

Don't Touch Me! Are Post-Traumatic Stress Symptoms the Pathway Between
Interpersonal Trauma and Touch Behaviors, Touch Aversion, and Relationship Quality?

by

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ABSTRACT

Prior studies have demonstrated the positive impact of touch on both individual and relational well-being. In contrast, a history of trauma is associated with reductions in well-being. Post-traumatic stress disorder caused by prior interpersonal trauma (IPT) may cause individuals to avoid interpersonal touch, which may lead to many negative outcomes. Additionally, prior studies found that experiencing more post-traumatic stress symptoms (PTSS) is linked with worse romantic relationship quality. Accordingly, higher PTSS may be a pathway through which more IPT leads to fewer touch behaviors, more touch aversion, and worse relationship quality.

Participants were 543 English-speaking females (64.8% White; mean age 30.3 years) recruited through online survey systems Sona and Prolific. The following measures were used: Cumulative Stress and Trauma Scale (IPT); Brennan Touch Scale (touch aversion); the PTSD Checklist for DSM-5 (PTSS); CSE Scale for Trauma (CSET); Emotion Regulation Questionnaire (expressive suppression); and Perceived Relationship Quality Component Index (relationship quality). Mediation and moderated mediation models were analyzed using the PROCESS macro v.3.4 in SPSS v. 27.

The major hypotheses were that 1) more IPT would lead to fewer touch behaviors, greater touch aversion, and worse relationship quality through its links to greater PTSS; and 2) the pathways between PTSS and the outcome variables would be moderated by expressive suppression (strengthening the association) and trauma coping self-efficacy (weakening the association).

The results showed that the overall associations between IPT and touch behaviors and between IPT and relationship quality were not significant, but the indirect links via PTSS were significant. The association between IPT and touch aversion was significant, but the addition of PTSS as a mediator made that association nonsignificant. When

moderators were added, there were mixed outcomes. The moderation term for CSET on the PTSS to touch behaviors pathway was significant. Because touch is important for healthy relationships, therapies should focus on reducing touch aversion for people with a history of IPT and high PTSS. Furthermore, therapy focusing on improving CSET and reducing expressive suppression may help increase touch behaviors, reduce touch aversion, and improve relationship quality in individuals with IPT.

DEDICATION

I dedicate my thesis work first and foremost to Midnight, without whom I would have not gotten to where I am today. I would also like to extend a special feeling of gratitude to my loving parents, siblings (and sister-in-law), and my best friend, River. Lastly, I would like to give an honorable mention to coffee, without which I would not have survived.

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CHAPTER 1

INTRODUCTION

Upon entering the world, the first interpersonal gesture we experience is touch (Algoe & Jolink, 2020). In a classic study by Harry Harlow (1958), infant monkeys were separated from their biological mothers and put in a cage with two types of “mothers”: one mother was made from wire, and the other mother was made from cloth-covered wood. In one condition, the wire mother had the milk; in the other condition, the cloth mother had the milk. The study demonstrated the importance of touch when Harlow discovered that infant monkeys in both conditions much preferred the cloth mother, even if it wasn’t the source of food. As the infant monkeys in the wire condition grew, they showed no attachment to the wire mother. However, as the infant monkeys in the cloth condition grew, they did show attachment to their cloth mother. Furthermore, when presented with a fear-producing stimulus, the infant monkeys would return to the cloth monkey, even if it wasn’t the source of milk. These findings demonstrate that feeding alone is not sufficient for the development of affection or security; touching soft items was also necessary for bonding and security.

Many animal species, including our closest primate relatives, live in groups and are hard-wired to maintain proximity with other members of the same species. Social Baseline theory (Coan, 2010) proposes that this proximity works as a baseline affect regulation strategy (in both infants and adults). Social touch signals the presence of another, and by extension it regulates affective states. For example, in human infants, caregivers’ touch can regulate emotions, promote or inhibit exploratory behavior, and elicit positive affect (Algoe & Jolink, 2020). At least some of these effects persist into adulthood (Burluson et al., 2022; Murphy et al., 2018).

Furthermore, touch can be successfully used to share emotional aspects of communication between people and can have many effects on people's behavior (see review by Gallace & Spence, 2010). Expanding upon touch's powerful effects on behavior and subjective states, Morrison (2016) found that social touch may play a functional role in physiological regulation of the body's responses to acute stressors. Touch is also particularly important in romantic relationships, as it is a way of enacting intimacy (Debrot et al., 2013; Jolink et al., 2021).

When something happens to limit one's ability or desire to touch, the outcome can be detrimental to both well-being and relationship quality. Experiences with trauma, specifically interpersonal trauma (IPT), may cause individuals to avoid touch (Strauss et al., 2019), which can lead to negative outcomes for both individuals and their relationships. For example, one study found that when participants reported less intimate touch, they also reported more anxiety, more loneliness, and lower overall psychological well-being (Von Mohr et al., 2021). Trauma and touch are not well studied together, and pathways through which trauma is linked to touch aversion are not yet known. In the current study, we examined the associations among trauma, post-traumatic stress symptoms, relationship quality, touch behaviors, and touch attitudes, and we proposed and analyzed a potential pathway; we also examined three moderators for these potential pathways.

Traumatic Events and Interpersonal Trauma

The American Psychological Association (APA) defines trauma as “an emotional response to a terrible event like an accident, rape, or natural disaster” . Traumatic events are common occurrences that affect a large percentage of the population worldwide (Benjet et al., 2016). Benjet and colleagues (2016) looked at different studies investigating the prevalence of traumatic events in 24 different countries and found that

over 70% of respondents reported experiencing at least one traumatic event in their lifetime (with 30.5% reporting being exposed to four or more). In a sample of American adults, 89.7% reported experiencing one or more traumatic events in their lifetime (using DSM-5 criteria), but only 8.3% of that sample met diagnostic criteria for Post-Traumatic Stress Disorder (PTSD; Kilpatrick et al., 2013). Other studies estimate that a slightly smaller number of individuals (60% of men and 51% of women) experience trauma in their lives (e.g., Shiromani et al., 2009). Most individuals that experience trauma do not develop PTSD, due to protective factors that include (but are not limited to) healthy emotion regulation strategies (Chesney & Gordon, 2017; Eftekhari et al., 2009), coping self-efficacy (Benight & Bandura, 2004), and social support (Wagner et al., 2020).

Within traumatic events, there is a specific type of trauma (interpersonal trauma; IPT) that is more likely than other types of trauma to lead to psychological health issues (Zinzow et al., 2012) and physical health issues (Stein & Barrett-Connor, 2000). Here, we define interpersonal trauma as trauma caused deliberately by another person (including, but not limited to, child abuse, sexual assault, physical assault, or emotional abuse) that can occur at any stage of life.

Post-Traumatic Stress Disorder and Post-Traumatic Stress Symptoms

According to the DSM-5, PTSD occurs in approximately 8.7% of people who have experienced one or more traumatic events in the United States (5th ed.; DSM-5; American Psychiatric Association [APA], 2013). Due to the nature of the trauma, people with a history of IPT and combat trauma are more likely to develop PTSD than individuals with a history of other types of traumas (e.g., natural disasters; reviewed in Tolin & Foa, 2006).

Symptoms of PTSD are referred to as post-traumatic stress symptoms (PTSS) and include avoiding anything that reminds the individual of the traumatic event, a persistent negative emotional state, high irritability, and social withdrawal (5th ed.; DSM-5; APA, 2013). To be diagnosed with PTSD, individuals must have experienced exposure to a traumatic event and have nine (or more) symptoms from five categories— intrusion, negative mood, dissociation, avoidance, and arousal—that began (or worsened) after the traumatic event occurred (5th ed.; DSM-5; APA, 2013). Therefore, if an individual has a diagnosis of PTSD, one can assume that they report either a high number of PTSS, a high level of PTSS severity, or both. Because we do not have access to charts containing clinical diagnoses of our participants, we examined PTSS instead of clinically diagnosed PTSD. We were interested in investigating whether PTSS was the primary pathway through which IPT has particular types of negative effects.

Females Are More Likely to Develop PTSD than Males

Females are twice as likely to develop PTSD as males (Breslau, 2001; Swaab & Bao, 2020), but the origin of this difference is still controversial. According to the DSM-5 (5th ed.; DSM-5; APA2013), the difference is in part due to women's greater exposure to traumatic events of an interpersonal nature, including rape and other types of interpersonal violence. Consistently throughout articles reviewed by Tolin and Foa (2006), females were less likely to experience potentially traumatic events than males, although they were more likely to meet criteria for PTSD. Therefore, amount of exposure to traumatic events does not explain the gender difference in PTSD diagnoses.

As mentioned above, one potential explanation could be the types of traumas endured; across many studies, males reported experiencing more accidents, nonsexual assault, combat or war, disasters, serious illness or witnessing death or injury than females, whereas females reported experiencing more sexual assault or sexual, verbal, or

physical abuse than males (Tolin & Foa, 2006). Furthermore, the most common traumas associated with PTSD among females were sexual molestation and rape, whereas the most common traumas associated with PTSD among males were combat exposure and witnessing trauma to others (Breslau, 2001). Nevertheless, when males and females were compared within type of trauma, no sex differences were found. Therefore, the “trauma type” explanation is unsupported in the review by Tolin and Foa (2006).

Another potential explanation stems from the differences in physiology between males and females. For example, a study by Swaab and Bao (2020) found that when compared to females without PTSD, females with PTSD had lower levels of basal cortisol (which is important for stress responses); males without PTSD did not differ in basal cortisol from males with PTSD. Furthermore, estrogens are involved in the expression of pituitary adenylate cyclase-activating polypeptide (PACAP), which regulates both central and peripheral stress responses (Mustafa et al., 2013; Swaab & Bao, 2020). Because females have greater amounts of estrogen than males, and levels of PACAP correlated in females with fear, PTSD diagnosis, and PTSD symptoms, it follows that females may be more likely than males to develop PTSD. In addition, low concentrations of estradiol and allopregnanolone (a stress-reducing hormone) in the early follicular phase of menstruation are associated with increased expression of PTSD-related symptoms. On the other hand, high or increasing levels of estradiol and allopregnanolone (during the mid-follicular and early luteal phase) are associated with decreased symptom expression, and may therefore be protective factors for traumatized women (Ravi et al., 2019). In other words, symptoms expressed are, in part, due to the phase of menstruation.

Sex Differences in Touch

Not only are females more likely to develop PTSD, but in general, females report a greater desire for touch than males (Jakubiak et al., 2021). Females also respond more

to positive touch than males and perceive affectionate touch more pleasantly than males (reviewed in Russo et al., 2020). Due to the sex differences mentioned here and described above regarding differences between males and females in the risk of developing PTSD, this study focused solely on females.

Touch Aversion Linked to Interpersonal Trauma and PTSD

There is currently little research surrounding touch behaviors in people with a history of interpersonal trauma. However, the studies that do exist found that individuals without a history of interpersonal trauma have a higher tendency to enjoy affectionate touch, whereas individuals with a history of interpersonal trauma have a lower tendency to enjoy affectionate touch and show changes in response to touch or even show aversion to touch. For example, a report by Strauss and colleagues (2019) compared individuals with PTSD caused by IPT to healthy individuals in two studies. The first study looked (in part) at the differences in the groups' reported pleasantness of forearm touch when stroked by an experimenter using a soft brush. The second study examined differences in fMRI scans between groups when being stroked by an experimenter's hand.

Strauss and colleagues (2019) found that patients with a history of IPT and diagnoses of PTSD rated forearm touch delivered by an experimenter's hand to be less pleasant than did the healthy control group, but there was no group difference in pleasantness of forearm touch when the experimenter used a soft brush. Five of thirteen patients and one healthy control participant of thirteen reported negative memories when stroked by the hand of an experimenter who was shielded from view, but no such memories were reported when the experimenter was visible or used a soft brush.

In the second study, a different group of 20 patients with PTSD showed hippocampal suppression when stroked by the experimenter's hand. The authors

suggested that the suppression might reflect the patients' efforts to control or suppress traumatic memories that were induced by the experimenter's touch.

Another study found that individuals with PTSD had a decreased neural response to neutral touch. Badura-Brack and colleagues (2015) investigated neural activity following nonthreatening tactile stimulation in combat veterans with and without PTSD. The group with PTSD showed almost no neural response to neutral touch in primary touch-related brain areas, suggesting that they did not attend to or engage with the touch stimulation. In another study, Devine and colleagues (2020) found that individuals with a lack of nurturing touch or the presence of abuse during childhood showed atypical blunted sensitivity to pleasantness differences among touch stimuli that were specifically designed to test the functioning of a subset of affective touch neurons in the skin. If these neurons cannot adequately transmit pleasure from social touch, this could provide an additional explanation for touch aversion amongst individuals with a history of trauma. Finally, a survey study of 209 university students and staff found that those reporting greater childhood trauma also reported more negative attitudes regarding social touch (Trotter et al., 2018).

Together, these findings suggest that interpersonal and affect-related touch are experienced differently by individuals with a history of trauma and provide neural evidence of pathways that could contribute to these differences. Potential weaknesses are the mostly small samples (due to methodological constraints) and a main focus on those with clinical or institutional histories. The single survey study had a somewhat larger sample of students and university workers but utilized only one measure of touch attitudes and focused only on childhood trauma. In the current study, we tested a large sample of individuals who reported any episode of IPT in their lifetime and compared them to those with no report of interpersonal trauma. We expected that those with IPT

and higher levels of PTSS would feel more negatively about interpersonal touch and engage in fewer affectionate touch behaviors.

Affectionate Touch and Romantic Relationships

In close relationships, people generally like to give and receive affectionate touch (Jakubiak & Feeney, 2017). Numerous studies have demonstrated that giving and receiving affectionate touch is associated with many relationship benefits. For example, Carmichael and colleagues (2021) found that even among those with avoidant attachment styles (who touched their partners less), more partner touch was linked to enhanced closeness and reports of better relationship quality. Both imagining and receiving touch from a romantic partner can enhance state attachment security and trust for the partner (Jakubiak & Feeney, 2016). A study conducted by Naruse and Moss (2021) demonstrated that a massage intervention among couples promoted better relationship quality via both verbal and nonverbal communication. They found that pleasurable touch promoted love, care, and a deeper connection among partners.

Touch may be both an indicator of and a contributor to better relationships, as momentary reports of greater intimacy both predict (Jolink et al., 2021) and follow (Debrot et al., 2014) momentary reports of responsive touch. Debrot and colleagues (2014) also showed that partners who received more responsive touch during a week of data collection four times per day reported greater psychological well-being six months later. If one assumes that the frequency of touch recorded during the study reflected the couples' typical behavior, this indicates an ongoing synergistic cycle in which affectionate touch can enhance both individual and relationship well-being over a period of time, which in turn may maintain or increase touch frequency.

Affectionate Touch and Individual Well-Being

Numerous studies and reviews have demonstrated the impact of affectionate touch on individuals' psychological and physical well-being (as reviewed by Jakubiak & Feeney, 2017). Holt-Lunstad and colleagues (2008) demonstrated that affectionate touch between spouses produced declines in physiological stress markers. Using self-reports during video-taped sessions, Jakubiak and Feeney (2019) demonstrated that people who received a higher occurrence and intensity of touch during a stressor were better able to psychologically overcome the stressor and reported a greater decrease in stress and increase in self-esteem. However, for individuals with a history of trauma (specifically childhood maltreatment), avoidance tendencies toward touch prevented stress-buffering effects of physical contact (Maier et al., 2020).

Daily-diary studies demonstrate real-life scenarios supporting lab findings relating touch to psychological and physical well-being. A daily-diary and interview study by Murphy, Janicki-Deverts, and Cohen (2018) found that receiving a hug is associated with both a smaller conflict-related increase in negative affect and a smaller conflict-related decrease in positive affect, and this was irrespective of sex or relationship status. Similarly, a daily-diary study by Burleson, Trevathan, and Todd (2007) demonstrated that physical affection significantly predicted lower negative mood and stress and higher positive mood on the same and the following day.

In addition to buffering from and helping overcome stress, increasing positive affect, decreasing negative affect, and improving long-term psychological well-being, touch can buffer against threat of physical pain (Coan et al., 2006). Coan and colleagues (2006) demonstrated that women threatened with shock while holding their husband's hand showed a lower level of activation in the neural pathways responsible for emotional and behavioral threat responses than when holding an experimenter's hand or no hand.

The same study found that those with the highest marital quality showed the greatest benefit of holding their husbands' hand. This demonstrates that the benefits of touch for individuals may be related to contextual factors, such as the type and quality of their relationship with the touch partner.

Touch for Affect Regulation

Given the extent to which interpersonal touch, especially physical affection, has been associated with improved mood and greater well-being (e.g., Burleson et al., 2007; Debrot et al., 2014; Jakubiak & Feeney, 2016), it would be surprising if individuals did not use touch to alter their affective states. Touch for Affect Regulation (TAR) is conceptualized as the extent to which individuals typically use touch to self- or co-regulate their affect (Burleson et al., 2022). Higher levels of TAR are linked with better relationship quality (Burleson et al., 2022), but TAR has not yet been studied in populations with a history of IPT. Due to the importance of touch for relationship health, the potential for touch aversion after IPT, and the relationship difficulties experienced by individuals with a history of IPT, we examined TAR in the context of IPT. We were interested in investigating whether TAR would weaken the effects of PTSS on relationship quality.

Romantic Relationship Difficulties, Interpersonal Trauma, and PTSD

It is well established that a history of interpersonal trauma is correlated with lower relationship satisfaction even in the absence of PTSD diagnoses (e.g., Larsen et al., 2011; Nelson & Wampler, 2000; Walker et al., 2009). A history of IPT is related to fear in relationships, relationship anxiety, and relationship depression (Dorahy et al., 2013). Furthermore, there are numerous potential factors through which interpersonal trauma is linked to relationship difficulties (e.g., current mental health; Tardif-Williams et al., 2017; psychological distress, cognitive and behavioral problems, and self-dysregulation;

Zamir, 2021). On the other hand, numerous factors have been found to protect individuals with a history of interpersonal trauma from relationship difficulties (e.g., good coping strategies and emotion regulation; Zamir, 2021). We were particularly interested in investigating a pathway through which IPT may lead to worse relationship quality.

Numerous studies have found that greater PTSS leads to intimate relationship discord (Taft et al., 2011) and lower relationship satisfaction in military and civilian samples (e.g., Monson et al., 2010; Nelson & Wampler, 2000). Because PTSD is linked to relationship difficulties, it stands to reason that PTSD or greater PTSS might be a pathway through which IPT leads to relationship difficulties.

Emotion Regulation and Romantic Relationships

Explicit emotion regulation is defined as “those processes that require *conscious effort* for initiation and demand *some level of monitoring* during implementation and are associated with *some level of insight* and *awareness*” (Gyurak et al., 2011, p. 401). Some emotion regulation strategies employed by individuals are adaptive, while others are not (Dixon-Gordon et al., 2015); adaptive emotion regulation is necessary for successful social relationships (Gross & John, 2003); and type of emotion regulation can affect relationship quality (Farrell et al., 2018). For example, the inhibition of emotional expression (expressive suppression) leads to lower relationship satisfaction (Cameron & Overall, 2018), whereas thinking differently about the emotional event (cognitive reappraisal) leads to higher relationship satisfaction (Mazzuca et al., 2019).

Emotion regulation is a way to cope with and control one’s overall state. Effective coping strategies, including successful emotion regulation, help improve feelings of psychological and relationship security and enhance relationships (both friendly and romantic; Sbarra & Hazan, 2008). Therefore, we expected emotion regulation,

specifically expressive suppression, to moderate the association between PTSS and relationship quality.

Emotion Regulation Difficulties, IPT, and PTSD

For individuals with a history of interpersonal trauma, emotion regulation difficulties are common. Extremely traumatic experiences often foster maladaptive regulation strategies. For example, Ehring and Quack (2010) found that PTSD symptom severity (caused by interpersonal trauma) was associated with multiple emotion regulation difficulties measured using a web-based survey that included the Difficulties in Emotion Regulation questionnaire (DERS; Gratz & Roemer, 2004) and the Emotion Regulation Questionnaire (ERQ; Gross & John, 2003). Additionally, sexual assault and other IPT leads to greater emotion dysregulation (Raudales et al., 2019). Because survivors of high betrayal trauma do not engage in social support in ways to foster emotion regulation skills (Kline & Palm Reed, 2020), it follows that they would have a harder time regulating their emotions. Furthermore, in addition to IPT and PTSD leading to emotion regulation difficulties, emotion dysregulation can predict development of chronic PTSD (Pencea et al., 2020).

When people use expressive suppression to cope with or control negative emotions, the subjective intensity of the emotions is increased (Gross & John, 2003). Furthermore, habitual use of expressive suppression is associated with lower individual well-being and worse interpersonal relations (Gross & John, 2003) than use of cognitive reappraisal. Expressive suppression is linked with both depression and anxiety disorders (Dryman & Heimberg, 2018); thus, it appears that expressive suppression has undesirable “side-effects.” Therefore, we expected use of expressive suppression to interact with PTSS and enhance their potential negative influences.

Coping Self-Efficacy

Coping self-efficacy (CSE) is one's belief about their ability to cope successfully (Chesney et al., 2006). In general, self-efficacy beliefs are vital for human functioning, and they influence a multitude of outcomes. For example, as noted by Benight and Bandura (2004), self-efficacy beliefs determine how individuals think about themselves (self-enhancing vs. self-deprecating), how they persevere when presented with difficulties, their vulnerability to stress and depression, their resiliency, and more. Self-efficacy beliefs could be a moderating factor in the association between PTSS and touch behaviors and attitudes and between PTSS and relationship quality.

Long-term post-traumatic outcomes can be predicted by general coping self-efficacy (Benight et al., 2015). Coping self-efficacy for trauma (CSET), however, is especially predictive in understanding the recovery process that occurs after traumatic events including childhood sexual abuse, domestic violence, and terrorist attacks (Benight & Bandura, 2004). Benight and colleagues (2015) found that coping self-efficacy for trauma was associated with psychological well-being after trauma, which is consistent with the idea that believing one can manage their post-traumatic recovery helps provide them confidence to do so. Additionally, Mahoney and colleagues (2021) found that CSET mediates the association between sexual violence and PTSD symptom severity, thus showing that CSET can be protective against PTSD symptoms.

Touch interventions, such as positive massage among couples, have been shown to improve self-efficacy through self-care skills (Naruse & Moss, 2021). In other words, the ability to utilize self-care in the form of positive massage between partners can improve self-efficacy and one's ability to persevere when presented with difficulties and can improve one's resilience. We were interested to investigate whether the opposite also

held true (i.e., whether differing levels of coping self-efficacy were associated with different effects of PTSS on touch behaviors, touch attitudes, and relationship quality).

Because lower depression, higher resiliency, and better perseverance in the face of difficulties (all correlates of high CSE) are associated with better relationship quality, it stands to reason that in individuals with high CSET, PTSS will be less damaging to relationship quality. Better relationship quality is linked with more affectionate touch behaviors and with less avoidance of touch (e.g., Jakubiak & Feeney, 2017), so it's logical to also assume that in individuals with high CSE, any tendency for PTSS to reduce touch behaviors and promote touch aversion would be weakened. Furthermore, evidence suggests that aversion to touch in PTSD arises because it can activate trauma-related memories, leading to distress. Therefore, if individuals are confident in their ability to cope effectively, the association of IPT and PTSS with aversion to touch and avoidance of touch behaviors may be weakened.

Current Study

The associations among affectionate touch, individual well-being, and relationship quality are well-studied, and there is a large literature examining the sequelae of interpersonal trauma for individual well-being and relationship quality. Given the interpersonal nature of intimate touch behaviors and that interpersonal trauma itself often involves touch, it is somewhat surprising that few studies have investigated the links between interpersonal trauma history and intimate touch behaviors and attitudes. A gap also remains in the traumatic stress literature surrounding the influences of IPT versus PTSS. We investigated whether PTSS accounted for all of the associations among IPT and the outcome variables.

Our aim was to explore interpersonal trauma and post-traumatic stress symptoms and their associations with touch behaviors, touch aversion, and relationship

quality. Based on the literature reviewed above, we tested three simple mediation models predicting three different outcomes (see Figure 1): affectionate touch behaviors (Model 1S), touch aversion (Model 2S), and romantic relationship quality (Model 3S). We then tested seven moderated mediation models predicting the same three outcomes (see Figure 2). Coping self-efficacy for trauma and expressive suppression were predicted moderators in models for all three outcomes (Models 1M to 7M), and touch for affect regulation was an additional predicted moderator in a model for relationship quality (Model 7M; because of the conceptual overlap among TAR, touch behaviors, and touch aversion, we excluded TAR from those two models). These models were identical to each other in form, in the exogenous predictor (IPT), and in the mediator (PTSS). Each model included one moderator of the path from the mediator to the final outcome. The following hypotheses were proposed:

1) More interpersonal trauma will be associated with:

H_{1TB} - fewer touch behaviors;

H_{1TA} - greater touch aversion; and

H_{1RQ} - worse relationship quality.

2) **H₂** - Greater IPT will be related to more PTSS in all ten models.

3) More PTSS will be associated with:

H_{3TB} - fewer touch behaviors;

H_{3TA} - greater touch aversion; and

H_{3RQ} - worse relationship quality.

4) PTSS will mediate the associations between IPT and each outcome:

indH_{4TB} - touch behaviors (where “ind” denotes an indirect path);

indH_{4TA} - touch aversion; and

indH_{4RQ} - relationship quality.

5) Greater coping self-efficacy for trauma will weaken the predicted links

between greater PTSS and outcomes; for the same level of PTSS:

H5_{c_{TB}} - touch behaviors will be more frequent;

H5_{c_{TA}} - touch aversion will be lower; and

H5_{c_{RQ}} - relationship quality will be better.

6) Greater use of expressive suppression will strengthen the predicted links

between greater PTSS and outcomes; for the same level of PTSS:

H6_{c_{TB}} - touch behaviors (where “c” denotes a conditional [moderated] path) will be even fewer;

H6_{c_{TA}} - touch aversion will be even higher; and

H6_{c_{RQ}} - relationship quality will be even worse.

7) **H7_c** - Greater use of touch for affect regulation (TAR) will weaken the negative association between greater PTSS and relationship quality; for the same level of PTSS, relationship quality will be better.

8) The indirect effects of IPT on outcomes will be moderated corresponding to the effects proposed by H5, H6, and H7 above:

indH4H5_{c_{TB}}, **indH4H6_{c_{TB}}**;

indH4H5_{c_{TA}}, **indH4H6_{c_{TA}}**;

indH4H5_{c_{RQ}}, **indH4H6_{c_{RQ}}**, **indH4H7_{c_{RQ}}**.

CHAPTER 2

METHODS

Participants

Between February 1 and March 11, 2022, a sample of 594 English-speaking adult females were recruited in the United States (US) through Prolific, an online data collection platform with a large nationwide participant pool, and the Arizona State University (ASU) Sona research system, an online data collection platform for ASU undergraduate students. Forty-eight participants who completed under 55% of the survey and three participants who missed more than one attention check were excluded, leaving a final sample of 543, aged 18 to 83 years. All participants had a history of trauma, and 82.1% ($N=446$) had a history of interpersonal trauma. Of the 543 participants, 63.9% were in a relationship; 64.3% of all participants identified as heterosexual, 3.9% as lesbian, 26.7% as bisexual, and 5.2% as other. The average participant was mid-aged ($M=30.3$ yrs, $SD=12.1$) and White (64.8% White, 5.5% Black or African American, 16.6% Latinx or Hispanic, 4.6% Asian or Asian American, 0.6% American Indian or Alaskan Native, 0.2% Native Hawaiian or Pacific Islander, 0.9% Middle Eastern or Arab origin, and 6.8% Other); had at least some college (88.7%), was employed (74.2%), and reported annual household income above \$50,000 (52.8%).

Procedure

After giving informed consent, participants completed an IRB-approved 30-minute online survey comprising the measures below. At the end, they were provided with phone numbers for crisis texting and calling services and were compensated \$4.75 (for Prolific participants) or given one research credit (for Sona participants).

Measures

Demographics

Demographic measures included age, race/ethnicity, education, religion, sexual orientation, relationship status, employment, income, and education.

Interpersonal Trauma

We assessed lifetime trauma using the Cumulative Stress and Trauma Scale (CTS-S; Kira et al., 2008). The CTS-S is a self-reported 36-item questionnaire measuring both the amount and the different types of trauma individuals experienced on a 5-point Likert-type scale ranging from 0 (*never*) to 4 (*many times*). Ambiguously-worded items were slightly modified (e.g., “I was led to sexual contact by someone older than me” was modified to “I was led to unwanted sexual contact by someone older than me”). A 9-item subscale taken from the original measure measuring interpersonal trauma was further analyzed. Higher scores indicate a higher amount of interpersonal trauma (Cronbach’s α : .763).

Trauma Coping Self-Efficacy

We used the Coping Self-Efficacy scale for Trauma (CSET; Benight et al., 2015), a self-report measure that assesses trauma-related coping self-efficacy using nine items (e.g., manage distressing dreams or images about the traumatic experience) and an 8-point Likert-type scale ranging from 0 (*not capable*) to 7 (*totally capable*). Higher scores indicate greater ability to utilize coping self-efficacy after trauma (Cronbach’s α : .860).

Post-Traumatic Stress Symptoms

The PTSD Checklist for DSM-5 (PCL-5; Blevins et al., 2015) is a self-report measure that assesses post-traumatic stress symptoms (PTSS) over the past month using 20 items (e.g., “...being ‘superalert,’ watchful, or on guard”) are rated on a 5-point Likert-type scale, ranging from 0 (*not at all*) to 4 (*extremely*). A higher total score indicates a greater severity of *post-traumatic stress symptoms* (Cronbach’s α : .943).

Relationship Quality

We used the Perceived Relationship Quality Component Inventory (PRQCI; Fletcher et al., 2000), a self-report measure that assesses relationship quality over the past two weeks using six items (e.g., How satisfied are you in your relationship?) on a 5-point Likert-type scale, ranging from 1 (*not at all*) to 5 (*extremely*). Higher mean scores indicate higher ratings of relationship quality (Cronbach's α : .913).

Expressive Suppression

We used the Emotion Regulation Questionnaire (ERQ; Gross & John, 2003). This is a self-report measure that assesses how individuals control their emotions using 10 items on a 7-point Likert-type scale, ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). We used the 4-item Expressive Suppression subscale (e.g., When I am feeling negative emotions, I make sure not to express them). Higher total score on the suppression subscale indicates a higher use of expressive suppression (ExpSupp) to regulate emotions (Cronbach's α : .804).

Affectionate Touch Behaviors

The Physical Affection Scale (PAS; Burleson et al., 2022; adapted from Diamond, 2000) is an eight-item self-report measure that assesses affectionate touch behaviors with one's current or prior partner if not currently in a relationship (e.g., cuddling with each other on a couch or bed) on a 5-point Likert-type scale, ranging from 0 (*never*) to 4 (*almost daily*). Higher mean scores indicate more *affectionate touch behaviors* (Cronbach's α : .903).

Touch Aversion

The Brennan Touch Scale (BTS; Brennan et al., 1998) is a self-report measure that assesses seven subscales of affectionate touch with one's current or prior partner (if not in a relationship) on a 7-point Likert-type scale, ranging from 1 (*not like me*) to 7 (*very much like me*). For this study, we used the three-item Touch Aversion subscale. A

sample item is, “My partner continually complains that I don’t touch them enough.”

Higher mean scores indicate greater touch aversion (Cronbach’s α : .852).

Touch for Affect Regulation

Touch for affect regulation was measured using the Touch for Affect Regulation Questionnaire (TARQ; Burleson et al., 2022), a self-report of 21 original items developed in our laboratory to assess how individuals used touch to regulate their own and others’ affect, as well as how effective it was. Participants rated each statement using a 6-point scale from 1 (*strongly disagree*) to 6 (*strongly agree*). Three items were reverse scored. Sample items include “I ask for a hug when I want to feel less anxious” and “When I’m already aggravated, being touched irritates me even more” (Cronbach’s α : .930).

Model Specification and Data Analyses

To test our conceptual models (Figures 1 and 2), we specified three mediation models using interpersonal trauma as the exogenous predictor, post-traumatic stress symptoms as the mediator, and touch behaviors, touch attitudes, and relationship quality as the outcome variables and six models using CSET or expressive suppression as moderators of the path from PTSS to the outcome in a model for each of the three outcome variables. We estimated a seventh model with touch for affect regulation as a moderator of the path from PTSS to relationship quality. Age was a covariate in all models. We used the PROCESS macro v.3.4 (Hayes, 2018) with SPSS version 27 to test the models. Variables were mean-centered for interactions and significant interactions were probed at $\pm 1 SD$.

CHAPTER 3

RESULTS

Bivariate Correlations

Table 1 shows the bivariate correlations among study variables across the whole sample. Most of the variables were correlated significantly with each other in the expected directions. For example, touch aversion was negatively correlated with touch behavior frequency and TAR. Unexpectedly, however, greater IPT was uncorrelated with relationship quality in the current sample.

Table 2 shows the bivariate correlations for all variables by presence or absence of interpersonal trauma. As determined by Fisher's z tests, there were five differences between the groups in the correlations. Among those reporting IPT, older age was significantly associated with worse relationship quality and lower TAR, whereas correlations between these variables in the non-IPT group were nonsignificant. Although greater PTSS was significantly related to lower CSET in both groups, the association was significantly stronger among those who reported IPT. Better relationship quality was associated with significantly less touch aversion among IPT reporters, but unrelated among those without IPT. Finally, greater frequency of affectionate touch behaviors was linked to greater use of TAR among those with IPT, but unrelated in the group without IPT.

Mean Differences between IPT and non-IPT Participants

Table 3 shows means, standard deviations, F values, significance levels, and effect sizes for the differences between individuals with a history of IPT and individuals without. Individuals with a history of IPT reported more PTSS, higher touch aversion, and lower CSET than individuals without a history of IPT.

Hypothesis Tests

We first tested indirect effects of IPT via PTSS on the three final outcomes using simple mediation. Table 4 shows unstandardized coefficients, standard errors (SE), significance levels, and upper and lower 95% confidence intervals (CI) for direct and indirect paths in simple (unmoderated) mediation models for the three final outcomes. Tables 5, 6, 7, and 8 show unstandardized coefficients, standard errors (SE), significance levels, and 95% confidence intervals (CI) for direct and indirect paths in moderated mediation models for the three final outcome variables. The CIs for the indirect paths in all models were calculated using the bootstrapped SEs (10,000 bootstrap samples). Text results report standardized coefficients (β).

Age was included as a covariate in all models. Older age was significantly associated with fewer PTSS, fewer affectionate touch behaviors, greater touch aversion, and lower relationship quality (see Tables 4 through 8).

Touch Behaviors as Final Outcome

Simple Mediation. See Table 4 and Figure 3. We predicted that more IPT would be related to fewer touch behaviors (H_{1TB}). Inconsistent with our hypothesis, the total effect was nonsignificant between IPT and touch behaviors ($\beta = -.008, p = .863$). As predicted, however, more IPT was associated with greater PTSS ($H_2; \beta = .405, p < .001$). Also as predicted, greater PTSS was related to fewer touch behaviors ($H_{3TB}; \beta = -.106, p = .028$). Accordingly, the indirect path from IPT to affectionate touch behaviors via PTSS was significant ($indH_{4TB}; \beta = -.043, p < .05$), such that greater IPT was associated with less frequent affectionate touch behaviors via greater PTSS. The direct path from IPT to touch behaviors (Model 1S) was nonsignificant. ($\beta = .035, p = .479$).

Conditional Effects. We proposed a separate model for each of two moderators of the path between PTSS and touch behaviors: coping self-efficacy for

trauma and expressive suppression (see Table 5). In H5_{C_{TB}}, we hypothesized that the predicted negative association between PTSS and touch behaviors (H3_{TB}) would be weaker among those with greater CSET (Model 1M), whereas in H6_{C_{TB}}, we hypothesized that the predicted negative association between PTSS and touch behaviors would be stronger among participants with relatively higher ExpSupp (Model 2M). We also hypothesized (in indH4H5_{C_{TB}} and indH4H6_{C_{TB}}, respectively) that these moderation effects would result in correspondingly moderated indirect paths.

Path Moderation by CSET. The moderation term for CSET was significant ($\beta = .087, p = .033$; see Table 5), although the findings were not exactly as predicted. Visual inspection revealed that the slopes of the simple slopes were of opposite signs (see Figure 6). As predicted, at relatively lower levels of CSET (-1 SD), more PTSS was associated with fewer touch behaviors. Unexpectedly, at relatively higher levels of CSET (+1 SD), more PTSS was associated with *more* touch behaviors. None of the simple slopes of PTSS on touch behaviors at differing levels of CSET were significant, however. Furthermore, despite the significant moderation described above, the index of moderated mediation was nonsignificant (see Table 5), indicating that the indirect path was not moderated.

Path Moderation by ExpSupp. Moderation of the direct path between PTSS and touch behaviors by ExpSupp was not significant (see Table 5). Accordingly, the index of moderated mediation was also nonsignificant, indicating that the indirect path was not moderated. The direct association between ExpSupp and touch behaviors, however, was significant ($\beta = -0.096, p = .038$; see Table 5); participants with higher levels of ExpSupp reported less frequent touch behaviors.

Touch Aversion as Final Outcome

Simple Mediation. We hypothesized that more IPT would be related to greater aversion to touch (H1_{TA}; see Table 4). Supporting this hypothesis, the total effect between

IPT and touch aversion was significant and positive ($\beta = .111, p = .013$). Consistent with other hypotheses, more IPT was associated with higher levels of PTSS (H2; $\beta = .410, p < .001$); and greater PTSS was associated with stronger aversion to touch (H3_{TA}; $\beta = .177, p < .001$). Therefore, IPT was indirectly associated with higher touch aversion via PTSS (indH4_{TA}, $\beta = .073, p < .05$). Furthermore, when we added PTSS as a mediator of the path between IPT and touch aversion, the direct path became nonsignificant ($\beta = .038, p = .422$).

Conditional Effects. We proposed a separate model for each of the two moderators of the path between PTSS and touch aversion: coping self-efficacy for trauma and expressive suppression (see Table 6). In H6_{C_{TA}}, we hypothesized that the predicted positive association between PTSS and touch aversion (H3_{TA}) would be weaker among those with greater CSET (Model 3), whereas in H6_{C_{TA}}, we hypothesized that the predicted positive association between PTSS and touch behaviors would be stronger among those with greater ExpSupp (Model 4). We also hypothesized (in indH4H5_{C_{TB}} and indH4H6_{C_{TB}}, respectively) that these significant moderations of the direct path from PTSS to touch behaviors would result in correspondingly moderated indirect paths.

Path Moderation by CSET. The moderation term for CSET was not significant ($\beta = .005, p = .905$; see Table 6). Accordingly, the index of moderated mediation also was nonsignificant (see Table 6), confirming that the indirect path was not moderated. The direct association between CSET and touch aversion was also nonsignificant ($\beta = -.016, p = .763$; see Table 6).

Path Moderation by ExpSupp. The moderation term was nonsignificant ($\beta = .003, p = .945$; see Table 6), as was the index of moderated mediation. The direct association between ExpSupp and touch aversion, however, was significant ($\beta = .153, p <$

.001; see Table 6); participants with higher levels of ExpSupp reported stronger aversion to touch.

Romantic Relationship Quality as Final Outcome

Simple Mediation. We hypothesized that more IPT would be directly related to worse relationship quality (H_{1RQ}; see Table 4). This hypothesis was not supported, as the total effect between IPT and relationship quality was not significant, ($\beta = -.027, p = .579$). As predicted, more IPT was associated with greater PTSS (H₂; $\beta = .419, p < .001$) and greater PTSS was associated with poorer relationship quality (H_{3RQ}; $\beta = -.144, p = .006$). More IPT was related indirectly to worse relationship quality through PTSS (indH_{4RQ}; $\beta = -.060, p < .05$; see Table 4). The direct path remained nonsignificant ($\beta = .033, p = .540$) when the mediator was added.

Conditional Effects. We proposed a separate model for each of three moderators of the path between PTSS and relationship quality: coping self-efficacy for trauma, expressive suppression, and touch for affect regulation (see Tables 7 and 8). In H_{6CRQ}, we hypothesized that the predicted negative association between PTSS and relationship quality (H_{3RQ}) would be weaker among those with greater CSET (Model 5). In H_{6CRQ}, we hypothesized that the predicted negative association between PTSS and relationship quality would be stronger among those with greater ExpSupp (Model 6), and in H_{7CRQ}, we hypothesized that the predicted negative association between PTSS and relationship quality would be weaker among those with greater TAR (Model 7). We also hypothesized (in indH_{4H5CTB}, indH_{4H6CTB}, and indH_{4H7CTB}, respectively) that these significant moderations of the direct path from PTSS to touch behaviors would result in correspondingly moderated indirect paths.

Path Moderation by CSET. The moderation term for CSET was not significant ($\beta = .024, p = .580$; see Table 7). Accordingly, the index of moderated

mediation also was nonsignificant (see Table 7), confirming that the indirect path was not moderated. The direct association between CSET and relationship quality was nonsignificant ($\beta = .104, p = .084$; see Table 7).

Path Moderation by ExpSupp. Results for moderation by ExpSupp were similar to those for CSET: The moderation term was nonsignificant ($\beta = .009, p = .848$; see Table 7), as was the index of moderated mediation. The association between ExpSupp and relationship quality was significant ($\beta = -.158, p = .001$; see Table 7); participants with higher levels of ExpSupp reported worse relationship quality.

Path Moderation by TAR. The moderation term was nonsignificant ($\beta = .045, p = .303$; see Table 8), as was the index of moderated mediation. Finally, the association between TAR and relationship quality was significant, ($\beta = .263, p < .001$; see Table 8); participants who reported higher TAR also reported better relationship quality.

CHAPTER 4

DISCUSSION

The importance of affectionate touch for both individual and relationship well-being is well established in the literature (see review by Jakubiak & Feeney, 2017), and more recent studies continue to support the benefits of affectionate touch (Carmichael et al., 2021). In contrast, interpersonal trauma may lead to many negative outcomes, including post-traumatic stress disorder (5th ed.; DSM-5; APA, 2013) and poor relationship quality (Larsen et al., 2011; Nelson & Wampler, 2000; Walker et al., 2009). Given prior findings regarding the links between PTSS and multiple negative outcomes, we surmised that PTSS developed after IPT were more likely to cause negative outcomes than the IPT itself. This led us to hypothesize that any association between IPT and the measured outcomes (e.g., relationship quality) would be mediated by PTSS. It is also the case that individuals with PTSD or high levels of PTSS are likely to avoid anything that reminds them of the traumatic event (5th ed.; DSM-5; APA, 2013). Because interpersonal traumatic events often involve interpersonal touch (e.g., physical or sexual abuse), we hypothesized that IPT would be associated with fewer interpersonal touch behaviors and more negative interpersonal touch attitudes.

Based on the different associations described above, we developed conceptual models linking greater IPT to fewer affectionate touch behaviors, stronger aversion to interpersonal touch, and poorer romantic relationship quality. We also proposed that these associations occur indirectly through higher levels of PTSS (see Figures 1 and 2). We tested both simple mediation models and models in which coping self-efficacy for trauma, expressive suppression for emotion regulation, and touch to regulate affective states moderated the path between PTSS and the outcome variables.

IPT Linked Directly to PTSS and Touch Aversion

Consistent with our hypotheses (H2), more interpersonal trauma (IPT) was linked to more post-traumatic stress symptoms (PTSS) across all 10 models. Also in line with hypotheses, more IPT was linked to greater touch aversion prior to the addition of PTSS.

Prior research suggests that touch may not be experienced the same way in those with a history of interpersonal trauma as in those without (Strauss et al., 2019). In Strauss and colleagues' (2019) study, fMRI results indicated that individuals with a history of IPT showed hippocampal suppression during interpersonal touch. Being touched may remind individuals of the trauma they experienced (in fact, several participants reported this during the study), and hippocampal suppression may reflect attempts to suppress traumatic memories. Given that interpersonal touch can have a more negative effect on those with a history of IPT, it may not have the same benefits as it would for those without; in fact, it may even be detrimental to their mental well-being. Therefore, it stands to reason that individuals with a history of IPT would demonstrate greater touch aversion.

Association between IPT and Touch Aversion was Mediated by PTSS

Individuals with PTSD or high levels of PTSS are likely to avoid anything that reminds them of the traumatic event (5th ed.; DSM-5; APA, 2013), and interpersonal traumatic events often involve negative experiences of interpersonal touch. We therefore hypothesized that the association between IPT and touch aversion, as well as any link between IPT and affectionate touch behaviors or relationship quality, would be mediated by PTSS (indH4_{TB,TA,RQ}).

Due to their level of avoidance, we predicted that greater PTSS would be related to greater aversion to touch. Because interpersonal trauma leads to PTSS, and PTSS is

related to avoidance symptoms, we predicted that PTSS would mediate the association between IPT and touch aversion, and our findings supported this hypothesis. When we added PTSS to the model, the direct path became nonsignificant. Because the direct path became nonsignificant and the path was mediated, we can conclude that PTSS is a pathway through which IPT leads to greater touch aversion.

IPT Was Not Directly Linked to Touch Behaviors or Relationship Quality

Interestingly, and inconsistent with prior literature and our hypotheses, IPT was not directly linked to touch behaviors. According to Benight and Bandura (2004), self-efficacy beliefs determine how people think, persevere when presented with difficulties, their vulnerability to stress and suppression, and their resiliency. A higher amount of coping self-efficacy could potentially reduce the negative effects of IPT, which could prevent a reduction in touch behaviors. Given that touch aversion was higher in individuals with more IPT, the lack of association between IPT and touch behaviors shows that there is potentially a lack of communication between partners or partners are not respecting other's wishes to avoid touch.

Also inconsistent with prior literature and our hypothesis, IPT was not directly linked to relationship quality. This could be the case due to outside variables that were not included in the model. For example, different emotion regulation strategies (Farrell et al., 2018) and coping mechanisms (Sbarra & Hazan, 2008) can improve feelings of psychological and relationship security and enhance relationships. Healthy emotion regulation strategies (including touch for affect regulation) and coping mechanisms could, therefore, be protective factors from negative outcomes of IPT. Additional variables we did not account for in our analyses included time since trauma and whether individuals sought therapy after their trauma. It is possible that we would find significant relationships if we were to control for these variables. Additionally, it is possible that the

measure used for relationship quality did not get the full picture of the couples' relationship quality.

IPT Was Indirectly Linked to Touch Behaviors and Relationship Quality through PTSS

Though there is not much literature linking PTSS and touch behaviors, a study by Badura-Brack and colleagues (2015) found that those with greater PTSS have almost no neural response to neutral touch. Because of that finding, we predicted that PTSS would link greater IPT to fewer touch behaviors. Prior literature supported the idea that greater PTSS is related to worse relationship quality (e.g., Taft et al., 2011). We, therefore, predicted that PTSS would also link greater IPT to worse relationship quality. Consistent with our hypotheses, post-traumatic stress provided an indirect path between IPT and touch behaviors and between IPT and relationship quality. The greater the PTSS, the fewer the touch behaviors and the worse relationship quality. Though we found no direct path from IPT to touch behaviors or IPT to relationship quality, the significant associations through PTSS demonstrates the importance of reducing PTSS to develop healthier and happier relationships.

Mixed Effects of Moderating Variables

As predicted ($H_{5C_{TB}}$), individuals who reported higher CSET also displayed a weaker negative association between PTSS and touch behaviors than those who reported lower CSET. It is possible that people who believe they are better at coping may use touch more as a mechanism to feel better. Contrary to our predictions, however, coping self-efficacy did not moderate the association between PTSS and touch aversion or PTSS and relationship quality. It is possible that coping self-efficacy for trauma would have moderated the link between IPT and PTSS, but we did not test that in our models. If that were the case, individuals with higher CSET may have experienced fewer or less severe

PTSS, precluding CSET from moderating the path from PTSS to the outcome variables. Likewise, expressive suppression did not moderate the association between PTSS and touch behaviors, PTSS and touch aversion, or PTSS and relationship quality. Perhaps using a different form of emotion regulation, such as cognitive reappraisal or rumination, would have revealed moderating effects. However, at least one alternate form, touch for affect regulation, also did not moderate the association between PTSS and relationship quality.

Association Among Touch Behaviors, Touch Aversion, Relationship Quality, Coping Self-Efficacy, Touch for Affect Regulation, and Expressive Suppression

Consistent with prior literature, we found that touch behaviors were positively correlated with relationship quality. Furthermore, better relationship quality was associated with lower touch aversion, greater coping self-efficacy, and lower expressive suppression. The current study was the first in which touch for affect regulation was studied in individuals with a history of interpersonal trauma. Consistent with prior literature in a community sample (Burleson et al., 2022), we found that a greater endorsement of touch for affect regulation was related to better relationship quality. Touch for affect regulation may be another method available to those with interpersonal trauma to reduce the damaging effects.

Limitations

One potential limitation of the current study was the self-report aspect. Participants may have answered the questions in line with social desirability bias, may not have wanted to reveal private details, or may have avoided extremes or vice versa (i.e., selecting only the middle options on the scale or selecting only the extremes). Additionally, as a cross-sectional study, we are unable to confirm causality. Though

trauma occurs prior to PTSS, individuals who have PTSS are more likely to be traumatized again when compared to those without (Buffarini et al., 2022; Ports et al., 2016). Furthermore, because we only looked at females, our data lack generalizability in the overall population. Most people were employed, white, and had incomes of over \$50,000. Perhaps unemployed individuals or individuals with different ethnicities and a lower income would have had different results.

Our sample included individuals who reported some level of interpersonal trauma, but we did not exclude those who also reported non-interpersonal trauma. Therefore, some of the PTSS could have been accounted for by non-interpersonal trauma. In the future, it could be worth comparing those with no trauma to those with interpersonal trauma. We also only tested a select few models. Perhaps if we tested different models or used different measures for PTSS and relationship quality, we would have different findings.

Future Directions

Because this study focused solely on females, we plan to look at the same associations in males in a future study. We then plan to compare differences between males and females. We also want to look at individuals who only experienced interpersonal trauma during childhood (and not adulthood) to help support a causal model. This would help us to determine whether we can say that IPT *causes* touch aversion or if it is only related to it. Because we collected data for both the PCL-5 and for the International Trauma Questionnaire, we are interested to see whether there is a difference in results between the two measures. Furthermore, because complex PTSD (CPTSD) has slightly different characteristics than PTSD, we also plan to look at these associations in individuals with CPTSD to see whether they remain.

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APPENDIX A

TABLES

Table 1*Pearson Correlations among Study Variables across Whole Sample*

Variable	1	2	3	4	5	6	7	8
1 Age	--							
2 Interpersonal trauma	.26**	--						
3 PTSD symptoms	-.11**	.35**	--					
4 Relationship quality	-.09	-.05	-.12*	--				
5 Affectionate touch behaviors	-.15**	-.05	-.07	.49**	--			
6 Touch aversion	.09*	.13**	.18**	-.29**	-.27**	--		
7 Trauma coping self-efficacy	.07	-.22**	-.61**	.14**	.15**	-.12**	--	
8 Touch affect regulation	-.07	-.10*	-.19**	.30**	.29**	-.38**	.24**	--
9 Expressive suppression	-.21**	.07	.27**	-.16**	-.08	.17**	-.32**	-.24**

Note. *Ns* for correlations range from 432 to 543.

* $p < .05$. ** $p < .01$.

Table 2*Pearson Correlations among Study Variables, by Interpersonal Trauma*

Variable	1	2	3	4	5	6	7	8	9
1 Age	--	.25***	-.13**	-.15**	-.16**	0.09	.09	-.10*	-.22**
2 Interpersonal trauma	..	--	.29**	-.04	-.05	.08	-.18***	-.01*	.08
3 PTS symptoms	-.29**	..	--	-.13*	-.08	.15**	-.62**	-.19**	.26**
4 Relationship quality	.17	..	.00	--	.50**	-.32**	.16**	.32**	-.14*
5 Affectionate touch behaviors	-.09	..	-.03	.44**	--	-.30**	.17**	.35**	-.10
6 Touch aversion	-.002	..	.17	-.12	-.14	--	-.10*	-.38**	.15**
7 Trauma coping self-efficacy	.09	..	-.48**	.02	.04	-.15	--	.24**	-.34**
8 Touch for affect regulation	.11	..	-.13	.17	-.02	-.33**	.21*	--	-.23**
9 Expressive suppression	-.19	..	.31**	-.26*	.01	.29**	-.21*	-.29**	--

Note. **Bold** font indicates correlations differ significantly between groups; same-color cells indicate corresponding *r*-values. PTS = post-traumatic stress. Upper triangle = interpersonal trauma; *ns* range from 416 to 445 except for relationship quality, where $n = 359$. Lower triangle = no interpersonal trauma; *ns* range from 93 to 97 except for relationship quality, where $n = 81$.

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

Table 3*Means and Standard Deviations of Study Variables by Interpersonal Trauma*

Variable	Interpersonal trauma		No interpersonal trauma		<i>F</i> (<i>df</i>)	<i>p</i> _{diff}	η^2
	Mean	SD	Mean	SD			
	Age	31.03	12.21	26.74			
Interpersonal trauma	8.71	7.00	0.00	0.00	149.98 (1, 541)	<.001	.217
PTSD symptoms	31.24	17.30	19.44	15.33	38.50 (1, 541)	<.001	.066
Relationship quality	3.72	1.25	3.85	1.28	0.70 (1, 438)	.405	.002
Affectionate touch behaviors	3.80	0.94	3.85	0.96	0.20 (1, 507)	.655	.020
Touch aversion	2.92	1.86	2.33	1.36	8.98 (1, 540)	.003	.016
Trauma coping self-efficacy	4.51	1.13	4.98	1.01	14.11 (1, 541)	<.001	.025
Touch for affect regulation	3.72	0.99	3.84	0.93	1.17 (1, 541)	.279	.002
Expressive suppression	15.7	5.40	15.45	5.06	0.17 (1, 541)	.683	.000

Note. Significant differences are shown in **bold** font. *ns* for IPT group range from 359 to 446; *ns* for no-IPT group range from 81 to 97. η^2 =eta squared.

Table 4*Simple (Unmoderated) Mediation Models for Touch Behaviors, Touch Aversion, and Relationship Quality as Outcome Variables (DVs)*

Effect	Outcome variables															
	Affectionate touch behaviors					Touch aversion					Relationship quality					
	Hyp ^a	Coeff	SE	<i>p</i>	CI [LL,UL]	Hyp ^a	Coeff	SE	<i>p</i>	CI [LL,UL]	Hyp ^a	Coeff	SE	<i>p</i>	CI [LL,UL]	
Total effect of IPT on DV	H1 _{TB}	-.001	.006	.863	-.013, .011	H1 _{TA}	.028	.011	.013	.006 , .049	H1 _{RQ}	-.005	.009	.579	-.021, .012	
Effect of IPT on PTSS	H2	.991	.103	<.001	.788 , 1.194	H2	1.004	.010	<.001	.808 , 1.200	H2	1.025	.110	<.001	.809 , 1.241	
Effect of age on PTSS		-.342	.062	<.001	-.463 , -.220		-.321	.059	<.001	-.438 , -.205		-.372	.072	<.001	-.514 , -.230	
Unique effect of PTSS on DV	H3 _{TB}	-.006	.003	.028	-.011 , -.001	H3 _{TA}	.018	.005	<.001	.009 , .027	H3 _{RQ}	-.010	.004	.006	-.017 , -.003	
Direct effect of IPT on DV		.005	.006	.479	-.008, .017		.010	.012	.422	-.014, .033		.006	.009	.540	-.013, .024	
Effect of age on DV		-.014	.004	<.001	-.021 , -.006		.015	.007	.022	.002 , .028		-.013	.006	.020	-.024 , -.002	
Indirect effect of IPT on DV ^b	indH4 _{TB}	-.006	.003	<.050	-.012 , -.001	indH4 _{TA}	.018	.005	<.050	.008 , .029	indH4 _{RQ}	-.010	.004	<.050	-.019 , -.003	
Variance explained in DV		<i>R</i>² = .032, <i>p</i> < .001					<i>R</i>² = .046, <i>p</i> < .001					<i>R</i>² = .026, <i>p</i> = .009				

Note. Significant effects are shown in **bold** font. Coefficients are unstandardized. *N* = 506. Age is included as covariate. *Coeff* = coefficient; *SE* = standard error; *CI* = confidence intervals; *LL* = lower limit, *UL* = upper limit; *IPT* = interpersonal trauma; *PTSS* = post-traumatic stress symptoms.

^aHypothesis corresponding to the results displayed to the right on that row. ^bStandard errors and confidence intervals are bootstrapped for indirect effects, hence *p* < .05 if *CI* does not cross zero.

Table 5

Models 1M and 2M: Affectionate Touch Behaviors as Outcome (DV), Trauma Coping Self-Efficacy and Expressive Suppression as Moderators

Effect	Moderator of path from PTSS to affectionate touch behaviors									
	Model 1) Coping self-efficacy for trauma					Model 2) Expressive suppression				
	Hyp ^a	Coeff	SE	p	CI [LL,UL]	Hyp ^a	Coeff	SE	p	CI [LL,UL]
Effect of IPT on PTSS	H2	.991	.115	<.001	.764, 1.218	H2	.991	.115	<.001	.764, 1.218
Effect of age on PTSS		-.342	.057	<.001	-.453, -.230		-.342	.057	<.001	-.453, -.230
Unique effect of PTSS on affectionate touch behaviors	H3TB	.0004	.003	.895	-.005, .007	H3TB	-.004	.003	.105	-.010, .001
Direct effect of IPT on affectionate touch behaviors		.006	.006	.340	-.006, .018		.005	.006	.424	-.007, .017
Effect of age on affectionate touch behaviors		-.013	.004	<.001	-.021, -.006		-.015	.004	<.001	-.023, -.007
Main effect of moderator on affectionate touch behaviors		.133	.048	.006	.040, .227		-.017	.008	.033	-.032, .001
Conditional effects of PTSS on affection touch behaviors	H5CTB	.004	.002	.046	.000, .008	H6CTB	-.000	.000	.605	-.001, .001
Low level of moderator (-1 SD)		-.004	.004	.262	-.012, .003		-.003	.004	.397	-.010, .004
Average level of moderator (mean)		.000	.003	.895	-.006, .007		-.004	.003	.105	-.010, .001
High level of moderator (+1 SD)		.005	.004	.202	-.003, .013		-.006	.004	.120	-.013, .001
Conditional indirect effects of IPT on touch behaviors ^b	indH4H5CTB					indH4H6CTB				
Index of moderated mediation		.004	.002	≥.05	-.000, .009		-.001	.001	≥.05	-.001, .001
Low level of moderator (-1 SD)		-.004	.004	≥.05	-.012, .003		-.003	.004	≥.05	-.010, .004
Average level of moderator (mean)		.004	.003	≥.05	-.006, .007		-.004	.003	≥.05	-.010, .001
High level of moderator (+1 SD)		.005	.004	≥.05	-.002, .013		-.006	.004	≥.05	-.013, .002
Variance explained in affectionate touch behaviors					R² = .056, p = .001					R² = .042, p = .001

Note. Significant effects are shown in **bold** font. Coefficients are unstandardized. *N* = 506. Age included as covariate. *Coeff* = coefficient; *SE* = standard error, *CI* = confidence intervals; *LL* = lower limit, *UL* = upper limit; *IPT* = interpersonal trauma; *PTSS* = post-traumatic stress symptoms.

^aHypothesis corresponding to the results displayed to the right on that row. ^b*SE*, *CI*, and index of moderated mediation bootstrapped for indirect effects.

****p* < .001.

Table 6*Moderated Mediation Models 3 and 4: Touch Aversion as Outcome, Trauma Coping Self-Efficacy and Expressive Suppression as Moderators*

Effect	Moderator of path from PTSS to touch aversion									
	Model 3) Coping self-efficacy for trauma					Model 4) Expressive suppression				
	Hyp ^a	Coeff	SE	p	CI [LL,UL]	Hyp ^a	Coeff	SE	p	CI [LL,UL]
Effect of IPT on PTSS	H2	1.004	.112	<.001	.785, 1.223	H2	1.004	.112	<.001	.785, 1.223
Effect of age on PTSS		-.321	.054	<.001	-.427, -.215		-.321	.054	<.001	-.427, -.215
Unique effect of PTSS on touch aversion	H3TA	.017	.006	.004	.006, .029	H3TA	.015	.005	.003	.005, .024
Direct effect of IPT on touch aversion		.010	.012	.417	-.014, .033		.008	.012	.512	-.016, .031
Effect of age on touch aversion		.015	.006	.016	.013, .028		.020	.006	.002	.007, .032
Main effect of moderator on touch aversion		-.026	.084	.757	-.191, .139		.052	.015	<.001	.023, .081
Conditional effects of PTSS on touch aversion	H5CTA	.0004	.004	.916	-.008, .009	H6CTA	.0001	.001	.944	-.002, .002
Low level of moderator (-1 SD)		.017	.007	.017	.003, .030		.014	.006	.017	.003, .026
Average level of moderator (mean)		.017	.006	.004	.006, .029		.015	.005	.003	.005, .024
High level of moderator (+1 SD)		.018	.008	.026	.002, .033		.015	.007	.031	.001, .028
Conditional indirect effects of IPT on touch aversion ^b	indH4H5CTA					indH4H6CTA				
Index of moderated mediation		.000	.004	<.05	-.008, .009		.000	.001	<.05	-.002, .002
Low level of moderator (-1 SD)		.017	.008	<.05	.003, .032		.014	.006	<.05	.002, .028
Average level of moderator (mean)		.017	.006	<.05	.006, .030		.015	.005	<.05	.005, .026
High level of moderator (+1 SD)		.018	.008	<.05	.003, .034		.015	.007	<.05	.001, .030
Variance explained in touch aversion					R² = .046, p < .001					R² = .067, p < .001

Note. Significant effects are shown in **bold** font. Coefficients are unstandardized. *N* = 539. Age included as covariate. *Coeff* = coefficient; *SE* = standard error, *CI* = confidence intervals; *LL* = lower limit, *UL* = upper limit; *IPT* = interpersonal trauma; *PTSS* = post-traumatic stress symptoms.

^aHypothesis corresponding to the results displayed to the right on that row. ^b*SE*, *CI*, and index of moderated mediation bootstrapped for indirect effects.

Table 7*Moderated Mediation Models 5 and 6: Relationship Quality as Outcome, Trauma Coping Self-Efficacy and Expressive Suppression as Moderators*

Effect	Moderator of path from PTSS to relationship quality									
	Model 5) Coping self-efficacy for trauma					Model 6) Expressive suppression				
	Hyp ^a	Coeff	SE	p	CI [LL,UL]	Hyp ^a	Coeff	SE	p	CI [LL,UL]
Effect of IPT on PTSS	H2	1.025	.109	<.001	.813, 1.237	H2	1.025	.109	<.001	.813, 1.237
Effect of age on PTSS		-.372	.066	<.001	-.502, -.242		-.372	.066	<.001	-.502, -.242
Unique effect of PTSS on relationship quality	H3RQ	-.005	.005	.258	-.014, .004	H3RQ	-.008	.004	.052	-.015, .0001
Direct effect of IPT on relationship quality		.006	.008	.501	-.011, .022		.008	.009	.372	-.009, .025
Effect of age on relationship quality		-.013	.005	.019	-.024, -.002		-.016	.006	.004	-.027, -.005
Main effect of moderator on relationship quality		.117	.067	.082	-.015, .249		-.037	.011	<.001	-.059, -.015
Conditional effects of PTSS on relationship quality	H5CRQ	.002	.003	.579	-.004, .007	H6CRQ	.0001	.001	.849	-.001, .001
Low level of moderator (-1 SD)		-.007	.006	.211	-.018, .004		-.008	.005	.091	-.018, .001
Average level of moderator (mean)		-.005	.005	.258	-.014, .004		-.008	.004	.052	-.015, .000
High level of moderator (+1 SD)		-.004	.006	.529	-.015, .008		-.007	.005	.191	-.017, .003
Conditional indirect effects of IPT on relat quality ^b	indH4H5CRQ					indH4H6CRQ				
Index of moderated mediation		.002	.003	≥.05	-.004, .007		.000	.001	≥.05	-.001, .001
Low level of moderator (-1 SD)		-.007	.006	≥.05	-.018, .004		-.008	.005	≥.05	-.019, .002
Average level of moderator (mean)		-.005	.005	≥.05	-.015, .004		-.008	.004	≥.05	-.016, .000
High level of moderator (+1 SD)		-.004	.006	≥.05	-.016, .008		-.007	.006	≥.05	-.018, .004
Variance explained in relationship quality					R² = .034, p = .022					R² = .049, p < .001

Note. Significant effects are shown in **bold** font. Coefficients are unstandardized. *N* = 437. Age included as covariate. *Coeff* = coefficient; *SE* = standard error, *CI* = confidence intervals; *LL* = lower limit, *UL* = upper limit; *IPT* = interpersonal trauma; *PTSS* = post-traumatic stress symptoms; *relat* = relationship.

^aHypothesis corresponding to the results displayed to the right on that row. ^b*SE*, *CI*, and index of moderated mediation bootstrapped for indirect effects.

Table 8*Moderated Mediation Model 7: Relationship Quality as Outcome, Touch for Affect Regulation as Moderator*

Effect	Model 7) Touch for affect regulation				
	Hyp ^a	Coeff	SE	p	CI [LL,UL]
Effect of IPT on PTSS	H2	1.025	.109	<.001	.813, 1.237
Effect of age on PTSS		-.372	.066	<.001	-.502, -.242
Unique effect of PTSS on relationship quality	H3 _{RQ}	-.006	.004	.103	-.013, .001
Direct effect of IPT on relationship quality		.006	.008	.448	-.010, .021
Effect of age on relationship quality		-.011	.005	.032	-.021, -.001
Main effect of moderator on relationship quality		.336	.064	<.001	.209, .462
Conditional effects of PTSS on relationship quality	H5 _{CRQ}	.003	.004	.356	-.004, .010
Low level of moderator (-1 SD)		-.009	.005	.089	-.020, .001
Average level of moderator (mean)		-.006	.004	.103	-.013, .001
High level of moderator (+1 SD)		-.003	.005	.573	-.012, .007
Conditional indirect effects of IPT on relat quality ^b	indH4H7 _{CRQ}				
Index of moderated mediation		.003	.004	≥.05	-.004, .011
Low level of moderator (-1 SD)		-.010	.006	≥.05	-.020, .002
Average level of moderator (mean)		-.006	.004	≥.05	-.014, .001
High level of moderator (+1 SD)		-.003	.005	≥.05	-.013, .007
Variance explained in relationship quality					R² = .101, p < .001

Note. Significant effects are shown in **bold** font. Coefficients are unstandardized. $N = 437$. Age included as covariate. *Coeff* = coefficient; *SE* = standard error, *CI* = confidence intervals; *LL* = lower limit, *UL* = upper limit; *IPT* = interpersonal trauma; *PTSS* = post-traumatic stress symptoms; *relat* = relationship.

^aHypothesis corresponding to the results displayed to the right on that row. ^b*SE*, *CI*, and index of moderated mediation bootstrapped for indirect effects.

Table 7*Moderated Mediation Models 5 and 6: Relationship Quality as Outcome, Trauma Coping Self-Efficacy and Expressive Suppression as Moderators*

Effect	Moderator of path from PTSS to relationship quality									
	Model 5) Coping self-efficacy for trauma					Model 6) Expressive suppression				
	Hyp ^a	Coeff	SE	p	CI [LL,UL]	Hyp ^a	Coeff	SE	p	CI [LL,UL]
Effect of IPT on PTSS	H2	1.025	.109	<.001	.813, 1.237	H2	1.025	.109	<.001	.813, 1.237
Effect of age on PTSS		-.372	.066	<.001	-.502, -.242		-.372	.066	<.001	-.502, -.242
Unique effect of PTSS on relationship quality	H3 _{RQ}	-.005	.005	.258	-.014, .004	H3 _{RQ}	-.008	.004	.052	-.015, .0001
Direct effect of IPT on relationship quality		.006	.008	.501	-.011, .022		.008	.009	.372	-.009, .025
Effect of age on relationship quality		-.013	.005	.019	-.024, -.002		-.016	.006	.004	-.027, -.005
Main effect of moderator on relationship quality		.117	.067	.082	-.015, .249		-.037	.011	<.001	-.059, -.015
Conditional effects of PTSS on relationship quality	H5 _{CRQ}	.002	.003	.579	-.004, .007	H6 _{CRQ}	.0001	.001	.849	-.001, .001
Low level of moderator (-1 SD)		-.007	.006	.211	-.018, .004		-.008	.005	.091	-.018, .001
Average level of moderator (mean)		-.005	.005	.258	-.014, .004		-.008	.004	.052	-.015, .000
High level of moderator (+1 SD)		-.004	.006	.529	-.015, .008		-.007	.005	.191	-.017, .003
Conditional indirect effects of IPT on relat quality ^b	indH4H5 _{CRQ}					indH4H6 _{CRQ}				
Index of moderated mediation		.002	.003	≥.05	-.004, .007		.000	.001	≥.05	-.001, .001
Low level of moderator (-1 SD)		-.007	.006	≥.05	-.018, .004		-.008	.005	≥.05	-.019, .002
Average level of moderator (mean)		-.005	.005	≥.05	-.015, .004		-.008	.004	≥.05	-.016, .000
High level of moderator (+1 SD)		-.004	.006	≥.05	-.016, .008		-.007	.006	≥.05	-.018, .004
Variance explained in relationship quality					R² = .034, p = .022					R² = .049, p < .001

Note. Significant effects are shown in **bold** font. Coefficients are unstandardized. *N* = 437. Age included as covariate. *Coeff* = coefficient; *SE* = standard error, *CI* = confidence intervals; *LL* = lower limit, *UL* = upper limit; *IPT* = interpersonal trauma; *PTSS* = post-traumatic stress symptoms; *relat* = relationship.

^aHypothesis corresponding to the results displayed to the right on that row. ^b*SE*, *CI*, and index of moderated mediation bootstrapped for indirect effects.

APPENDIX B

FIGURES

Figure 1
Simple Mediation

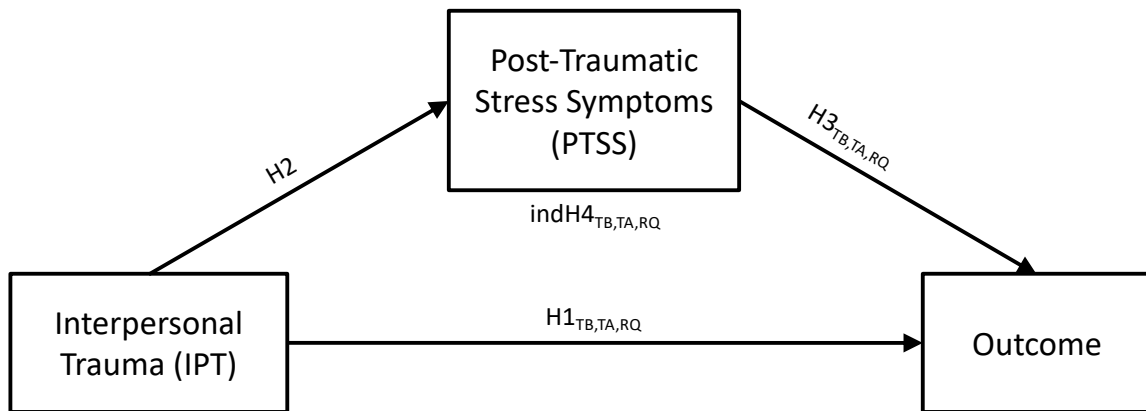


Figure 2
Moderated Mediation

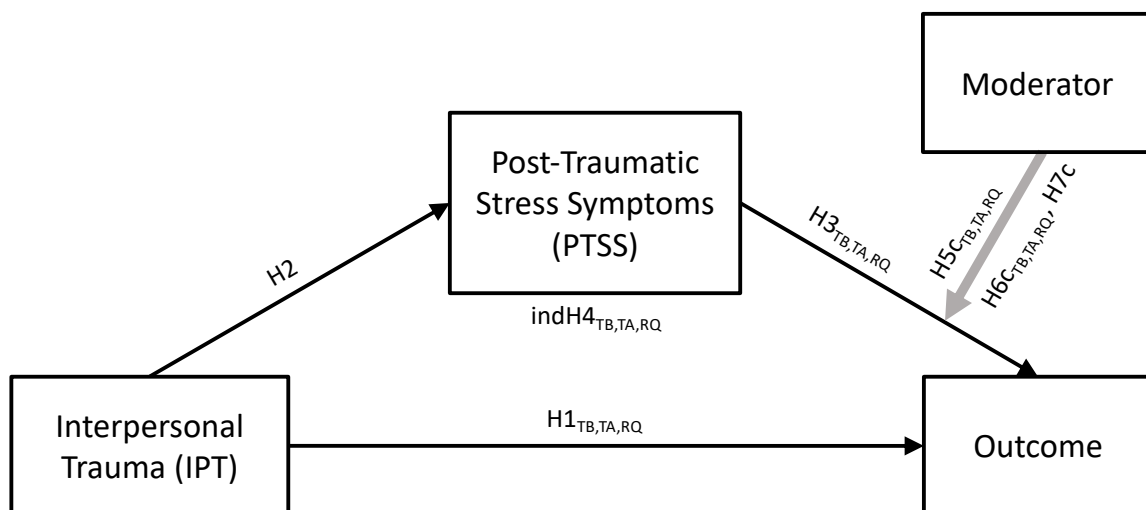


Figure 3

Simple Mediation: Affectionate Touch Behaviors as Outcome

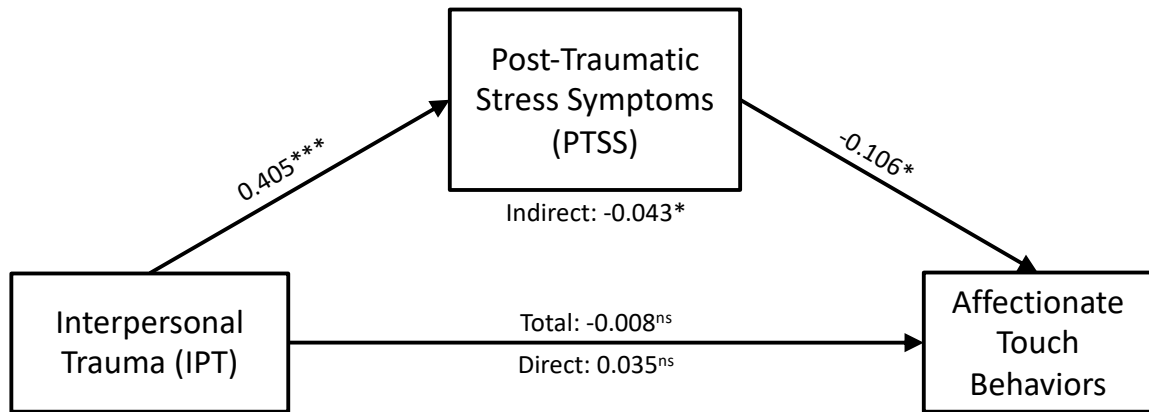


Figure 4

Simple Mediation: Touch Aversion as Outcome

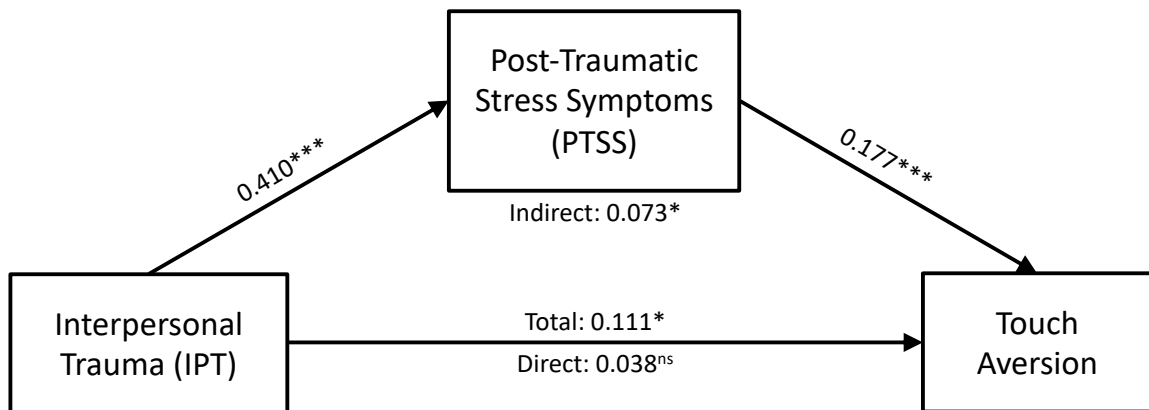


Figure 5
Simple Mediation: Relationship Quality as Outcome

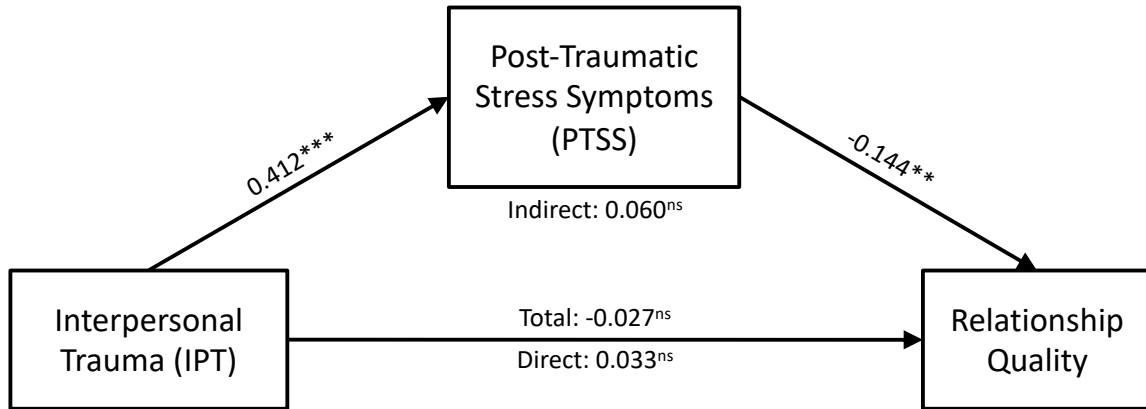


Figure 6
Moderated Mediation: Affectionate Touch Behaviors as Outcome; Trauma Coping Self-Efficacy as Moderator

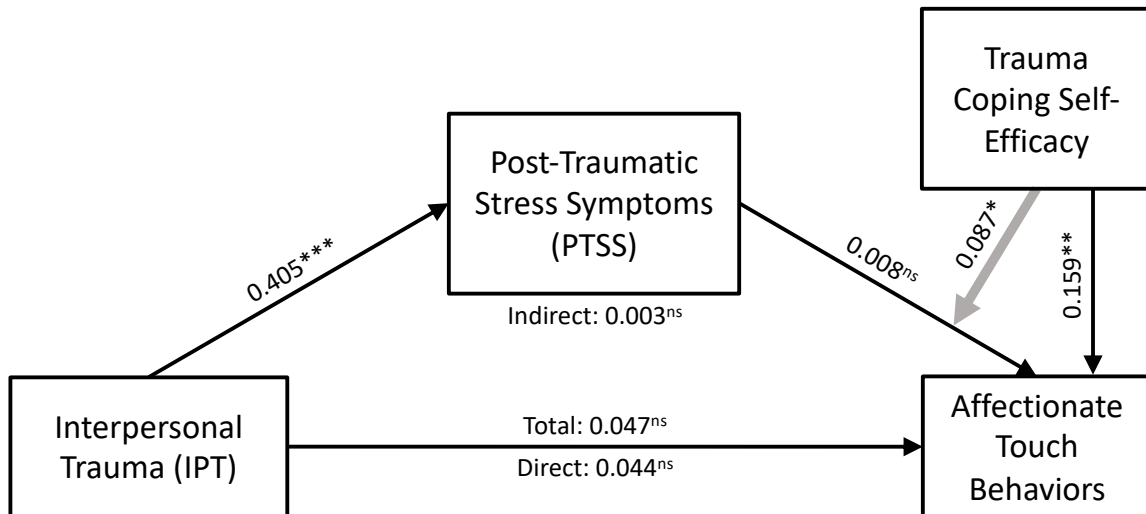


Figure 7

Moderated Mediation: Affectionate Touch Behaviors as Outcome; Expressive Suppression as Moderator

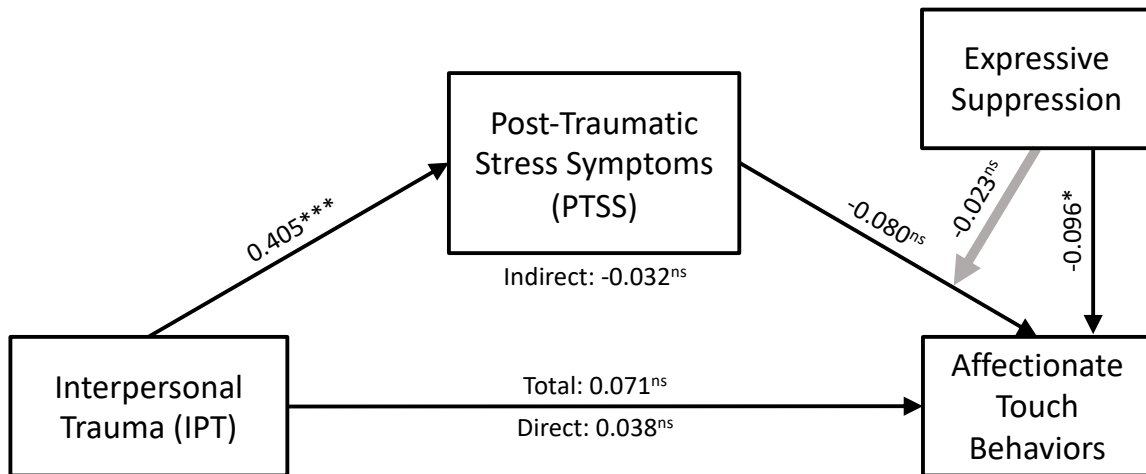


Figure 8

Moderated Mediation: Touch Aversion as Outcome; Trauma Coping Self-Efficacy as Moderator

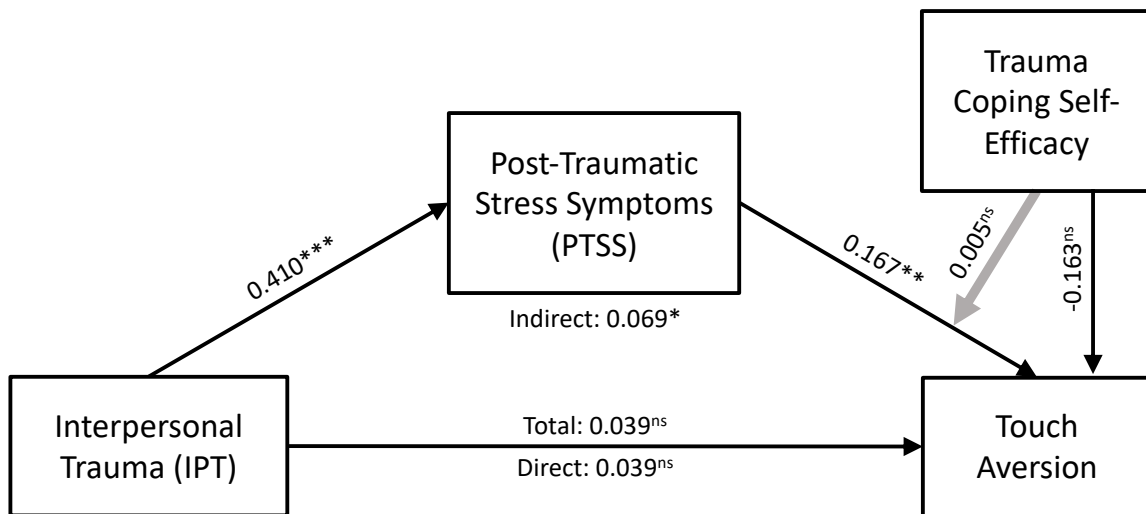


Figure 9

Moderated Mediation: Touch Aversion as Outcome; Expressive Suppression as Moderator

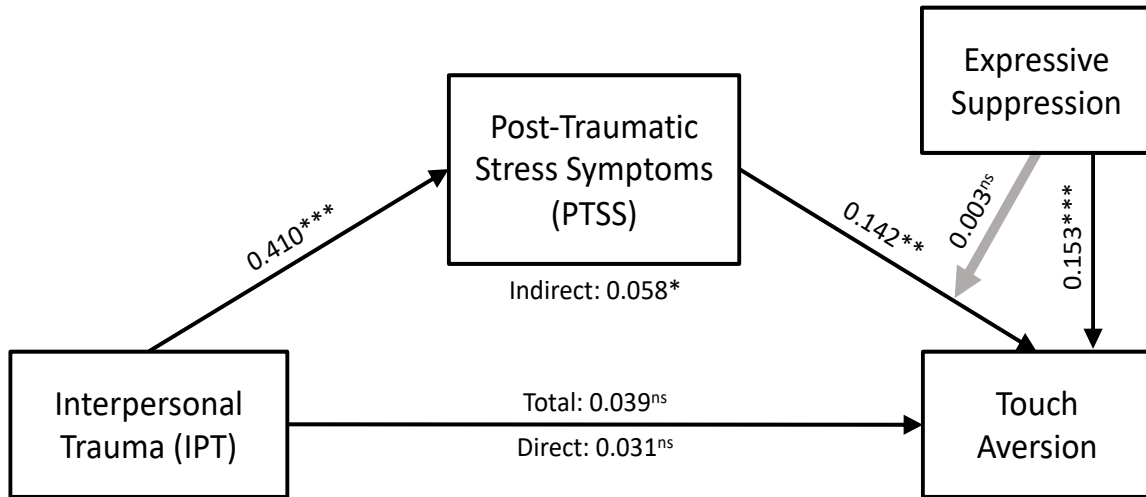


Figure 10

Moderated Mediation: Relationship Quality as Outcome; Trauma Coping Self-Efficacy as Moderator

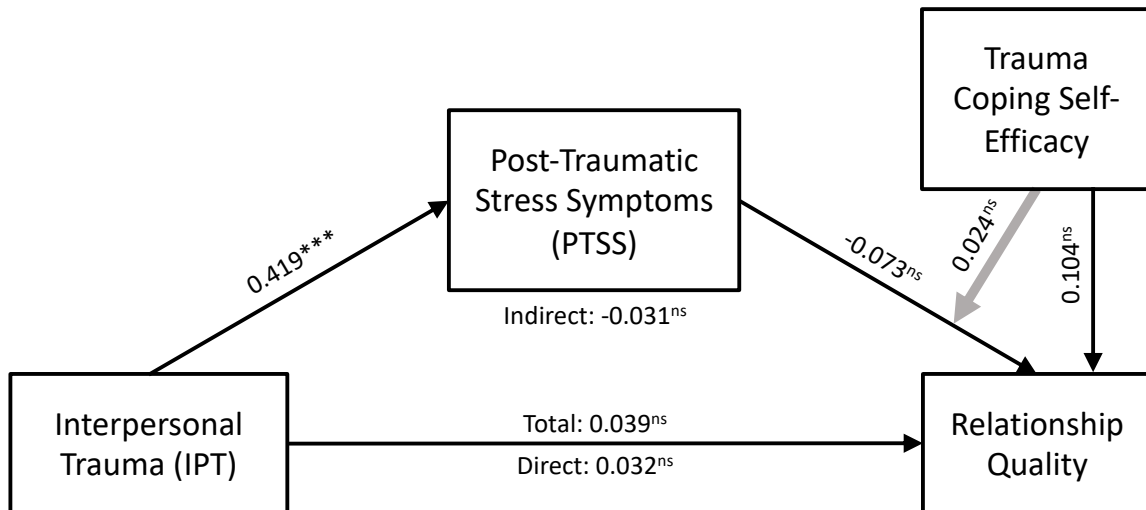


Figure 11

Moderated Mediation: Relationship Quality as Outcome; Expressive Suppression as Moderator

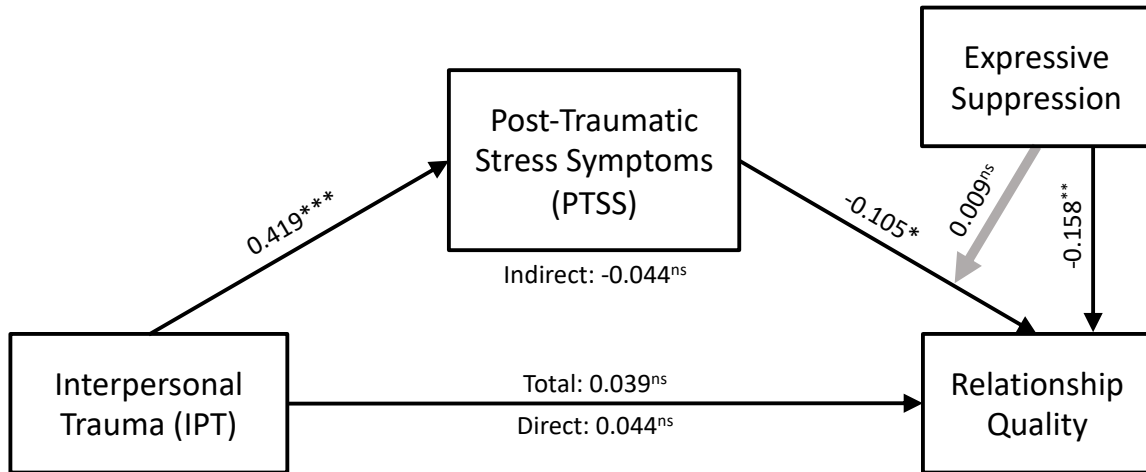
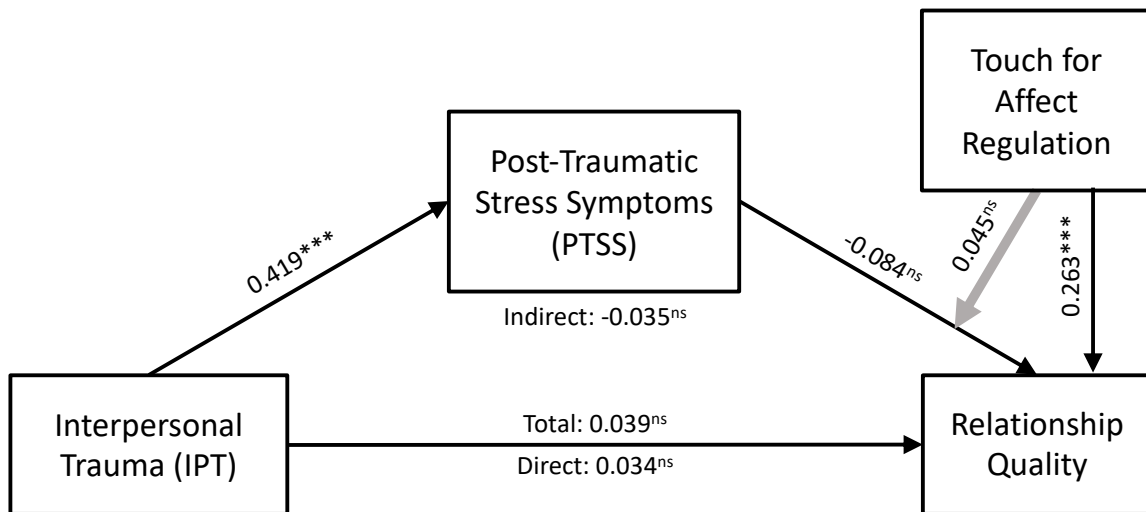


Figure 12

Moderated Mediation: Relationship Quality as Outcome; Trauma Coping Self-Efficacy as Moderator



APPENDIX C
SURVEY

Demographics

Please use a regular computer (desktop or laptop) in order to properly display each question.

1. Please select the device you are using to complete this survey:
 - a. Computer/Desktop
 - b. Phone/Mobile device
2. What is your age in years? (Please enter a whole number)
3. What is your gender?
 - a. Female
 - b. Male
 - c. Transgender (M to F)
 - d. Transgender (F to M)
 - e. Non-binary
 - f. Other (please specify)
4. How do you usually describe yourself?
 - a. American Indian/Alaska Native
 - b. African/African American/Black
 - c. Asian/Asian American
 - d. Hispanic/Latino
 - e. Middle Eastern/North African (MENA)/Arab Origin
 - f. Native Hawaiian/Other Pacific Islander
 - g. White/Caucasian/European American
 - h. Other ethnic group/biracial/multi-racial (please specify):
5. Please describe your family background in more detail. For example, if you selected Native American/Alaska Native, you could list your tribal affiliation here. Or, if you selected Asian/Asian American, or any other choice, you could list the country or countries from which your family originated.
6. What is your current religious affiliation?
 - a. Catholic
 - b. Christian-Protestant
 - c. Christian-Nondenominational
 - d. Christian-Other
 - e. Mormon
 - f. Jewish
 - g. Muslim
 - h. Hindu
 - i. Buddhist
 - j. Spiritual but not religious
 - k. Atheist
 - l. Agnostic
 - m. Other (please specify)
7. What was your religious affiliation growing up?
 - a. Catholic
 - b. Christian-Protestant
 - c. Christian-Nondenominational
 - d. Christian-Other
 - e. Mormon
 - f. Jewish
 - g. Muslim

- h. Hindu
 - i. Buddhist
 - j. Spiritual but not religious
 - k. Atheist
 - l. Agnostic
 - m. Other (please specify)
8. What is your sexual orientation?
- a. Bisexual
 - b. Gay/Lesbian
 - c. Straight/Heterosexual
 - d. Other (please specify)
9. Are you currently in a romantic or sexual relationship?
- a. No
 - b. Yes
10. How would you describe your current relationship status? (Check all that apply)
- a. Single
 - b. Divorced
 - c. Separated
 - d. Widowed
11. Have you ever been in a romantic or sexual relationship?
- a. No
 - b. Yes
12. How long has it been since you were in a romantic or sexual relationship?
- a. Years
 - b. Months
13. Are you married?
- a. No
 - b. Yes
14. How long have you been in your most current relationship?
- a. Years
 - b. Months
15. What is the gender of your current romantic partner/significant other?
- a. Female
 - b. Male
 - c. Transgender (M to F)
 - d. Transgender (F to M)
 - e. Non-binary
 - f. Other (Please specify)
16. Do you live with your current partner?
- a. Yes
 - b. No
17. Please select the choice that best describes your level of happiness with your romantic relationship.
- a. Extremely unhappy
 - b. Very unhappy
 - c. Somewhat unhappy
 - d. Somewhat happy
 - e. Very happy
 - f. Extremely happy
18. How would you rate your current health?

- a. Excellent
 - b. Very good
 - c. Fair
 - d. Poor
19. If you drink alcohol, about how many alcoholic drinks do you have, on average, per week? If you don't drink alcohol, please enter "0."
20. Which one of the following best describes your highest level of education?
- a. Less than some high school
 - b. Some high school
 - c. High school diploma/GED or equivalent
 - d. Some college
 - e. Associate's degree
 - f. Bachelor's degree
 - g. Trade or vocational school
 - h. Some postgraduate college
 - i. Postgraduate degree
21. If you are currently a student, what is your class rank?
- a. Freshman
 - b. Sophomore
 - c. Junior
 - d. Senior
 - e. Other (please specify)
22. Are you presently employed or volunteering?
- a. Yes, full-time
 - b. Yes, part-time
 - c. No
23. Which of the following best describes the financial status of you and your family?
- a. I do not have enough money to meet my basic needs and must rely on others (e.g. government, friends, relatives) to make ends meet each month.
 - b. I can barely pay all my bills each month but usually manage on my own.
 - c. I have enough money for basic needs and usually have some extra money for savings or special purchases.
 - d. I have plenty of money for whatever I want.
24. Below you will find a standard income table widely used in survey research. Yearly family income is grouped into categories. Family income includes, for example, income from work plus other sources such as interest, social security, and so forth. If you live with your parents or your spouse or other family members, it includes their income plus your income. Please choose the answer choice that comes closest to your family income for the past year:
- a. Under \$10,000
 - b. \$10,000- \$29,999
 - c. \$30,000-\$49,999
 - d. \$50,000-\$69,999
 - e. \$70,000-\$89,999
 - f. \$90,000-\$109,999
 - g. \$110,000 or more
25. How many people are supported by that income (including yourself)?
26. How many people live in your household including yourself?

Touch for Affect Regulation Questionnaire (TARQ) – shortened – 21 items

Please indicate how much you agree or disagree with each of the following statements. (*strongly disagree, moderately disagree, slightly disagree, slightly agree, moderately agree, strongly agree*)

1. I ask for a hug when I want to feel less anxious.
2. When I feel upset, being held by someone I care about makes me feel better.
3. I feel better after being touched by someone I care about.
4. When I feel sad, I feel supported when a loved one gives me a hug.
5. When someone I care about is upset, I offer them a hug.
6. I usually hug someone I care about in response to their emotional state.
7. When I hug a friend who is sad, it makes me feel better too.
8. I feel calmer when I hug a friend who is sad.
9. Being touched makes it harder for me to calm down when I am irritated. (R)
10. When I'm already aggravated, being touched irritates me even more. (R)
11. When I am already upset, being hugged can make it worse. (R)
12. Being touched helps me keep my emotions to myself.
13. Touch helps me control my emotions by not expressing them
14. When I am touching someone, it helps me hold back my emotions.
15. Being held increases my awareness of my feelings.
16. Touch makes my emotions more noticeable to me.
17. Being hugged makes me more aware of my feelings.
18. When I want to improve my mood, I ask for a hug.
19. When I'm feeling tense, I look for a hug.
20. If someone I care about is upset, I provide comforting touch.
21. I feel better after giving physical affection to someone who is upset.

Trauma and Feelings Towards Touch Pre- to Post-Trauma

1. Do you believe you've experienced (or witnessed) at least one or more traumatic event(s) in your life?
Y/N
2. Did your feelings towards touch change from pre- to post- trauma?
Yes: I like touching or being touched more now than I did before the traumatic event
Yes: I do not like touching or being touched as much now as I did before the traumatic event
No: My feelings towards touch stayed the same

Cumulative Stress and Trauma Scale – Short Form (CTS-S)

For each question, we will also add “how old were you the first time this happened” and “how old were you the most recent time this happened?” Per the scale, we also asked “If this happened, how has this affected you?” from 1 (*Extremely positive*) to 7 (*Extremely negative*). Many people have experienced different kinds of events and situations in their lives. The following questions will ask you about some specific events. Please indicate how many times they happened to you from *never* (0) to *many times* (4).

1. In my life I witnessed or experienced natural disasters, for example, earthquake, hurricane, tornado, or flood.
2. I have experienced life-threatening accidents, for example, motor vehicle accidents.

3. I have been involved in or witnessed a war or combat.
4. I have experienced sudden death of one of my parents, or close friend, or of loved ones.
5. I have experienced a life-threatening or permanently disabling event for loved ones (e.g., parents, close friends).
6. I have experienced a life-threatening illness or permanently disabling event (e.g., cancer, stroke, serious chronic illness, or major injury).
7. I have experienced robbery involving a weapon (robbed or mugged).
8. I have witnessed severe assault of acquaintance or stranger (e.g., got shot, stabbed, or severely beaten up).
9. I have been threatened to be killed or to be seriously harmed.
10. I have been physically abused, pushed hard enough to cause injury, or beaten up by a caretaker, for example, by a parent.
11. I have witnessed or heard one of my parents or caregivers hitting, hurting, and/or threatening to kill my other parent or caregiver.
12. I was led to *unwanted* sexual contact by someone older than me.
13. I was sexually abused, raped, or involved in unwanted sex with one or more persons.
14. Two parts
15. I have been jailed
16. I have been tortured mentally or physically.
17. My mother has abandoned or left me, or separated from me when I was young.
18. My father has abandoned or left me, or separated from me when I was young.
19. I was put down, threatened, or discriminated against by some other's negative attitudes, stereotypes, or actions because of my ethnicity, race, culture, religion, or national origin.
20. My parents divorced and/or separated from each other.
21. My race or ethnicity or religion has history of being oppressed, discriminated against, or threatened by genocide within the last 300 years.
22. I have experienced a nervous breakdown or felt that I was about to have one (e.g., about to lose control) due to seemingly small but recurrent or unremitting hassles or chronic stressors.
23. At least one of my parents or siblings was involved in war, combat, or being tortured.
24. I have experienced frequent failures in school.
25. I was uprooted and forced to move from my favorite environment in town, village, or country.
26. I have been physically attacked, beaten up by another stronger person or group of persons, and been injured.
27. I was led to sexual contact by one of my caregivers/parents.
28. I was put down, denied my rights, or discriminated against (not by family members), by some others' negative attitudes, stereotypes, or actions, or by institutions because of my gender.
29. I have experienced serious rejection or failure in my relationships.
30. I have experienced loss of a child or spouse.
31. I have experienced employment termination, been laid off, or failed in business.
32. I have remarried.
33. I have experienced being part of a poor family with many hardships.
34. I was put down, threatened, or discriminated against by family members (e.g., parents, siblings), by their negative attitudes, stereotypes, or actions because of my gender (being a girl/woman, a boy/man, agender, non-binary, etc.).
35. I have had to physically hurt another person.
36. I have lived in a neighborhood where violence and illegal events were common.
37. I was told that my birth was difficult.

38. I was put down, threatened, or discriminated against by some other's negative attitudes, stereotypes, or actions because of my sexual preferences.

Coping Self Efficacy Scale for Trauma – 9 item

Please rate your ability to handle the following event; 0 = Not Capable, 7 = Totally Capable.

1. Deal with my emotions (anger, sadness, depression, anxiety) since I experienced my trauma.
2. Get my life back to normal.
3. Not “lose it” emotionally.
4. Manage distressing dreams or images about the traumatic experience.
5. Not be critical of myself about what happened.
6. Be optimistic since the traumatic experience.
7. Be supportive to other people since the traumatic experience.
8. Control thoughts of the traumatic experience happening to me again.
9. Get help from others about what happened.

Perceived Relationship Quality Component Inventory (PRQCI) – Shortened – 6 items

Please answer the following questions regarding your romantic relationship with respect to the PAST TWO WEEKS. (1. Not at all; 2. A little; 3. Somewhat; 4. Quite a bit; 5. Extremely)

1. How satisfied are you with your relationship?
2. How dedicated are you to your relationship?
3. How intimate is your relationship?
4. How much can you count on your partner?
5. How lustful is your relationship?
6. How much do you cherish your partner?

Emotion Regulation Questionnaire

We would like to ask you some questions about your emotional life, in particular, how you control (that is, regulate and manage) your emotions. Although some of the following questions may seem similar to one another, they differ in important ways. Respondents answer each item on a 7-point Likert-type scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*).

1. When I want to feel more positive emotion (such as joy or amusement), I change what I’m thinking about.
2. I keep my emotions to myself.
3. When I want to feel less negative emotion (such as sadness or anger), I change what I’m thinking about.
4. When I am feeling positive emotions, I am careful not to express them.
5. When I’m faced with a stressful situation, I make myself think about it in a way that helps me stay calm.
6. I control my emotions by not expressing them.
7. When I want to feel more positive emotion, I change the way I’m thinking about the situation.
8. I control my emotions by changing the way I think about the situation I’m in.
9. When I am feeling negative emotions, I make sure not to express them.
10. When I want to feel less negative emotion, I change the way I’m thinking about the situation.

Physical Affection Questionnaire

Please indicate how often you engage in each of the following behaviors with your partner OR, if you are not in a relationship right now, how often you engaged in the following behaviors with your most recent partner. (Rating – never, less than once a month, 1-3 times a month, 1-3 times a week, almost daily, N/A)

1. Hugging each other
2. Touching or patting each other anywhere on the body
3. Holding hands or having arms around one another's shoulders
4. Adjusting each other's clothes, hair, or appearance
5. Cuddling with each other on a couch or bed
6. Giving each other neck or back massages or similar warm touches
7. Kissing
8. Having sexual contact with each other

Brennan Touch Scale

If you are not married or in a romantic relationship, please answer according to your most recent romantic relationship. If you are married or in a romantic relationship, please answer according to your current relationship. Please indicate how much each of the following statements is similar to you: Rating from not like me (1) to very much like me (7).

1. When I'm not feeling well, I really need to be touched by my partner.
2. My partner continually complains that I don't touch them enough.
3. I usually become sexually aroused when touching my partner.
4. Sometimes I wish my partner were more comfortable with being touched by me.
5. Sometimes I am not very happy with the level of touch in my relationship.
6. I like my partner to hold my hand to demonstrate his or her affection for me.
7. I like touching and being touched by my partner, especially when others are around to see.
8. Even in private, I can't get my partner to touch me enough.
9. My partner often complains that I don't touch them enough.
10. When I'm angry with my partner, I sometimes feel like hitting them.
11. It feels very natural for my partner and me to touch each other, even when others are around.
12. After a sexual interaction, I really enjoy being held by my partner.
13. Just being touched by my partner is usually enough to arouse me sexually.
14. When I'm upset with my partner, I still need physical reassurance from them.
15. I think it is embarrassing when my partner touches me in public.
16. I sometimes wish my partner would touch me more.
17. I use touch as a means to initiate sexual interaction with my partner.
18. When I am facing a difficult situation, I like being touched by my partner.
19. My partner often touches me to assert his or her feelings of control.
20. My partner's touch makes me feel loved.
21. My partner uses touch as a means to initiate sexual closeness with me.
22. Sometimes I find my partner's touch really annoying.
23. When my partner is feeling under the weather, my first reaction is to touch them.
24. I usually hug my partner to show how happy I am to see them.

PTSD Checklist for DSM-5 (PCL-5)

The following are list of problems that people sometimes have in response to a very stressful or traumatic experience. Please read each problem carefully and then select one of the numbers to the right to indicate how much you have been bothered by that problem in the PAST MONTH. Scores range from 0 (*not at all*) to 4 (*extremely*).

1. Repeated, disturbing, and unwanted memories of the stressful experience?
2. Repeated, disturbing dreams of the stressful experience?
3. Suddenly feeling or acting as if the stressful experience were actually happening again (as if you were actually back there reliving it)?
4. Feeling very upset when something reminded you of the stressful experience?
5. Having strong physical reactions when something reminded you of the stressful experience (for example, heart pounding, trouble breathing, sweating)?
6. Avoiding memories, thoughts, or feelings related to the stressful experience?
7. Avoiding external reminders of the stressful experience (for example, people, places, conversations, activities, objects, or situations)?
8. Trouble remembering important parts of the stressful experience?
9. Having strong negative beliefs about yourself, other people, or the world (for example, having thoughts such as: I am bad, there is something seriously wrong with me, no one can be trusted, the world is completely dangerous)?
10. Blaming yourself or someone else for the stressful experience or what happened after it?
11. Having strong negative feelings such as fear, horror, anger, guilt, or shame?
12. Loss of interest in activities that you used to enjoy?
13. Feeling distant or cut off from other people?
14. Trouble experiencing positive feelings (for example, being unable to feel happiness or have loving feelings for people close to you)?
15. Irritable behavior, angry outbursts, or acting aggressively?
16. Taking too many risks or doing things that could cause you harm?
17. Being “superalert” or watchful or on guard?
18. Feeling jumpy or easily startled?
19. Having difficulty concentrating?
20. Trouble falling or staying asleep?

APPENDIX D
IRB APPROVAL



APPROVAL: MODIFICATION

[Mary Burleson](#)
[NCIAS: Social and Behavioral Sciences, School of \(SSBS\)](#)
602/543-6804
mary.burleson@asu.edu

Dear [Mary Burleson](#):

On 1/31/2022 the ASU IRB reviewed the following protocol:

Type of Review:	Modification / Update
Title:	Do Post Traumatic Stress Symptoms Mediate the Relationship between Interpersonal Trauma and Touch Behaviors?
Investigator:	Mary Burleson
IRB ID:	STUDY00015186
Funding:	Name: Arizona State University (ASU)
Grant Title:	None
Grant ID:	None
Documents Reviewed:	<ul style="list-style-type: none">• Prolific Consent Form, Category: Consent Form;• Protocol , Category: IRB Protocol;• Recruitment, Category: Recruitment Materials;• Sona Consent Form, Category: Consent Form;

The IRB approved the modification.

When consent is appropriate, you must use final, watermarked versions available under the “Documents” tab in ERA-IRB.

In conducting this protocol you are required to follow the requirements listed in the INVESTIGATOR MANUAL (HRP-103).

REMINDER - - Effective January 12, 2022, in-person interactions with human subjects require adherence to all current policies for ASU faculty, staff, students and visitors. Up-to-date information regarding ASU’s COVID-19 Management

Strategy can be found [here](#). IRB approval is related to the research activity involving human subjects, all other protocols related to COVID-19 management including face coverings, health checks, facility access, etc. are governed by current ASU policy.

Sincerely,

IRB Administrator

cc: Aubrie Munson
Nicole Roberts