Psychological Sciences, 4*(2), 16-49.  
<https://link.gale.com/apps/doc/A314443334/AONE?u=byuprovo&sid=AONE&xid=5b39caac>
- Lucas, G. M., Gratch, J., Cheng, L., & Marsella, S. (2015). When the going gets tough: Grit predicts costly perseverance. *Journal of Research in Personality, 59*(1), 15–22.  
<https://doi.org/10.1016/j.jrp.2015.08.004>
- Lum, W. (2002). The use of self of the therapist. *Contemporary Family Therapy, 24*(1), 181–197. <https://doi.org/10.1023/A:1014385908625>
- Marshall, E. M., Kuijer, R. G., Simpson, J. A., & Szepeswol, O. (2017). Standing on shaky ground? Dyadic and longitudinal associations between posttraumatic stress and relationship quality post-earthquake. *Journal of Family Psychology, 31*(6), 721–733.  
<https://doi.org/10.1037/fam0000305>
- Matthieu, M., & Ivanoff, A. (2006). Using stress, appraisal, and coping theories in clinical practice: Assessments of coping strategies after disasters. *Brief Treatment and Crisis Intervention, 6*(4), 337–348. <http://dx.doi.org/10.1093/brief-treatment/mhl009>
- McCrae, R.R., & Costa, P.T. (1994). The stability of personality: Observation and evaluations. *Current Directions in Psychological Science, 3*, 173–175.

- McIlvaine-Newsad, H., Porter, R., & Delany-Barmann, G. (2020). Change the game, not the rules: The role of community gardens in disaster resilience. *The Journal of Park and Recreation Administration, 38*(3), 194–214. <https://doi.org/10.18666/JPRA-2019-9721>
- Miller, R. B., & Johnson, L. N. (Eds.). (2014). *Advanced methods in family therapy research: A focus on validity and change*. ProQuest Ebook Central. <https://ebookcentral.proquest.com>
- Monson, C.M., Gradus, J.L., La Bash, H.A., Griffin, M.G., & Resick, P.A. (2009). The role of couples' interacting world assumptions and relationship adjustment in women's postdisaster PTSD symptoms. *Journal of Traumatic Stress, 22*(4), 276–281. <https://doi.org/10.1002/jts.20432>
- Monson, C. M., Fredman, S. J., Macdonald, A., Pukay-Martin, N. D., Resick, P. A., & Schnurr, P. P. (2012). Effect of cognitive-behavioral couple therapy for PTSD. *JAMA: Journal of the American Medical Association, 308*, 700–709. <http://dx.doi.org/10.1001/jama.2012.9307>
- Musumari, P. M., Tangmunkongvorakul, A., Srithanaviboonchai, K., Techasrivichien, T., Suguimoto, S. P., Ono-Kihara, M., et al. (2018). Grit is associated with lower level of depression and anxiety among university students in Chiang Mai, Thailand: A cross-sectional study. *PloS ONE, 13*(12): e0209121. <https://doi.org/10.1371/journal.pone.0209121>
- Muthén, L. K., & Muthén, B. O. (1998–2017). *Mplus user's guide. Eighth edition*. Los Angeles, CA: Muthén & Muthén.
- National Oceanic and Atmospheric Administration. (2021). *Fast facts: Hurricane costs*. <https://coast.noaa.gov/states/fast-facts/hurricane-costs.html>

- Nelson, B. S., Wangsgaard, S., Yorganson, J., & Higgins Kessler, M. (2002). Single- and dual-trauma couples: Clinical observations of relational characteristics and dynamics. *American Journal of Orthopsychiatry*, 72(1), 58–69. <https://doi.org/10.1037/0002-9432.72.1.58>
- Norris, F. H., Perilla, J. L., Riad, J. K., Kaniasty, K., & Lavizzo, E. A. (1999). Stability and change in stress, resources, and psychological distress following natural disaster: Findings from hurricane Andrew. *Anxiety, Stress & Coping*, 12(4), 363-396. <https://doi.org/10.1080/10615809908249317>
- Novak, J. R., Sandberg, J. G., & Davis, S. Y. (2016). The role of attachment behaviors in the link between relationship satisfaction and depression for clinical couples: Implications for clinical practice. *Journal of Marital and Family Therapy*, 43(2), 352–363. <https://doi.org/10.1111/jmft.12201>
- Olsson, I., Sorebo, O., & Dahl, A. A. (2010). The Norwegian version of the Experiences in Close Relationships measure of adult attachment: Psychometric properties and normative data. *Nordic Journal of Psychiatry*, 64(5), 340–349. <http://dx.doi.org/10.3109/08039481003728586>
- Perkins-Gough, D. (2013). The significance of grit. *Educational Leadership*, 71, 14–20.
- Preacher, K. J., & Hayes, A. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods*, 40, 879–891. <https://doi.org/10.3758/BRM.40.3.879>

- Riggs, D. S. (2014). Traumatized relationships: Symptoms of posttraumatic stress disorder, fear of intimacy, and marital adjustment in dual trauma couples. *Psychological Trauma: Theory, Research, Practice, and Policy*, *6*(3), 201-206.  
<http://dx.doi.org/10.1037/a0036405>
- Ruhlmann, L. M., Gallus, K. L., & Durtschi, J. A. (2018). Exploring relationships satisfaction and attachment behaviors in single- and dual-trauma couples: A pilot study. *Traumatology*, *24*(1), 27–35. <https://doi.org/10.1037/trm0000129>
- Salles, A., Cohen, G. L., & Mueller, C. M. (2014). The relationship between grit and resident well-being. *American Journal of Surgery*, *207*(2), 251–254.  
<https://doi.org/10.1016/j.amjsurg.2013.09.006>
- Sandberg, J. G., Busby, D. M., Johnson, S. M., & Yoshida, K. (2012). The Brief Accessibility, Responsiveness, and Engagement (BARE) scale: A tool for measuring attachment behavior in couple relationships. *Family Process*, *51*(4), 512–526.  
<https://doi.org/10.1111/j.1545-5300.2012.01422.x>
- Sandberg, J. G., Novak, J. R., & Bates, T. (2016). Can couple level attachment mediate the influence of depressive symptoms on health? *The American Journal of Family Therapy*, *44*(2), 80–94. <https://doi.org/10.1080/01926187.2016.1145082>
- Sandberg, J. G., Bradford, A. B., & Brown, A. P. (2017). Differentiation between attachment styles and behaviors and their association with marital quality. *Family Process*, *56*(2), 518–531. <https://doi.org/10.1111/famp.12186>
- Satir, V., Banmen, J., Gerber, J., & Gomori, M. (1991). *The Satir model: Family therapy and beyond*. Palo Alto, CA: Science & Behavior Books.

- Schneider, S., Rasul, R., Liu, B., Corry, D., Liebermann-Cribbin, W., Watson, A., Kerath, S. M., Taioli, E., & Schwartz, R. M. (2018). Examining posttraumatic growth and mental health difficulties in the aftermath of Hurricane Sandy. *American Psychological Association, 11*(2), 127–136. <http://dx.doi.org/10.1037/tra0000400>
- Schultz, J. M., & Galea, S. (2017). Mitigating the mental and physical health consequences of Hurricane Harvey. *JAMA, 318*(15), 1437–1438. <http://dx.doi.org/10.1001/jama.2017.14618>
- Schwind, J. S., Norman, S. A., Brown, R., Frances, R. H., Koss, E., Karmacharya, D., & Santangelo, S. L. (2019). Association between earthquake exposures and mental health outcomes in Phulpingdanda village after the 2015 Nepal earthquakes. *Community Mental Health Journal, 55*(1), 1103–1113. <https://doi.org/10.1007/s10597-019-00404-w>
- Shepherd, D., McBride, D., & Lovelock, K. (2017). First responder well-being following the 2011 Canterbury earthquake. *Disaster Prevention and Management: An International Journal, 26*(3), 286–297. <https://doi.org/10.1108/dpm-06-2016-0112>
- Silverstein, M. W., Witte, T. K., Lee, D. J., Kramer, L. B., & Weathers, F. W. (2018). Dimensions of growth? Examining the distinctiveness of the five factors of the posttraumatic growth inventory. *Journal of Traumatic Stress, 31*(3), 448–453. <https://doi.org/10.1002/jts.22298>
- Smith, B. W. (1996). Coping as a predictor of outcomes following the 1993 Midwest flood. *Journal of Social Behavior, 11*(2), 225–239.

- Snyder, J. D., Boan, D., Aten, J. D., David, E. B., Van Grinsven, L., Liu, T., & Worthington Jr., E. L. (2020). Resource loss and stress outcomes in a setting of chronic conflict: The conservation of resources theory in the eastern Congo. *Journal of Traumatic Stress, 33*(3), 227–237. <https://doi.org/10.1002/jts.22448>
- Stix, G. (2011). The neuroscience of true grit. *Scientific American, 204*(3), 28–33. <https://www.jstor.org/stable/26002433>
- Tell, S. J., Pavkov, T., Heckner, L., & Lee Fontaine, K. (2006). Adult survivors of child abuse: An application of John Gottman’s Sound Marital House Theory. *Contemporary Family Therapy, 28*, 225–238. <http://dx.doi.org/10.1007/s10591-006-9004-0>
- Tyler-Viola, L. A. (2019). Grit: The essential trait of nurses during a disaster. *Journal of Perinatal & Neonatal Nursing, 33*(3), 201–204. <https://doi.org/10.1097/JPN.0000000000000416>
- U.S. Census Bureau. (2021, March 15). *QuickFacts: United States*. <https://www.census.gov/quickfacts/fact/table/US/PST045219>
- Vestal, C. (2017, October 16). Psychological trauma is invisible long-term toll of megastorms. *Miami Herald*, pp. 1A, 2A.
- Vinokur, A. D., Pierce, P. F., Lewandowski-Romps, L., Hobfoll, S. E., & Galea, S. (2011). Effects of war exposure on air force personnel’s mental health job burnout and other organizational related outcomes. *Journal of Occupational Health Psychology, 16*(1), 3–17. <https://doi.org/10.1037/a0021617>
- Waring, A. (2015). *The influence of attachment and grit on life satisfaction and romantic relationship satisfaction*. [Unpublished doctoral dissertation]. University of La Verne, La Verne, CA.

- Weiss D. S., & Marmar, C. R. (1997). The impact of event scale-revised. In: P. Wilson & T. Keane, (Eds.), *Assessing psychological trauma and post traumatic stress disorder: A handbook for practitioners* (pp. 399-411). New York: Guilford Press.
- Zhong, Z., & Yuan, K.-H. (2011). Bias and efficiency in structural equation modeling: Maximum likelihood versus robust methods. *Multivariate Behavioral Research*, 46, 229–265. <https://doi.org/10.1080/00273171.2011.558736>
- Zuccarini, D., Johnson, S. M., Dagleish, T. L., & Makinen, J. A. (2013). Forgiveness and reconciliation in emotionally focused therapy for couples: The client change process and therapist interventions. *Journal of Marital and Family Therapy*, 39(2), 148-162. <https://doi.org/10.1111/j.1752-0606.2012.00287.x>

**Appendix A: Tables and Figures***Table 1 . Descriptive statistics for the variables used in the study.*

	N	Mean	Mdn	SD	Min.	Max.	Skew.	Kurt.
1. Trauma History (males)	240	0.16	0.00	0.43	0.00	3.00	3.11	11.46
2. Trauma History (females)	240	0.20	0.00	0.60	0.00	5.00	3.76	22.08
3. Disaster Exposure (males)	240	1.31	1.08	0.53	1.00	3.40	2.26	4.82
4. Disaster Exposure (females)	239	1.35	1.08	0.63	1.00	3.87	2.22	4.82
5. Grit (males)	240	3.71	3.75	0.75	1.25	5.00	-0.27	-0.30
6. Grit (females)	239	3.77	3.88	0.71	1.50	5.00	-0.24	-0.55
7. Attachment Behaviors (males, self)	240	4.10	4.17	0.82	1.17	5.00	-0.76	0.05
8. Attachment Behaviors (females, self)	240	4.10	4.17	0.82	1.83	5.00	-0.65	-0.45
9. PTSS (males)	238	1.56	1.20	0.73	1.00	4.05	1.44	1.25
10. PTSS (females)	239	1.67	1.29	0.80	1.00	4.38	1.22	0.94

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

Table 2. Pearson correlations between study variables N = 240.

	1	2	3	4	5	6	7	8	9	10
Trauma History (males)	-									
Trauma History (females)	0.27***	-								
Disaster Exposure (males)	0.18**	0.18**	-							
Disaster Exposure (females)	0.18**	0.39***	0.81***	-						
Grit (males)	-0.03	-0.02	-0.08	-0.03	-					
Grit (females)	0.06	0.01	-0.03	-0.02	0.35***	-				
Attachment Behaviors (self, males)	-0.02	-0.11	-0.21***	-0.17**	0.41***	0.31***	-			
Attachment Behaviors (self, females)	0.03	-0.12	-0.08	-0.12	0.27***	0.44***	0.67***	-		
PTSS (males)	0.25***	0.00	0.54***	0.37***	-0.24***	-0.19**	-0.27***	-0.12	-	
PTSS (females)	0.09	0.38***	0.39***	0.52***	-0.10	-0.14*	-0.35***	-0.35***	0.34***	-

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

Table 3. Total, Indirect, and Direct Effects Predicting Male and Female Grit, Male and Female Attachment Behaviors, and Male and Female PTSS.

Variable	Direct	Indirect	Total	R <sup>2</sup>
Effects on Male BARE				.23
Male Disaster Exposure	-.15	-.06	-.21	
Female Disaster Exposure	.00	.07	.07	
Male Trauma History	.03	-.04	-.01	
Female Trauma History	-.05	-.08*	-.14*	
Effects on Female BARE				.24
Male Disaster Exposure	.07	-.04	.04	
Female Disaster Exposure	-.14	.05	-.08	
Male Trauma History	.08	-.04	.05	
Female Trauma History	-.10	-.10**	-.20**	
Effects on Male PTSS				.40
Male Disaster Exposure	.60***	.02	.62***	
Female Disaster Exposure	-.13	-.03	-.16*	
Male Trauma History	.23***	.02	.25***	
Female Trauma History	-.08	.04*	-.04	
Effects on Female PTSS				.33
Male Disaster Exposure	.04	.01	.05	
Female Disaster Exposure	.42***	-.01	.41***	
Male Trauma History	-.01	.01	.00	
Female Trauma History	.24***	.02	.25***	

Note.  $p < .05$  \*  $p < .01$  \*\*  $p < .001$  \*\*\*; BARE = attachment behaviors, PTSS = posttraumatic stress symptoms.

Figure 1. Conceptual model of the study variables.

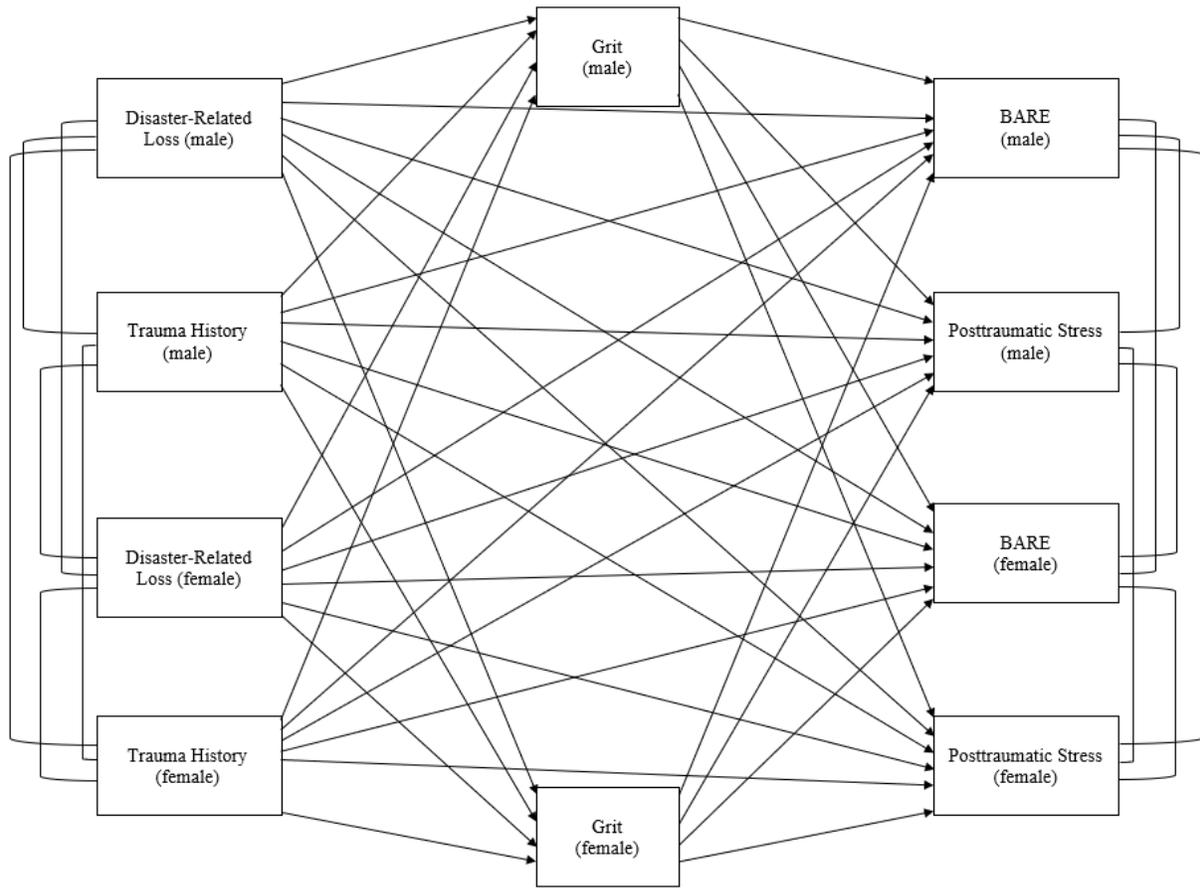
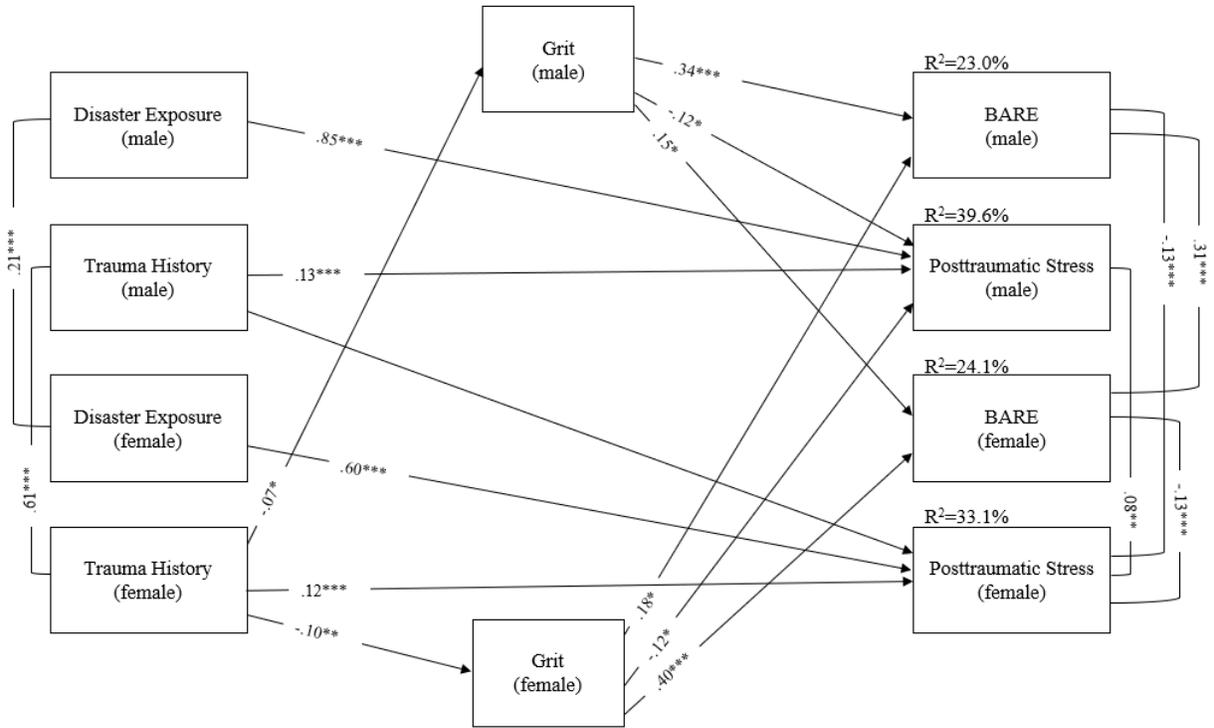


Figure 2. Actor-partner interdependence mediation model showing associations between partners  
N=240.



Notes. Unstandardized path estimates for significant paths and correlations are provided. For readability, some nonsignificant paths and residual variances are not shown. Variation in study variables attributable to socioeconomic status (measured by participants' education level), age and relationship length was controlled.

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ .