TRAUMA TYPE AND SUICIDE RISK: MEDIATING ROLE OF MENTAL

CONTAMINATION AND STRESS

by

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ABSTRACT

Suicide is a pervasive issue among different ethnicities, cultural backgrounds, genders, sexual orientations, and ages. Trauma, mental contamination, and posttraumatic stress may provide new insights related to identifying and treating individuals at high risk of suicide. This study aimed to understand the serial indirect effect of trauma type (i.e., non-interpersonal trauma, interpersonal sexual trauma, and interpersonal physical trauma) on suicide risk as mediated by posttraumatic mental contamination (PMC), posttraumatic stress (PTS) symptoms, and the factors from the Interpersonal Psychological Theory of Suicide (IPTS). It was hypothesized that sexual and physical trauma would have a significant serial indirect pathway on suicide risk through the respective variables. Moreover, it was hypothesized that non-interpersonal trauma would not be significantly related to suicide risk as mediated by the above-mentioned variables. Data was gathered from a student sample at a master-level regional university. Each participant completed several self-report measures and open-ended questions via Qualtrics. Using a serial indirect effect model with a multicategorical antecedent (i.e., trauma type), several significant relative direct effect pathways were found while none of the mediation outcomes were significant. Specifically, these models suggest physical trauma, perceived burdensomeness, and pain tolerance are directly related to suicide risk. Additionally, sexual trauma was directly related to posttraumatic mental contamination. This project

suggests that trauma type is an important factor to consider when conducting trauma

research as sexual trauma appears to impact mental health constructs differently than

physical and non-interpersonal traumas. It also suggests a novel way of researching

trauma by categorizing trauma into specific groups. While no serial indirect effect was

found, the direct effect findings could provide clinicians with important information to

help guide treatment of trauma survivors.

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CHAPTER I

INTRODUCTION TO TRAUMA TYPE AND SUICIDE RISK: MEDIATING ROLE

OF MENTAL CONTAMINATION AND STRESS

Mental contamination (MC), the internal feeling of being dirty, infected, and impure, has

recently begun to be studied in relation to trauma and trauma's associated disorders (e.g.,

PTSD). Due to trauma's relationship with MC and other factors like suicide risk, an

importance has been placed on understanding the relationship between trauma,

posttraumatic mental contamination, and suicide. MC is a psychological construct which

is most often studied alongside Obsessive-Compulsive Disorder (OCD). But, as

mentioned, recent studies have found MC to be related to other mental health concerns.

As such, there has been a shift in the focus of MC research. Feelings of MC occur

despite lacking the presence of an external, physical contaminant. Furthermore, MC is

related to negative emotions like disgust, helplessness, shame, guilt, and fear. More

times than not, mental contamination contains a moral element and tends to develop

following a psychological or physical violation (Rachman et al., 2015). So, when an

individual expresses having experienced a moral violation (e.g., being harmed by another

person), they may develop feelings of contamination, as well as others like disgust, guilt,

and shame. Moral violations range include physical and sexual assault, betrayal, and

humiliating circumstances. Additionally, because morals can vary between individuals, situations which evoke MC are specific to the affected person.

MC is different from traditional contact contamination. Traditional contact contamination is when an individual physically encounters an external contaminant. For example, touching something dirty (e.g., trash) could elicit feelings of contamination and lead an individual to wash their hands to alleviate those feelings. MC is evoked by experiencing a physical or psychological violation perpetrated by another person or their self (Rachman et al., 2015). However, these feelings may be provoked by secondary sources like a place, object, or another person which are associated with the initial source (Rachman et al., 2015). Furthermore, remembrance of moral violations and transgressions which involves other people can also generate these feelings (Brake et al., 2019; Rachman, 1994). As mentioned, mental contamination is associated with OCD. This is the result of frequent comorbidity of contamination (contact and mental) with obsessive thoughts and compulsive behaviors. Research has found that 59% of those suffering with OCD reported feelings of contact and/or mental contamination and 15% of that 59% reported feelings of only mental contamination (Coughtrey et al., 2012). This study provides two arguments for OCD, contact contamination, and MC being different constructs: (1) mental contamination and contact contamination do not always occur together, and (2) mental contamination is different from obsessions because only about 59% of those with OCD reported any feelings of contamination – contact or mental. The cognitive theory of obsessions and mental contamination further differentiates the two constructs (Rachman et al., 2015). According to this theory, obsessions result from a

person making significant misinterpretations of the personal significance of their intrusive and unwanted thoughts. On the other hand, mental contamination is caused by the persons' misinterpretations of the significance of a psychological and/or physical violation. While mental contamination is strongly connected with OCD and does not require a trauma to develop, it can develop because of a traumatic event. As such, recent research has begun to study its connection with other disorders, like Posttraumatic Stress Disorder (PTSD). Unfortunately, prior to 2012, most of the data regarding PTSD and mental contamination were largely based on case studies and clinical observations (Coughtrey et al., 2012). Additionally, early research has largely revolved around sexual traumas. For example, sexual assaults were found to often induce feelings of dirtiness and contamination. These feelings most commonly occur immediately following the event and when memories of the trauma(s) are triggered (Fairbrother & Rachman, 2004; Rachman, 1994). Unfortunately, most research has only focused on the links between sexual assault and mental contamination (Brake et al., 2018). This has left the relationship between mental contamination and non-sexual trauma neglected.

While recent research has begun to fill the gaps with empirical data, there is still a great deal of work to be done. Some of the more recent literature suggests there is a significant difference in levels of mental contamination between sexual and non-sexual assaults (Badour, Feldner, Babson, et al., 2013a). Badour and colleagues (2013a) found evidence to suggest that trauma-related disgust occurs across various types of trauma, sexual and non-sexual. These findings suggest that while sexual assault have the highest levels of MC, other types of trauma may still elicit it. This could, in part, be due to the

experience of disgust. With disgust being an extremely common emotion of mental contamination, more research is needed to examine the differences in disgust and mental contamination across various types of trauma. Specifically, literature needs to focus on how trauma relates to mental contamination.

Another important connection to discuss is the link between posttraumatic stress (PTS) symptoms and suicidality. PTS symptoms are known to be strongly correlated with, and predict, higher levels of suicide risk (Cougle et al., 2009; LeBouthillier et al., 2015; Panagioti et al., 2012; Thibodeau et al., 2013). PTS symptoms then go on to predict which of those individuals with suicidal ideations continue to plan for, or attempt, suicide (Nock et al., 2010). With past literature suggesting mental contamination exacerbates PTS symptoms (Rachman et al., 2015), understanding the connection between trauma and mental contamination could help clinicians better treat trauma survivors. Furthermore, it could aid in more narrowly predicting suicide risk within trauma-exposed populations. For example, if an individual reports a history of sexual abuse/assault, clinicians would know to monitor for suicide risk more closely. Suicide is more than an individual issue; it is a public health issue. According to the American Foundation for Suicide Prevention (2019), suicide is the 10th leading cause of death in the USA with over 47,000 (i.e., 129/day) deaths by suicide in 2017. Moreover, it was estimated there were over 1 million (i.e., 2,700/day) suicide attempts made that same year. Any and all information aiding in the prevention of suicide is important.

In an attempt to fill several gaps in the literature surrounding mental contamination and trauma, the present study had three broad goals which were accomplished through the hypotheses, which will be discussed later. (1) It examined how different trauma types relate to mental contamination following trauma exposure. (2) It investigated how mental contamination that developed after trauma exposure relates to PTS symptoms as defined by the DSM-5. Part of this will be to examine the role of mediation between trauma and suicide risk. (3) It utilized the Interpersonal Psychological Theory of Suicide (IPTS; Joiner, 2005) to predict suicide among a trauma-exposed population via its three major components: thwarted belongingness (TB), perceived burdensomeness (PB), and acquire capability (AC). These goals fill gaps in the literature and provide additional information for future projects regarding these constructs. Finally, a broad intention of this study was to provide information for mental health professionals which would aid in diagnosing, treating, and preventing suicide attempts in those with a history of trauma exposure.

CHAPTER II

LITERATURE REVIEW

Trauma and suicide risk

This study will specifically rely on the definition of trauma found in the

Diagnostic Statistical Manual 5th edition (DSM-5). The definition is housed within the

first criterion (i.e., Criterion A) required for a posttraumatic stress disorder (PTSD)

diagnosis (American Psychiatric Association, 2013). Per the DSM-5, a trauma is an

event where an individual experiences an actual or threatened death, severe injury, or

sexual violence. There are four primary ways these events can be experienced: if an

individual, (1) directly experiences a traumatic event as defined above, (2) witnesses the

trauma occurring to others, (3) learns about a close friend or family member

experiencing trauma, or (4) is repeatedly exposed to the intimate details of such events.

The latter three situations would be considered indirect exposure as the individual is not

personally experiencing the trauma but rather seeing it happen or learning about it

through someone else. The fourth situation – exposure to traumatic details – includes

vicarious trauma, which is when professionals working with trauma survivors take in the

experiences, reactions, and emotions of the survivors (Buchele, 1997). Social workers,

first responders, psychologists, and counselors are examples of those most at risk of

experiencing vicarious trauma (APA, 2013; Cosden et al., 2016; Dombo & Blome, 2016;

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Dombo & Gray, 2013). While this type of trauma exposure has been given its own name, it is, nonetheless, still a type of indirect trauma exposure. Aside from situations already mentioned, the DSM-5 gives numerous other examples of traumatic events. These include, but are not limited to, exposure to war, being beaten, being raped and/or molested, being kidnapped, being held hostage, experiencing a terrorist attack, torture, being a prisoner of war, and natural or man-made disasters.

Unfortunately, suicide risk is often higher in those with a history of trauma exposure than in those who have not experienced trauma, regardless of cultural background and ethnicity (Barbosa et al., 2014; Beristianos et al., 2016; Caravaca Sánchez et al., 2019; Estévez-Lamorte et al., 2019; Kimerling et al., 2016; Reifels et al., 2018; Smith et al., 2016; Zatti et al., 2017). Over decades of psychological research, academics, psychologists, counselors, and physicians have worked to understand what conditions and factors increase suicide risk. One of the first theories of suicide was published in the late 1800s. This first theory asserted suicide was a result of social and structural factors instead of individual factors specific to each person (Durkheim, 1897). Other theories of suicide range widely on what is thought to lead to suicidal ideation. For example, the Hopelessness Theory suggests hopelessness is the core factor of suicide vulnerability (Abramson et al., 2000) while the Escape Theory implies suicide is used by individuals in an attempt to escape negative and intense emotions and aversive self-awareness (Baumeister, 1990; Stanley et al., 2016). A more recent theory of suicide suggests that when an individual feels they do not belong, that they are a burden, and possess the capability to carry out a serious or lethal attempt, suicide risk is extremely

high (Joiner, 2005). This theory is the Interpersonal Psychology Theory of Suicide (IPTS). Due to this theory's reliability, validity, and relationship with trauma exposure, this was the theory used in the current project (e.g., Christensen et al., 2013, 2014; Davis et al., 2014; Heelis et al., 2016).

Interpersonal Psychological Theory of Suicide

The Interpersonal Psychological Theory of Suicide (Joiner, 2005; Van Orden et al., 2010) proposes there are three major elements that lead to death by suicide: thwarted belongingness (TB), perceived burdensomeness (PB), and acquired capability (AC). First, belonging is a powerful motivator. It is a basic human emotional need to be accepted by and connected with members of a group. Research found that humans need frequent, pleasant interactions with consistent individuals within a long-term, stable, and caring framework to satisfy the basic need of belongingness (Baumeister & Leary, 1995). Those without these interactions tend to have a decreased quality of life as psychological and physical problems are more common. For example, psychopathologies ranging from eating disorders to suicide are more common among those with thwarted belongingness (Baumeister & Leary, 1995). The IPTS postulates that a sense of belonging will not be met if an individual does not experience both a sense of caring from those around them and frequent face-to-face interactions with those same individuals (Baumeister & Leary, 1995; Joiner, 2005).

The second construct within this theory is most referred to as perceived burdensomeness (PB). However, some literature refers to it as thwarted effectiveness.

Effectiveness is the belief that we are contributors to our families, friends, and society (Joiner, 2005). When this feeling is thwarted, a perception of burdensomeness rises and contributes to suicidal ideations. The IPTS emphasizes the term "perceived" as these individuals perceive themselves to be a burden and believe this state is permanent and unchanging (Joiner, 2005; Van Orden et al., 2010). They believe this regardless of what may be true. Importantly, how one perceives something can influence their behavior. So, those who perceive they are a burden, in turn, are at an increased risk for suicidal desires and behaviors (Joiner, 2005). In early research, prior to the establishment of the IPTS, it was found that perceived burdensomeness and thwarted belongingness were common constructs within the suicide notes of those who died by suicide. Subsequently, this led to further research and the development of a theory which placed importance on thwarted belongingness and perceived burdensomeness as core predictors of suicidal desire (e.g., thinking one would be better off dead and desires to engage in suicidal behaviors; Joiner, 2005; Van Orden et al., 2010). A myriad of past research supports this theory and the role of these constructs on varying populations like Bhutanese refugees, younger individuals experiencing a psychotic episode, patients with eating disorders, and individuals battling chronic pain (Ellis et al., 2015; Heelis et al., 2016; Smith et al., 2018; Wilson et al., 2013).

The third and final construct within the IPTS is acquired capability (AC). Acquired capability increases the risk of lethal attempts and death by suicide (Joiner, 2005; Van Orden et al., 2010). The theory continues by stating AC is further broken down into two components. These components are an increase in pain tolerance and a

decreased fear of death. Repeated exposure to dangerous, painful, and provocative experiences can increase pain tolerance while decreasing fear of death (Bender et al., 2011; Van Orden et al., 2010). Acquired capability is accrued over time through these experiences. Examples of dangerous, painful, and provocative experiences can include, but are not limited to, combat, surgery, substance-abuse, trauma exposure, contact with police due to criminal behavior, and thrill-seeking activities (e.g., skydiving, street-racing, bungee jumping, cliff diving, and white-water rafting). However, recent research has found capability to not solely be acquired. Research has found genetics to play a role as well (Smith et al., 2012). While a shift has begun to consider the impact of genetics on capability – pain tolerance and decreased fear of death as part of that – this project will only investigate pain tolerance and fear of death.

As mentioned, recent literature has been extensively investigating the relationship between the IPTS within the context of trauma exposure (e.g., Allbaugh et al., 2017; Davis et al., 2014; Monteith et al., 2017; Schönfelder et al., 2019). Some of this research has aimed at understanding factors which mediate the relationship between trauma and suicide risk (e.g., Brake et al., 2019). As mentioned in the introduction, two of these factors are mental contamination and posttraumatic stress (PTS) symptoms. The next few sections discuss, in-depth, mental contamination and how this relates to trauma and posttraumatic stress symptoms.

Mental contamination

As mentioned in the introduction, mental contamination has been defined as the internal feeling of being dirty. It is associated with several different negative emotions. Furthermore, research on this construct has outlined its ability to present in one or more of the following forms: physical violation, psychological violation, visual contamination, self-contamination, and/or morphing (Rachman et al., 2015). As a reminder, the primary source of mental contamination is human. In other words, mental contamination will not develop if a human (i.e., self or other) is not present to evoke those feelings. For example, a child would not naturally feel internally dirty if he was not embarrassed by someone else. However, secondary sources can exist possibly including memories, objects, and places. This is true regardless of form of MC. MC can be caused by another human or be self-generated. Moreover, unlike contact contamination, MC is hard to localize, easily re-evoked, and not responsive to behaviors like washing. All forms of mental contamination tend to involve the violation of morals.

Mental contamination in the form of physical violation is when the initial event involves some form of physical contact (Rachman et al., 2015). This then creates feelings of contamination. Examples of physical violation include, but are not limited to, interpersonal traumas like sexual and physical assault. The second form, psychological violation, is caused without physical contact. Examples of this form of mental contamination include, but are not limited to, humiliation, betrayal, and degradation. Visual contamination results from an individual physically seeing someone who they deem as immoral, disreputable, or odd (Rachman et al., 2015). The mere sight of such an

individual is enough to induce this form of mental contamination. For example, if an individual knows someone is a child abuser, seeing them could induce these feelings. Self-contamination results from encountering one's own bodily products, from experiencing repugnant thoughts and urges, or by actions deemed unacceptable by oneself. Shame and guilt are common affect associated with this form of mental contamination. Individuals who experience this form of MC are often found to be scrupulous, have high personal standards, and aim to maintain moral and physical purity. For example, this form of MC may develop after having thoughts of harming another individual. Finally, morphing is the belief that being in close physical or visual proximity with an individual who has undesirable characteristics could pose a risk of absorbing those characteristics, in turn, becoming contaminated. This belief can construct negative, threatening cognitions which are antagonized by proximity to those who are viewed as having undesirable characteristics (Rachman et al., 2015). With all forms mentioned here, the feelings of dirtiness are internalized following the initial event. These feelings are often later provoked despite the lack of subsequent incidents of physical contact/contamination. This provocation can come from contact with the primary source or any secondary sources.

Posttraumatic mental contamination

As initially mentioned, mental contamination can come in different forms and be experienced in varying situations, traumatic and non-traumatic. Mental contamination has been well defined and studied in past literature (Bilekli & Inozu, 2018; Elliott & Radomsky, 2012; Fergus & Bardeen, 2016; Waller & Boschen, 2015). However,

posttraumatic mental contamination (PMC) is both a new construct and thought to be a subtype of mental contamination. Moreover, the relationship between PMC and PTS symptoms/PTSD has minimal research and understanding around it. Despite this, research has begun to make strides in an effort to stabilize this construct and better understand its impact on psychopathology and mental health treatments.

In a 2019 study, researchers aimed to broadly define PMC and examined its impact on PTS symptoms while investigating the indirect effects of PMC on suicide risk via PTS symptomology and TB/PB (Brake et al., 2019). Subsequently, the current study used the previously established definition of PMC. Broadly speaking, posttraumatic mental contamination seems to define itself without much additional thought or intellectual ponderance. That said, for technicality's sake, the formerly mentioned 2019 study defined PMC as MC that results following a traumatic event (Brake et al., 2019). However, an in-depth literature review suggests PMC could be better expounded on. This is because PMC may only primarily present in three of the five forms of MC (Rachman et al., 2015). The definition from the previously mentioned 2019 study does not consider the five forms in which mental contamination can come (Brake et al., 2019; Rachman et al., 2015). So, while the 2019 definition is a good start, the present study attempted to address the shortcomings of the current definition of PMC by incorporating the five types of MC.

Keeping this in mind, the definition for PMC developed in this study is: mental contamination initially presenting in the form(s) of physical violation, self-contamination,

and/or visual contamination that is experienced in the wake of a traumatic event. Notice two of the five forms are not mentioned (i.e., morphing and psychological violation). It does not appear there are situations in which those forms of MC develop that are also traumatic in nature. For example, being humiliated in public (i.e., psychological contamination), while distressing, is not traumatic. Similarly, being near an individual considered irreputable does not constitute a trauma. Note, these two forms of mental contamination can still develop following trauma exposure, but this study proposes that they are secondary if they develop at all. For the form of physical violation, these feelings often result from trauma like physical and sexual assault. Visual contamination can result from seeing someone you know who has committed an immoral act of which you are aware. Self-contamination can develop from witnessing traumas like a physical or sexual assault or experiencing an accident/disaster. When witnessing something like a physical assault, if the viewer does not stop or attempt to stop the event, this could be taken as violating one's own morals, thus causing self-contamination. Another example for this form is of an accident. If an individual caused a fatal car accident, this could also violate their personal morals of not harming another individual and, subsequently, induce feelings of contamination.

While little research has been done on it, there is literature which suggests non-interpersonal traumas are at a low risk of arousing feelings of mental contamination. Specifically, literature shows that non-interpersonal traumas do not evoke the strong feelings of disgust caused by interpersonal traumas (Badour et al., 2011). As previously discussed, disgust is a core emotion of mental contamination. Events which do not elicit

this emotion decrease the risk of mental contamination developing. Moreover, recent

research has found non-interpersonal traumas do not elicit behaviors specific to feelings

of contamination (e.g., washing; Ojserkis et al., 2020). A lack of disgust and

contamination specific behaviors, like washing, suggests the individual is not attempting

to cope with mental contamination. This is not to say it is impossible for non-

interpersonal traumas to evoke feelings of contamination. It is simply to mention their

risk is significantly lower than that of interpersonal trauma. For example, if an individual

experiences a disaster or accident in which others lose their life or are injured, they may

perceive the loss/injury as their fault because they believe they did not do enough to stop

the event, could have prevented it, or could have done more to protect others. The

inability to save and protect their loved ones could violate their own morals and be

internalized as unacceptable behavior subsequently creating feelings of contamination,

disgust, and guilt. So, while the possibility still exists, this is not expected to be a

common occurrence following a non-interpersonal trauma. Arguably, in considering the

previously mentioned literature (i.e., Badour et al., 2011; Ojserkis et al., 2020), this study

does not expect to find evidence which contradicts these studies.

Conceptually, those who experience self-contamination in situations like the one

discussed above may also be prone to moral thought-action-fusion (TAF) bias (Berle &

Starcevic, 2005), survivor's guilt (Murray, 2018; Valent, 2007), and/or deontological

guilt (Basile et al., 2011). It is suggested that these kind of cognitive biases and

processes can generate and maintain mental contamination (Rachman et al., 2015).

Moral TAF bias is when an individual holds the belief that simply having an immoral

thought is comparable to carrying out an immoral action (Coughtrey et al., 2013; Rachman et al., 2015). So, those who are biased toward these types of cognitive processes may be at an increased risk for mental contamination. The assumption of having violated one's own morals (i.e., deontological guilt) and thus developing feelings of worthlessness and expectations of punishment has been found to activate the insula, which is known in processing emotions like disgust (Basile et al., 2011). Next, due to the strong correlations between guilt and mental contamination (Fairbrother et al., 2005; Fairbrother & Rachman, 2004), it is reasonable that survivor's guilt (i.e., guilt/shame about surviving or not being harmed in situations where others were; Murray, 2018; Valent, 2007) is partially responsible for the development of PMC. The core of survivor's guilt is moral judgment of blaming oneself for events or the outcome of events that took place (Valent, 2007). Criticism, self-criticism or otherwise, increases feelings of contamination (Rachman et al., 2015). All of these constructs, including self-contamination, contain numerous similar negative affect and the experience of personal wrongdoing/moral violation(s). Disgust, shame, and guilt are three common emotions related to the various constructs discussed up to this point. While there are similarities, MC revolves around feelings/emotions whereas survivor's guilt is about self-judgement and blame. Blame is not a construct explicitly attached to MC. While these constructs are separate, they are not exclusive. These cognitive biases can generate and maintain feelings of contamination. From this point, PMC may contribute to the development of the other forms of mental contamination (i.e., psychological contamination, visual contamination, and morphing). Refer to Figure 1 below for the progression from event to

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PMC to other forms of MC. The progression of PMC in the context of this study is that

the traumatic event occurs first, then PMC develops via the MC forms of physical

violation, visual contamination, and/or self-contamination, then other forms of MC

can/may develop after as secondary forms of MC. However, the secondary forms will

not develop if, at least, one of the primary forms of PMC is not present.

Posttraumatic Stress Symptoms (PTS symptoms)

　　　　Having already discussed the definition of trauma, the next step is to outline PTS

symptoms that can develop after exposure. The DSM-5 (APA, 2013) describes Criteria

B-E as symptom sets with Criteria G-H representing qualifiers that must be met for the

symptoms to qualify as resulting from trauma exposure. Of course, these symptoms will

not present if Criterion A (i.e., trauma exposure) is not initially met. Criterion B requires

the presence of intrusive symptoms related to the traumatic event in at least one of the

following ways: unwanted and upsetting memories, nightmares, events in which the

individual feels the event is recurring (e.g., flashbacks), emotional distress after exposure

to reminders of the trauma, or physical reactivity after exposure to reminders of the

trauma. Criterion C requires the avoidance of stimuli related to the trauma in avoiding at

least one of the following: trauma-related thoughts, or feelings or trauma-related

reminders. For Criterion D, negative thoughts or feeling have to begin or worsen

following the trauma in at least two of the following ways: inability to recall details of the

trauma(s), overly negative appraisals of self and/or world, exaggerated blame of self or

others for causing the trauma, negative affect, decreased interest in activities previously

enjoyed, feelings of isolation or detachment from others, and trouble experiencing

Figure 1

Progression of events from traumatic event to PMC to other forms of MC

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┌─────────────────────────────────┐
│   Traumatic event: E.g. Forced  │
│  sexual penetration (i.e. rape),│
│     an accident, a disaster,    │
│         physical assault        │
└─────────────────────────────────┘
                 │
                 ▼
┌─────────────────────────────────┐
│  Posttraumatic mental           │
│  contamination presenting in    │
│  the form(s) of physical        │
│  violation, self-contamination, │
│  and/or visual contamination    │
│  experienced in the wake of a   │
│  traumatic event.               │
└─────────────────────────────────┘
                 │
                 ▼
┌─────────────────────────────────┐
│  Potential development of other │
│  forms of mental contamination  │
│  (i.e. psychological and        │
│  morphing) which are secondary  │
│  and will not develop if the    │
│  previous forms do not present. │
└─────────────────────────────────┘
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positive affect. Criterion E requires that trauma-related arousal and reactivity begins or worsens after trauma exposure and is experienced in at least two of the following ways: irritability or aggression, risky or destructive behavior, hypervigilance, heightened startle reaction, difficulty concentrating, and difficulty sleeping. Finally, these symptoms must last for more than one month (Criterion F), create functional impairment (Criterion G), and cannot be the result of medication, substance use, or other illnesses (Criterion H) (APA, 2013). The above defined criteria must be present for the diagnosis of PTSD. However, posttraumatic stress disorder symptoms, or subclinical posttraumatic stress disorder, which do not reach severity and requirements for a diagnosis of PTSD can still cause distress and impairment of one's life. Because this project is not investigating a clinical population, PTS symptoms will be the focus instead of PTSD.

Delineation of posttraumatic mental contamination and PTS symptoms

At this point, broad inferences could be drawn about the links between PMC, trauma, and PTS symptoms. This section is designated to clearly delineate between these constructs. There are several links between posttraumatic mental contamination and post-traumatic stress. These links help explain past literature finding strong relationships between the two. The links and similarities discussed below can provide some reasoning for why past research has found posttraumatic mental contamination to exacerbate PTS symptoms (Rachman et al., 2015). For example, PMC and PTS symptoms have similar affect (e.g., guilt, shame, and fear). Conceptually, a double dose of symptoms (e.g., negative affect from PMC and PTSD) would suggest overall psychopathologies are worse than if the affect only resulted from a single source (i.e., PTSD or PMC). With

posttraumatic mental contamination, the individual repeatedly experiences negative

cognitions/appraisals such as feelings of disgust, fear, and guilt (similar to Criterion D of

PTSD). Additionally, past literature suggests that the more negative appraisals one has of

feeling disgusted, the higher the likelihood the feelings of disgust will be internalized and

become MC (Ojserkis et al., 2018). These feelings can be provoked/triggered by

interaction with primary or secondary sources of the initial contamination (similar to

Criterion E of PTSD). The triggers can cause the individual to re-experience previous

feelings of posttraumatic mental contamination (similar to Criterion B of PTSD). The

experience of posttraumatic mental contamination also leads to avoidance of the

reminders of and source of the contamination. This is done to decrease the distress and

anxiety associated with the contaminant (similar to Criterion C of PTSD). As mentioned,

the feelings, reactions to, and symptoms of posttraumatic mental contamination are

similar to those of PTSD (e.g., re-experiencing, avoidance of triggers, negative changes

in cognitions, negative affect, and presence of triggers). Much like how those

experiencing posttraumatic mental contamination experience intrusive and pervasive

thoughts of dirtiness, those with PTSD experience intrusive and pervasive thoughts of

their trauma. In PTSD, extreme and prolonged psychological and physiological distress

and functional impairment occurs (Criterion G of PTSD). While the present study did

not find research that examines levels of distress and impairment which occurs within

MC, it is logical to assume this happens. For example, thoughts of an individual's

trauma(s) may lead to increased posttraumatic mental contamination. In turn, the

individual will attempt to remedy the feelings of dirtiness or seek out ways to avoid the

triggers of those feelings (Brake et al., 2018). The negative affect and avoidance of what causes the feelings of contamination may lead to significant levels of distress and functional impairments because of the cognitive load associated with avoiding reminders and attempting to alleviate distress.

Notably, while there are numerous similarities, posttraumatic mental contamination often contributes to different symptoms not seen in PTS symptomology. For example, while arousal is present in both, arousal within PTS often leads to behaviors like hypervigilance and heightened startle reaction (APA, 2013). Arousal within posttraumatic mental contamination presents as increased feelings of dirtiness and anxiety associated with exposure to reminders of a physical and psychological violations (Herba & Rachman, 2007; Rachman et al., 2015). Importantly, what separates posttraumatic mental contamination from PTS symptoms is that the development of posttraumatic mental contamination is not dependent on the experience of a traumatic event. Feelings of dirtiness can be felt following trauma (Badour, Feldner, Blumenthal, et al., 2013b; Brake et al., 2019; Herba & Rachman, 2007; Rachman et al., 2015), as discussed in the previous section on PMC. However, trauma is not a requirement for the development of these feelings. As a reminder, feelings of contamination can result from physical violation (e.g., assault), psychological violation (e.g., humiliation), visual contamination (e.g., seeing something deemed immoral), self-contamination (e.g., having an immoral thought), and/or morphing (e.g., fear of inheriting characteristics of someone immoral as a result of proximity to the person). Some of these forms of MC can be the

direct result of a traumatic event. But, all five forms of MC can be the consequence of non-traumatic events.

Another element that can help explain the link between posttraumatic mental contamination and trauma is moral injury (Antonelli, 2017; Rachman et al., 2015). While the present study will briefly discuss this, the in-depth conversation of the relationship between trauma, posttraumatic mental contamination, and moral injury is beyond the scope of this project. Moral injury is when the ethical codes of an individual are violated. Simply put, moral injury is the action/incident and metal contamination are the potential resulting emotions/feelings. Moral injury can happen when one violates, experiences, does not prevent, witnesses, or comes to know about actions that breach one's morals (Antonelli, 2017; Drescher et al., 2011; Litz et al., 2009). An example of a type of trauma often comorbid with moral injury is combat killing (Bryan et al., 2018; Kelley et al., 2019; Purcell et al., 2018). However, because morals can be vastly diverse across populations, the traumatic events which also involve moral injury vary as well and are often subjective. Posttraumatic mental contamination, also, often involves moral injury (Rachman et al., 2015). As mentioned, with moral injury being a common element of both posttraumatic mental contamination and trauma, this provides more reasoning for why PMC and PTS symptoms are closely related.

To summarize the delineation between posttraumatic mental contamination and PTS symptoms, while there are similarities, the numerous differences suggest they are two different constructs. Research has demonstrated that posttraumatic mental

contamination exacerbates PTS symptoms (Rachman et al., 2015). Additionally, past

research has found significant and yet, far from perfect correlation (r = .62; Brake et al.,

2019) between PTS symptoms and posttraumatic mental contamination. These findings

indicate these two constructs are distinct from each other This relationship could be

explained in part by the overlap in symptomology. Additionally, the potential of

experiencing moral injury is possible with both PTS symptomology and PMC, further

connecting the two constructs.

Current study

> After having discussed the various variables and commonalities above, the

importance for considering posttraumatic contamination (PMC; Brake et al., 2019) when

researching trauma and suicide risk is overwhelming. A 2019 study examined the

different associations and indirect effects between PMC, PTS symptoms, and suicidal

risk (Brake et al., 2019). Specifically, it researched how PMC indirectly affected suicide

risk via PTS symptoms and two of the three components of the IPTS (TB and PB). Their

research found PMC to indirectly predict suicide risk as mediated by PTSD total

symptoms and perceived burdensomeness. While they did not find the same results in

their model of PMC, PTSD total symptoms, and TB (i.e., significance was p < .10), this

pathway should not be disregarded and should be further studied to understand why this

pathway was not significant. While Brake and colleagues (2019) were forerunners for

this specific type of research, literature has yet to examine how different types of trauma

are related to PMC. Brake and colleagues (2019) specifically mentioned that one

limitation of their study was the most common traumatic events experienced by their

participants involved injury, death of a loved one, or illness. As a reminder, illness is not, in and of itself, traumatic unless sudden and/or catastrophic (APA, 2013). This could further confound their findings. Due to this noted limitation, nothing is known about how specific trauma types indirectly affect all three components of the IPTS and suicide risk via PMC and PTS symptoms. Due to the large number of events which can be considered traumatic, this study grouped trauma into three trauma types: interpersonal-sexual, interpersonal-physical, and non-interpersonal. Review Table 1 for a delineation of the trauma types with examples of each.

To support this categorization, the present study relied on past literature which segregated trauma types into two main categories: interpersonal trauma and non-interpersonal trauma (Kessler & Üstun, 2004; Sharp et al., 2017; Woodward et al., 2015; Yoo et al., 2018). Interpersonal traumas are those in which a perpetrator has the intent of doing harm to another and can cause an individual to question their autonomy and challenge their core beliefs of the world (Lilly et al., 2011). Non-interpersonal traumas, like accidents, illness, and natural disasters, normally lack a perpetrator and the intent to do harm. This makes victims less vulnerable to negative appraisals of the world (Bödvarsdóttir & Elklit, 2004; Lilly et al., 2011; Wagner et al., 2009). Interpersonal traumas, like sexual and physical assaults, that have been personally experienced by the victim have been shown to make an individual more vulnerable to mental contamination and, in turn, have a higher chance of PMC developing (Badour et al., 2014; Fairbrother & Rachman, 2004; Fergus & Bardeen, 2016; Herba & Rachman, 2007; Ishikawa et al., 2015). Research suggests this is due to the negative cognitive appraisals following an

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Table 1

Types of Trauma and Examples of Each

TYPE OF TRAUMA	EXAMPLES
INTERPERSONAL – SEXUAL	Personally experiencing, or witnessing or learning of a loved one or close friend experiencing, forced sexual penetration, alcohol/drug facilitated sexual penetration, sexual trafficking, noncontact sexual abuse, abusive sexual contact, etc.
INTERPERSONAL – PHYSICAL	Personally experiencing, or witnessing or learning of a loved one or close friend experiencing, physical attack, robbery, mugging, childhood physical abuse, torture, exposure to war, being taken hostage etc.
NON-INTERPERSONAL	Personally experiencing, or witnessing or learning of a loved one or close friend experiencing, natural or man-made disasters, severe motor vehicle accidents, medial traumas like waking during surgery and anaphylactic shock, etc.

Note. The examples above are also used in the DSM-5 (APA, 2013).

event which violates one's morals and freedoms, like sexual traumas (Ishikawa et al., 2015). Because research is largely inconclusive on whether sexual assaults are the only type of interpersonal trauma to produce feelings of mental contamination, this study separated trauma type groups for sexual and physical traumas. This allowed for a more comprehensive examination of how these traumas (i.e., interpersonal-sexual and interpersonal-physical) affect PMC.
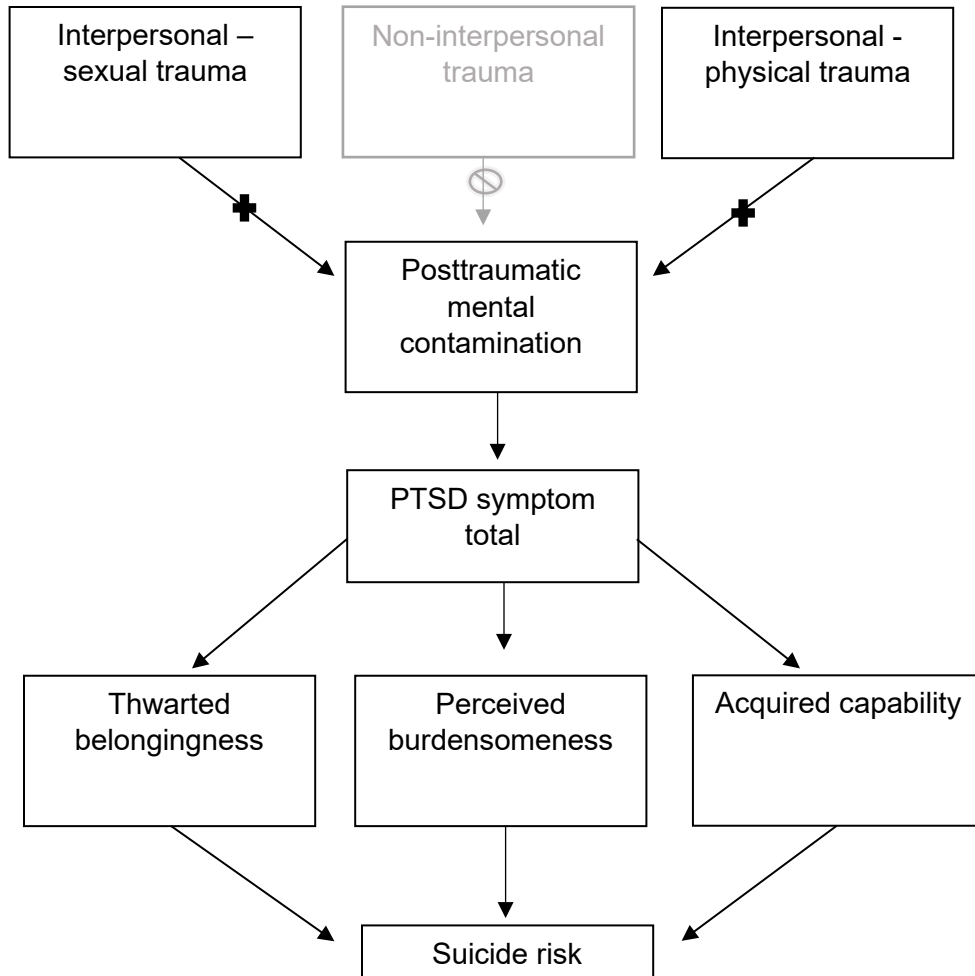
The current study aimed to build on and address limitations within the previously mentioned 2019 study that examined PMC, PTS symptoms, and suicide risk (Brake et al., 2019). To address one limitation, the current study assessed AC in one of the models. Brake and colleagues' (2019) study only examined thwarted belongingness (TB) and perceived burdensomeness (PB). While those scores establish desire for suicide, according to the IPTS, all three constructs are important in assessing total suicide risk and whether someone is going to engage in a serious or lethal attempt (Joiner, 2005; Van Orden et al., 2010). Additionally, because AC results from increased pain tolerance and decreased fear of death, exposure to traumas may elicit these changes in a person, subsequently increasing their suicide risk. As mentioned, this study addressed the trauma type limitation by having three separate trauma groups as previously described (i.e., non-interpersonal, interpersonal-sexual, and interpersonal-physical traumas).

Having addressed these limitations, the present study worked to expand on the indirect effect findings PMC has on suicide risk via PTS symptoms and the IPTS components. Additionally, the current study aimed to support several of the previous

findings from Brake and colleagues' (2019) study and to establish if these findings were consistent across different populations. The 2019 study used a community sample of adults older than 18 (M=40.65, SD=12.37, 60.34% female). The present study will look at a much younger sample, specifically college students. For this study, there were three hypotheses. 1) It was hypothesized that interpersonal-sexual traumas would significantly predict suicide risk and that this would be mediated by PMC, PTS symptom total, and each of the IPTS components, respectively. 2) It was hypothesized that interpersonal-physical traumas would also significantly predict suicide risk and that this would be mediated by PMC, PTS symptom total, and the IPTS components. 3) It was hypothesized that non-interpersonal traumas will not significantly predict PMC or suicide risk as mediated by PMC, PTS symptoms, and the IPTS components. For a visual of the proposed hypotheses, please refer to Figure 2.

Figure 2

Model of study and hypotheses

Note. ✚ represents the hypothesis when the trauma type will predict PMC. ⊘ represents the hypothesis when the trauma type will not predict PMC. This is a conceptual model. As such, some pathways and error terms are excluded for readability. Acquired capability is made up of pain tolerance and fear of death. These will be tested separately.

CHAPTER III

METHODS

Participants

Due to changes to Texas' Title IX laws, any data collected preceding January 1,

2020 was unusable and COVID-19 presented with its own complications[1]. Prior to

January 1, 2020, data from 51 undergraduate students from lower-level classes at a

master-level regional university were collected. Of those students, nine students were

disqualified due to describing multiple traumas or describing an event that is not

considered traumatic as defined in this study. The final participant pool used for analyses

was ($n = 42$). Participants were asked to identify their assigned gender (i.e., male,

female, or intersex). Because no one chose intersex as an option, assigned gender

presents as dichotomous in this study. Women made up 59.5% of the sample with the

most common ethnicity being Caucasian (76.2%). Ages ranged from 18 to 30 with most

being traditionally aged college students (M=19.31, SD=2.09).

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[1] The combination of COVID-19 and the change in Texas' laws presented with unforeseen data collection
complications. The state of Texas implemented Senate Bill 212 on January 1, 2020. This bill puts
mandatory reporting in place regardless of research protections and IRB approval. To protect the welfare
of the participants and their private information, the researchers agreed to only use data collected before
January 1, 2020. The researchers agreed that abiding by the principal of "do no harm" was of the utmost
importance in this situation.

Measures

The measures discussed below were presented to all the participants. All measures were presented using Qualtrics.

Traumatic free-text box

Participants briefly described (2 to 4 sentences) an event they experienced that they subjectively considered most traumatic. Participants were instructed to provide how often the trauma occurred, if more than once, and to list the age(s) at which it occurred. Additionally, the participants were told to refrain from using actual names, except their own, and to avoid going into too many details. The free-text box limited them to 400 characters to ensure the amount of details given were constrained. The trauma described in this free-text box was used to allow the researchers to sort the event into its respective trauma type. Specifically, the traumatic scenarios were sorted by multiple coders into the three different trauma types as previously described (i.e., interpersonal-sexual, interpersonal-physical, or non-interpersonal traumas).

Categorize question

Participants were asked to choose which of the three trauma types their experiences belonged in. This item was used as a manipulation check and to assist in accurately categorizing the participant's trauma. Fisher's exact test found a significant association between the trauma type categorization of the raters and participants. This suggests the categorization between the participants and the raters were consistent, $p <$

.01 (two-sided). Fisher's test was used because the data did not meet the requirements

for χ^2 test. Specifically, six cells had an expected count less than five.

The Suicide Behaviors Questionnaire-Revised

The Suicide Behaviors Questionnaire-Revised (SBQ-R; Osman et al., 2001)

assesses an individual's lifetime suicide ideation and attempts, threat of suicide attempt,

likelihood of future suicidal behavior, and suicidal ideation within the last year. Scores

can range from 3 to 18 with a score of 7 or higher being interpreted as a presence of

suicide risk within the general population. Past research has found this measure to be

reliable ($\alpha = 0.84$; Brake et al., 2019). Past attempts and ideation have been found to

indicate increased suicidal risk in an individual (Joiner, 2005). The SBQ-R was used to

analyze suicide risk. More specifically, this measure was used as the dependent variable

(DV) and worked as a suicide risk indicator for the researchers. If the score indicated a

participant was of high suicide risk (i.e., ≥ 7), they were contacted and given resources

and supports should they want or need to reach out for help. The measure showed good

internal consistency ($\alpha = .85$).

Posttraumatic Experience of Mental Contamination

The PEMC is a recently developed measure with promising preliminary

psychometric properties. The PEMC scale uses a 5-point Likert scale (0= *Not at all* to 4=

Very much). This measure is an adaptation of the Vancouver Obsessional Compulsive

Inventory-Mental Contamination scale (VOCI-MC; Thordarson et al., 2004). Items

within the PEMC were adapted to reference mental contamination following trauma

exposure. For example, "Since the event, I often cannot get clean no matter how thoroughly I wash myself". Participants were asked to rate each item with the trauma they briefly described in mind. The scores were then added together to create a total score – higher scores indicate greater PMC. The preliminary psychometric results of the PEMC scale were promising. The internal consistency was good ($\alpha = .98$), and the PEMC was significantly correlated with the VOCI-MC ($r = .71$, $p < .001$), which suggests convergent validity. Additionally, all items of the PEMC loaded onto one factor (Brake et al., 2019). This measure was used to assess the PMC levels across the different trauma types. A general cut-off score of ≥ 10 is suggested to identify those with clinically significant levels of PMC. This is the same cut-off score used for the VOCI-MC in past studies (Coughtrey et al., 2014). The reliability of this measure for the current study was $\alpha = .97$.

The Post-Traumatic Stress Disorder – Checklist

The Post-Traumatic Stress Disorder – Checklist version 5 (PCL-5) is a 20-item self-report measure which assesses the symptom severity of PTSD using the DSM-5 criteria (Weathers et al., 2013; Wortmann et al., 2016). The PCL-5 uses a 5-point Likert scale (0= *Not at all* to 4= *Extremely)*. Scores range from 0 to 80, and a cut-point score of ≥ 33 is suggested to be reasonable when, preliminarily, determining if an individual meets PTSD criterion. The original PCL version has a high test-retest reliability ($r = .96$), and the internal consistency is acceptable ($\alpha = .91$; Wortmann et al., 2016). This measure was used to gather information on PTS symptoms in the participants. The internal consistency was acceptable for the current study ($\alpha = .96$).

The Interpersonal Needs Questionnaire

The Interpersonal Needs Questionnaire (INQ-15; Van Orden et al., 2012) includes 15 items and uses a 7-point Likert scale (1= *Not at all true for me* to 7=*Very true to for me*) to assess thwarted belongingness and perceived burdensomeness, which is how the level of suicidal ideation is determined and are two of the three constructs within the IPTS (Van Orden et al., 2010). . It gives the participants prompts like, "These days, I feel disconnected from other people", and has them rank the prompt on the Likert scale. This scale can be used to gather a complete picture of an individual's interpersonal needs are being met. It can also be broken into two subscales to assess if one need (e.g., belongingness) is better or worse than the other (e.g., burdensomeness). As such, it has two subscales within it, one for PB (i.e., items 1-6) and one for TB (i.e., items 7-15). Suggested cut-off score of the PB subscale is a score greater than or equal to 17; cut-off score for the TB subscale is a score greater than or equal to 22 (Mitchell et al., 2017). Past research found acceptable internal validity for the INQ-PB subscale and for the INQ-TB subscale (αs = .89, .85; Van Orden et al., 2012). The entire measure showed good internal consistency in the current study (α = .96). The PB and TB subscales were also reliable (αs = .97, .89)

Acquired Capability for Suicide Scale – Fearlessness About Death

The Acquired Capability for Suicide Scale – Fearlessness About Death (ACSS-FAD; Ribeiro et al., 2014) was used to measure the amount of fear of death in the participants. Previous findings of the ACSS-FAD found it to have range of $\alpha = 0.77$ to 0.85, suggesting decent internal consistency (Ribeiro et al., 2014). Because a decreased fear of death increases suicide capability, this measure was used as one of the two scales to establish AC. This one focuses on fear of death and the next scale discussed measures implied pain tolerance. The reliability of this measure for the current study was acceptable ($\alpha = .82$).

The Painful and Provocative Events Scale

In addition to the ACSS-FAD, the Painful and Provocative Events Scale (PPES; Bender et al., 2011) was used to gather information about one's acquired capability. This scale collects an implied level of pain tolerance. It does this by assessing the amount of painful experiences an individual has encountered (e.g., getting a tattoo, being shot, having a broken a bone). This measure also assesses the amount of fear associated with dangerous, and potentially fatal, situations (e.g., skydiving, bungee jumping, use of intravenous drugs) by asking how often the individual has encountered situations which could lead to pain and/or death. A higher frequency of painful experiences implies an individual has a higher pain tolerance. Additionally, exposure to dangerous situations can increase pain tolerance. The PPES has had adequate reliability in past studies with a range of $\alpha = 0.89$ to 0.90 (Bauer et al., 2018; Bender et al., 2011). The internal consistency of the PPES for the current study was adequate ($\alpha = .79$).

Center for Epidemiologic Studies Depression Scale – Revised

The Center for Epidemiologic Studies Depression Scale – Revised (CESD-R; Eaton et al., 2004) is a 20 item, five-point Likert scale (0=*Not at all or Less than 1 day* to 4=*Nearly every day for 2 weeks*). Participants use the Likert scale to rate how often they experience each symptom (e.g., "I felt sad"). A summation of the score shows depression symptom severity with a range from 0-80. Past research has found this measure to be reliable with an acceptable internal consistency (α = .92; Van Dam & Earleywine, 2011). This measure was used to assess depression levels in the participants, which was used as a covariate. The reliability of this measure for the current study was good (α = .96).

The Trauma History Questionnaire

The Trauma History Questionnaire (THQ; Hooper et al., 2011) is a 24-question self-report measure that presented the participant with 24 separate brief traumatic scenarios and asked the participant to answer in a yes/no format as to if they have experienced that trauma. Some of these events include but are not limited to disasters, sexual and physical assault, and combat. For each event where the participant answered "yes", they were asked to specify the frequency of the event. This measure assisted the individual's recall of past trauma(s) while providing information on types and frequency of trauma. The THQ is primarily an instrument for qualitative data collection. As such, it has no standard scoring. However, for projects such as this, it is adapted to generate a total score of traumatic events. It further breaks down into three types of trauma (i.e., crime-related, physical and sexual assault, and disasters). In a previous study, the reliability for this measure was found to be less than what is considered acceptable (α

=.67; Sullivan et al., 2017). Research on the psychometric properties of this measure helps explain that, due to there being no standard scoring from which norms are established, there are some reasonable explanations for lower reliability and validity. This is a common occurrence with trauma history measurements. In part, it is a result of memory and motivation influencing answers, in turn, impacting reliability and validity. All of this combined with lack of standard scoring explains the low Cronbach's alpha (Hooper et al., 2011). Nonetheless, the THQ is a common trauma history measure used across a myriad of trauma research and clinical practices. The reliability of the THQ for the present study was adequate (α =.77), which is considered adequate. This measure was used to collect data on pervasiveness and amount of traumatic exposure for the sample and was used to control for trauma exposure frequency.

Happy event free-text box

Participants were instructed to reflect and think privately about the happiest day or event of their life. They were instructed to briefly describe the event once they were done reflecting on it. They were instructed to not use names, other than their own, and were limited to 500 characters. This activity was done to help mitigate any lingering distress following the measures above and increase pleasant emotions and affect. Research has found that having individuals sit and think privately on positive life events produces an increase in, and can maintain, positive emotions (Lyubomirsky et al., 2006). As such, this portion of the study helped to mitigate potential risks. This information was not included in any analyses and only served as a protectant for the participants.

Procedures

All study procedures were approved by the university's Institutional Review Board (#2019.11.001). Participants were recruited via fliers used in in-class announcements, word-of-mouth (i.e., student to student), and advertisement of the study via professors posting an announcement on Blackboard. Inclusion criteria were 18 years of age or older, were fluent in English, and have experienced at least one traumatic event during their life. If an individual did not qualify, other opportunities were available to them which would satisfy their course credit requirement. Participants signed up for the study on Doodle via a link posted on the Blackboard page of the participating courses. Approximately 24- to 48-hours before the slot they signed-up for, the participants were sent an email reminding them of the study's time and location**.**

Participants were run in groups in a computer laboratory on campus. The researchers used a generic computer log-in so no information regarding the study was tied to the participant's university account. While the participants were in a group setting, they completed the survey on their own and at their own pace. Following verbal instructions given by the researcher(s), the participants typed in an anonymous link provided to them at their arrival. This link took them into the electronic consent form. To acknowledge their understanding of the purpose and nature of the study and their agreement to participate in this study, participants either chose "yes" or "no" after reading through the form. If they chose "yes", they indicated that they 1) were 18 years of age or older, 2) were fluent in English, 3) have experienced some type of traumatic event, 4) have read and understood this consent form, and 5) wish to participate in this

study. With their electronic consent, they were taken into the rest of the study. If they chose "no", the study ended with no penalty to the participant and course credit was still received.

Participants were run in groups of no more than 20 persons. At least one computer was placed between each participant to ensure privacy and confidentiality of the information given by the participant during the survey. Additionally, when appropriate, participants were not seated directly behind each other. For example, the layout of one room was such if the participants sat behind each other, it was possible the participant in the back could see the answers of the one in the front. This was not the case for other rooms, though. They were instructed to place their phone on vibrate or silent and to keep it put away until they had left the room. This helped ensure the comfort and confidentiality of all participants. Upon completion of the study, they were provided with a paper copy of the informed consent for their records and a debriefing statement. Participants were instructed to refrain from talking during and after the study until they had left the room.

This study utilized block randomization. The first portion of the survey consisted of three blocks. One block contained numerous self-report measures which were randomized. These measures are as follows: the Interpersonal Needs Questionnaire (INQ; Van Orden et al., 2012) the Acquired Capability for Suicide Scale-Fearlessness About Death (ACSS-FAD; Ribeiro et al., 2014), the Center for Epidemiologic Studies Depression Scale-Revised (CESD-R; Eaton et al., 2004), the Painful and Provocative

Events Scale (PPES; Bender et al., 2011), and the Post-Traumatic Stress Disorder –

Checklist version 5 (PCL-5; Wortmann et al., 2016). The second block consisted of the

traumatic free-text box and self-reports measures specific to traumatic event history.

These measures were not randomized within the block. This block first presented the

participants with the Trauma History Questionnaire (THQ; Hooper et al., 2011). Next,

they were presented with the traumatic free-text box, followed by the categorize question.

Finally, they answered the Posttraumatic Experience of Mental Contamination (PEMC;

Brake et al., 2019). The third block consisted of the Suicide Behaviors Questionnaire-

Revised (SBQ-R; Osman et al., 2001). These three blocks were presented to the

participants in random order to attempt to counterbalance order effects. The fourth block

was always presented last. In block four, the participants completed the happy event

free-text box.

It was important to the research team to identify high-risk individuals at-risk for

suicide and provide appropriate intervention (e.g., follow-up contacts). Empirical

evidence supports the preventive effects of follow-up contacts on suicidal behaviors

(Luxton et al., 2013). At the end of each day, the research team tabulated the scores of the

SBQ-R for each participant. A follow-up email was sent to all participants with a score

of 7 or above (Osman et al., 1999). These participants were offered the opportunity to

connect with the principal investigator (a clinical psychologist by training) and were

provided with a list of mental health resources (e.g., the university counseling center and

various mental health hotlines).

Data Analysis Plan

First, each traumatic event described by the participant was categorized. To ensure accurate placement of the described traumas, inter-rater reliability was used. The coding key was as follows: 0 = *no trauma*, 1 = *interpersonal sexual trauma*, 2 = *interpersonal physical trauma*, and 3 = *non-interpersonal trauma*. There were four primary raters, including the author of this thesis. The raters ranged from graduate to undergraduate students who were all approved by the IRB to work on the project. The only information provided to each rater was the DSM-5's definition of trauma and the coding system. All data were deidentified before being sent to the raters. Of the 51 participants, 11 participants had tied ratings. For example, two raters categorized the trauma as interpersonal physical while the other two categorized the same trauma as non-interpersonal. As such, the principal investigator acted as the tie breaker. While the participants also rated their own trauma, it was thought that their subjectivity of this rating could skew proper placement of their traumatic event into its respective group. As such, their personal rating was only used as a manipulation check. However, Fisher's exact test showed a significant correlation between the participants' and the raters' categorization, $p < .01$ (two-sided). Refer to the contingency table (Table 2) for the specific statistics. While the participant's rating was not relied on for the final categorization, as a manipulation check, it appears the researchers' and the participants' ratings were similar in the categorization of the traumas discussed by the participants. An example of the coding is if one participant reported experiencing a major natural disaster, they were put in the "non-interpersonal" trauma group.

In addition to running descriptive statistics and frequency statistics, bivariate correlations were run separately for men and women to examine the relationships between the primary variables in the study. This allowed for a more in-depth look at how gender is related to different mental health constructs and difficulties. Finally, this study examined the indirect effects of trauma type (i.e., the multi-categorical antecedent) on suicide risk via PMC, PTS symptom total, and TB, PB, AC. Per the IPTS, AC is comprised of an increased pain tolerance and a decreased fear of death (Joiner, 2005). The PPES and ACSS-FAD are two separate measures which, respectively, assessed those attributes. There is a lack of literature suggesting the total scores of the PPES and ACSS-FAD can be combined to create one cohesive variable (i.e., AC). As such, they were assessed separately in their own models. In the original hypotheses, non-interpersonal trauma was hypothesized to be non-significant in the model. As such, this served as the reference group to which sexual and physical traumas were compared. Analyses were conducted using Model 6 of the PROCESS macro for IBM's Statistical Package for the Social Sciences ® (version 26; IBM SPSS ®; Hayes, 2017). As discussed, the participants were categorized to their respective antecedent category using the rater's assignment of their answer to "briefly describe the most traumatic experience you've had." This coding system was explained in more detail above, as was the use of inter-rater reliability during the coding process. Indirect models were evaluated for significance using 95% bias-corrected confidence intervals based on 10,000 bootstrapped resamples with replacement. Biological sex (i.e., assigned gender), depression, and trauma exposure frequency were covariates within the model.

Table 2

Fisher's Exact Test for Ratings Between Research Raters and Participants

		Participant's rating			
		Sexual trauma	Physical trauma	Non-interpersonal trauma	Total
Researcher's rating	Sexual trauma	10	1	0	11
	% within researcher's rating	90.9	9.1	0.0	100.0
	% within participant's rating	100.0	7.7	0.0	26.2
	Physical trauma	0	5	5	10
	% within researcher's rating	0.0	50.0	50.0	100.0
	% within participant's rating	0.0	38.5	26.3	23.8
	Non-interpersonal trauma	0	7	14	21
	% within researcher's rating	0.0	33.3	66.7	100.0
	% within participant's rating	0.0	53.8	73.7	50.0
Total		10	13	19	42
	% within researcher's rating	23.8	31.0	45.2	100.0
	% within participant's rating	100.0	100.0	100.0	100.0

Results of the serial indirect effect analyses of trauma type on suicide risk via PMC, PTS symptom total, and TB, PB, pain tolerance, and fear of death are presented in Figures 3 through 10. There were four total analyses conducted. The difference in those models was the third mediator (i.e., the IPTS component). These models all had the same covariates. Figures 3 through 6 use the physical assault antecedent as the independent variable with suicide risk as the dependent variable. PMC, PTS symptoms, and TB, PB, pain tolerance, and fear of death were the mediators, respectively. Figures 7 through 10 use the sexual assault antecedent as the independent variable with suicide risk as the dependent variable. PMC, PTS symptoms, and TB, PB, pain tolerance, and fear of death as the mediators, respectively. As a reminder, the independent variable – trauma type – is multicategorical. The three categories are interpersonal physical trauma, interpersonal sexual trauma, and non-interpersonal trauma. Past literature suggests non-interpersonal traumas do not evoke feelings of mental contamination (Badour et al., 2011; Ojserkis et al., 2020). As such, this trauma type group was the reference group. The figures seen in the next chapter are broken down into models for each category of the antecedent (i.e., physical trauma and sexual trauma). This was done to ensure readability of each model. Furthermore, while the models report potential indirect and direct effects, they do not establish directionality or causation. The current research design is regressional in nature and presents findings that suggest relationship and predication rather than one variable having a directional or causal effect on another.

CHAPTER IV

RESULTS

Descriptive statistics

        Descriptive statistics for participants and measures (e.g., range, mean, and

standard deviation) are reported in Table 3. Frequency statistics for gender, ethnicity,

past suicide attempt, and trauma types are presented in Table 4. Of the total sample,

40.8% met potential criteria for possible PTSD diagnosis per the cut-off score of ≥ 33.

Additionally, 40.6% of the sample met or exceeded the cut-off score (i.e., ≥ 7) on the

SBQ-R. Seven of the 42 participants have previously attempted suicide. For this sample,

40.7% indicated feelings of not belonging, 14.4% indicated feeling like a burden, and

100% of the sample exceeded the minimum for scores of AC – made up of the ACSS-

FAD and the PPES. For PMC, 33.6% of the sample met or exceeded the cut-off score

(i.e., 10 points) which indicated clinical presence of PMC. Finally, 57.4% of the sample

indicated mild to severe depression symptoms.

Table 3

Descriptive Statistics

	N	Measure cutoff	Possible range	Min to Max	*M*	*SD*
Age (in years)	42	N/A	N/A	18-30	19.31	2.09
CESD-R	42	≥ 16*	0-80	0-61	22.98	17.76
THQ	42	N/A	0-24	0-14	5.14	3.67
PEMC	42	≥ 10*	0-80	0-67	11.95	16.43
PCL-5	42	≥ 33*	0-80	0-62	27.29	19.66
SBQ-R	42	≥ 7*	3-18	3-14	6.43	3.30
INQ-TB	42	≥ 22*	0-56	9-50	27.41	12.46
INQ-PB	42	≥ 17*	0-49	6-42	12.31	8.81
PPES	42	>26[+]	26-130	29-76	45.83	10.80
ACSS-FAD	42	>0[+]	0-28	0-28	16.55	7.14
Valid N (listwise)	42					

Note. *Indicates proposed rating for clinical concern for each measure. +Clinical concern associated with these measures begin with any rating over the stated score. CESD-R measures depression. THQ measures total number and types of traumatic events. PEMC measures posttraumatic mental contamination. PCL-5 measures PTS symptoms. SBQ-R measures current suicide risk and suicidal behaviors. INQ measures TB and PB in two subscales. PPES measures painful and provocative events and implied pain tolerance. ACSS-FAD measures acquired capability for suicide and fear of death.

Table 4

Frequency Statistics

		Frequency	Percent
Assigned Gender	Female	25	59.5%
	Male	17	40.5%
Ethnicity	Asian	1	2.4%
	Black or African American	4	9.5%
	Native Hawaiian/Pacific Islander	1	2.4%
	Caucasian/White	32	76.2%
	Other	3	7.1%
	Prefer not to answer	1	2.4%
Past suicide attempt	Yes	7	16.7%
	No	35	83.3%
Trauma type	Sexual Trauma	11	26.2%
	Physical Trauma	10	23.8%
	Non-interpersonal Trauma	21	50.0%

Correlations

Pearson's correlations were run to assess the relationships between depression, traumatic events (THQ total), PMC, PTS symptom total, the IPTS components, and suicide risk. Furthermore, these correlations were examined by gender. Intersex was an option for the participant to choose when asked about assigned gender. Because no one chose this as an option, assigned gender presents as dichotomous in this study. For women, depression was related to all variables except for traumatic events and AC. For PMC, there were significant relationships between it and PTS symptom total, TB, and PB. PTS symptom total was related to TB, PB and suicide risk. Suicide risk was also related to TB and PB. For men, trauma type was not significantly related to any other variable. Depression was related to traumatic events, PTS symptoms, TB, PB, and suicide risk. PMC was only related to PTS symptoms and TB. Suicide risk was only related to depression, traumatic events, and TB. Please refer to Table 5 for exact relationship type and significance level for each.

Physical trauma's indirect effect on suicide risk mediated by PMC, PTS symptoms, and TB

The overall model for physical trauma's indirect effect on suicide risk as mediated by PMC, PTS symptoms, and TB was not significant: .01, 95% CI [-.07, .08]. Within this model the only statistically significant pathway is the relative direct effect pathway between physical trauma and suicide risk ($C' = 2.22$; $t = 2.02$, $p = .05$). This suggests that physical trauma predicts suicide risk. Additionally, there were no significant relative indirect effects through any other pathways (e.g., physical trauma to PMC to suicide

risk). These findings are clear as the null of zero falls between the upper and lower limits

of the bootstrap confidence interval for both serial and simple indirect effect pathways.

Please refer to Figure 3 for the model.

Physical trauma's indirect effect on suicide risk mediated by PMC, PTS symptoms, and PB

The overall model for physical trauma's indirect effect on suicide risk as mediated

by PMC, PTS symptoms, and PB was not significant: 0.004, 95% CI [-0.08, 0.06].

Within this model there were two statistically significant pathways – both direct. These

were the relative direct effect pathways between physical trauma and suicide risk ($C' =$

2.25; $t = 2.02$, $p = .04$) and between PB and suicide risk ($b_3 = 0.17$; $t = 2.79$; $p = .01$).

These findings suggest both physical trauma and PB predict suicide risk in that the more

there is of physical trauma and PB, the higher the risk of suicide. Additionally, there was

not a significant relative indirect effect through any other pathways (e.g., physical trauma

to PTS symptom total to suicide risk). Please refer to Figure 4 for the model.

Physical trauma's indirect effect on suicide risk mediated by PMC, PTS symptoms, and pain tolerance (PT)

The overall model of physical trauma's indirect effect on suicide risk as mediated by

PMC, PTS symptoms, and PT was not significant: -0.01, 95% CI [-0.34, 0.36]. Within

this model there was one statistically significant relative direct effect between PT and

suicide risk ($b3 = 0.90$; $t = 2.48$, $p = .02$). This suggests that PT predicts suicide risk in

that

Table 5

Gender Bivariate Correlations

Variable	CESD-R	THQ	PEMC	PCL-5	INQ-TB	INQ-PB	PPES	ACSS-FAD	SBQ-R
CESD-R	-	.68**	.27	.86**	.65**	.76**	.55*	-.01	.55*
THQ	.32	-	.30	.76**	.57*	.59*	.73**	.23	.53*
PEMC	.53**	.72**	-	.52*	.62**	.17	.03	-.18	.08
PCL-5	.77**	.42*	.62**	-	.54*	.61**	.49*	-.13	.41
INQ-TB	.49*	.14	.41*	.68**	-	.61**	.27	-.05	.52*
INQ-PB	.60**	.39	.53**	.66**	.44*	-	.37	-.06	.48
PPES	.18	.47*	.51**	.20	-.03	.32	-	.56*	.42
ACSS-FAD	-.20	-.08	-.23	-.06	-.23	-.11	-.32	-	.10
SBQ-R	.55**	.35	.35	.68**	.46*	.81**	.16	.04	-

Note. **Correlation is significant at the .01 level (two-tailed). *Correlation is significant at the .05 level (two-tailed). CESD-R measures depression. THQ measures total number and types of traumatic events. PEMC measures posttraumatic mental contamination. PCL-5 measures PTS symptoms. SBQ-R measures current suicide risk and suicidal behaviors. INQ measures TB and PB in two subscales. PPES measures painful and provocative events and implied pain tolerance. ACSS-FAD measures fear of death.

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the higher the PT the higher the risk of suicide. Additionally, there were no significant relative indirect effects through any other pathways (e.g., physical trauma to PT to suicide risk). These findings are clear as the null of zero falls between the upper and lower limits of the bootstrap confidence interval for all indirect effect pathways for both serial and simple. Please refer to Figure 5 for the model.

Physical trauma's indirect effect on suicide risk mediated by PMC, PTS symptoms, and fear about death (FAD)
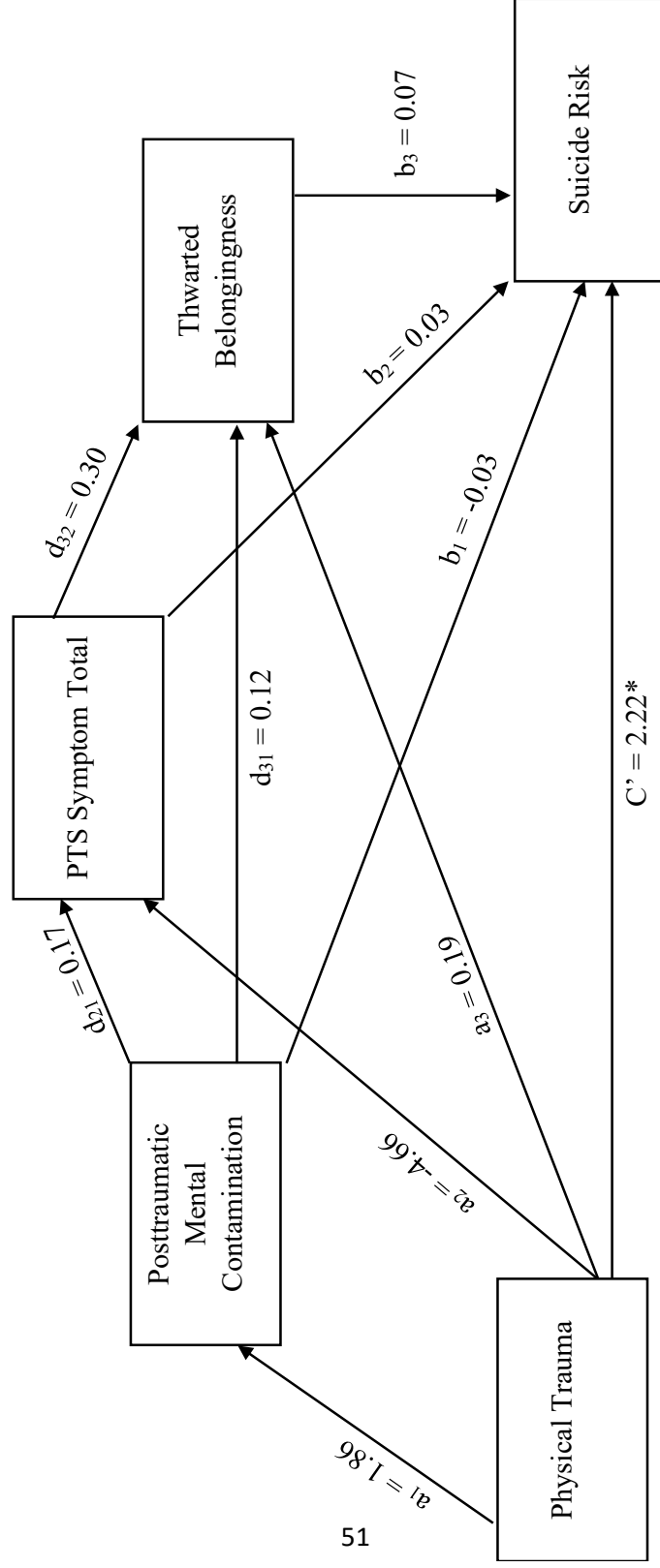
The overall model of physical trauma's indirect effect on suicide risk as mediated by PMC, PTS symptoms, and FAD was not significant: 0.00, 95% CI [-0.15, 0.21]. There were also no significant direct effects. Additionally, there were no significant relative indirect effects through any other pathways (e.g., physical trauma to FAD to suicide risk). Please refer to Figure 6 for the model.

Sexual trauma's indirect effect on suicide risk mediated by PMC, PTS symptoms, and TB

The overall model of sexual trauma's indirect effect on suicide risk as mediated by PMC, PTS symptoms, and FAD was not significant: 0.04, 95% CI [-0.07, 0.40]. Within this model the only statistically significant pathway is the relative direct effect pathway from sexual trauma to PMC (a_1 =12.22; $t = 2.49$; $p = .02$). The suggests that sexual traumas predict increased levels of PMC. Additionally, there were no significant relative indirect effects through any other pathways (e.g., sexual trauma to PMC to suicide risk). Please refer to Figure 7 for the model.

Figure 3

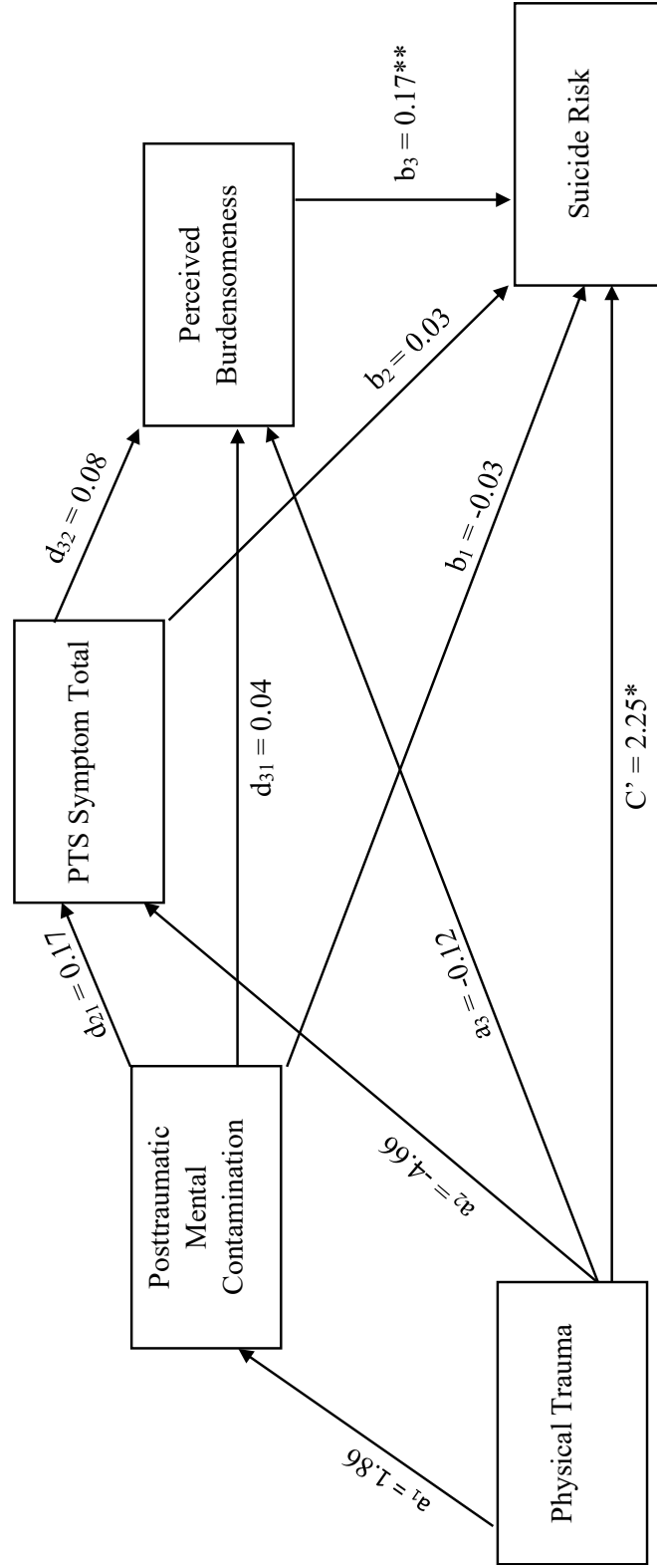*Physical Trauma's Indirect Effect on Suicide Risk Mediated by PMC, PTS symptoms, and TB*

Note. The reference group is non-interpersonal trauma.   * p < .05. Depression, total amount of trauma exposure, and assigned gender were covariates. For readability, the models were split per respective antecedent category. Unstandardized coefficients are presented.

Serial indirect effect through PMC, PTS symptoms, and TB: .01, 95% CI = [-.07, .08]

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Figure 4

Physical Trauma's Indirect Effect on Suicide Risk Mediated by PMC, PTS symptoms, and PB

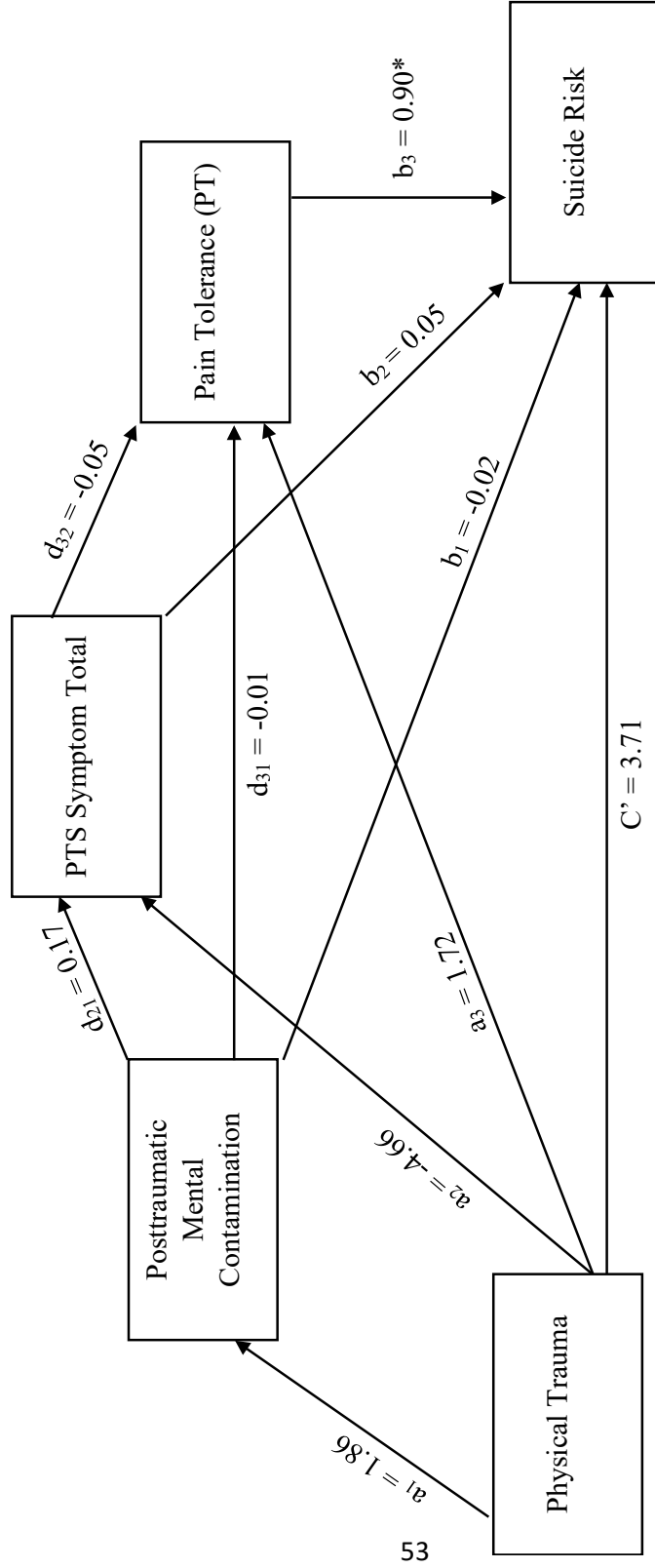*Note.* The reference group is non-interpersonal trauma. ** p < .01. * p < .05. Depression, total amount of trauma exposure, and assigned gender were covariates. For readability, the models were split per respective antecedent category. Unstandardized coefficients are presented.

Serial indirect effect through PMC, PTS symptoms, and PB: .00, 95% CI = [-.08, .06]

Figure 5

Physical Trauma's Indirect Effect on Suicide Risk Mediated by PMC, PTS symptoms, and Pain Tolerance
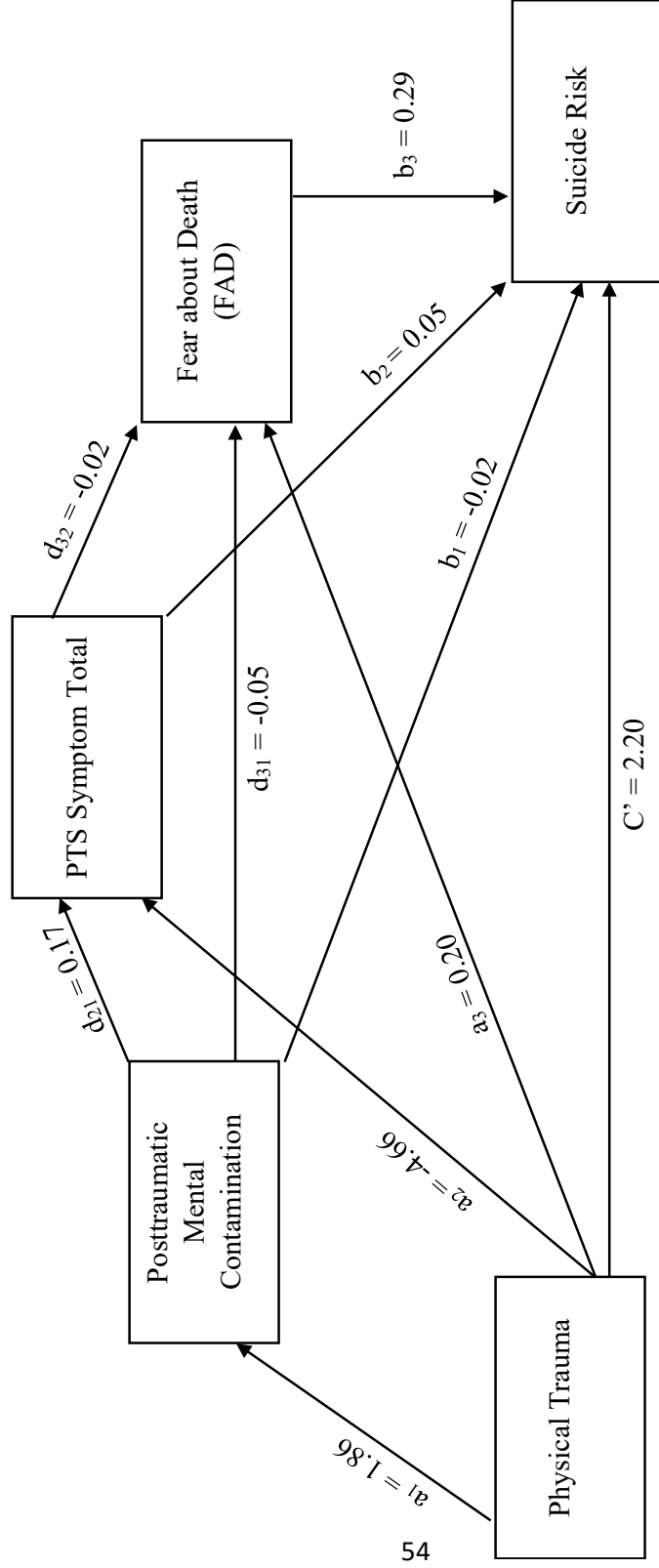

Note. The reference group is non-interpersonal trauma. * $p < .05$. Depression, total amount of trauma exposure, and assigned gender were covariates. Pain tolerance is measured by the PPES. For readability, the models were split per respective antecedent category. Unstandardized coefficients are presented.

Serial indirect effect through PMC, PTS symptoms, and PT: -.01, 95% CI = [-.34, .36]

Figure 6

Physical Trauma's Indirect Effect on Suicide Risk Mediated by PMC, PTS symptoms, and Fear about Death

Note. The reference group is non-interpersonal trauma. Depression, total amount of trauma exposure, and assigned gender were covariates. Fear of death is measured by the ACSS-FAD. For readability, the models were split per respective antecedent category. Unstandardized coefficients are presented.

Serial indirect effect through PMC, PTS symptoms, and FAD .00, 95% CI = [-.15, .21]

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Sexual trauma's indirect effect on suicide risk mediated by PMC, PTS symptoms, and PB

The overall model was not significant. Within this model the only statistically significant pathway is the relative direct effect pathway between sexual trauma and PMC (a_1 =12.22; t = -0.11; p = .02). Again, this suggests PMC levels would be expected to be higher in those with a history of sexual trauma. There were no significant serial indirect effects on suicide risk through PMC, PTSD, and PB: 0.03, 95% CI [-0.08, 0.40]. Additionally, there were no significant relative indirect effects through any other pathways (e.g., sexual trauma to PTS symptom total to suicide risk. Please refer to Figure 8 for the model.

Sexual trauma's indirect effect on suicide risk mediated by PMC, PTS symptoms, and pain tolerance
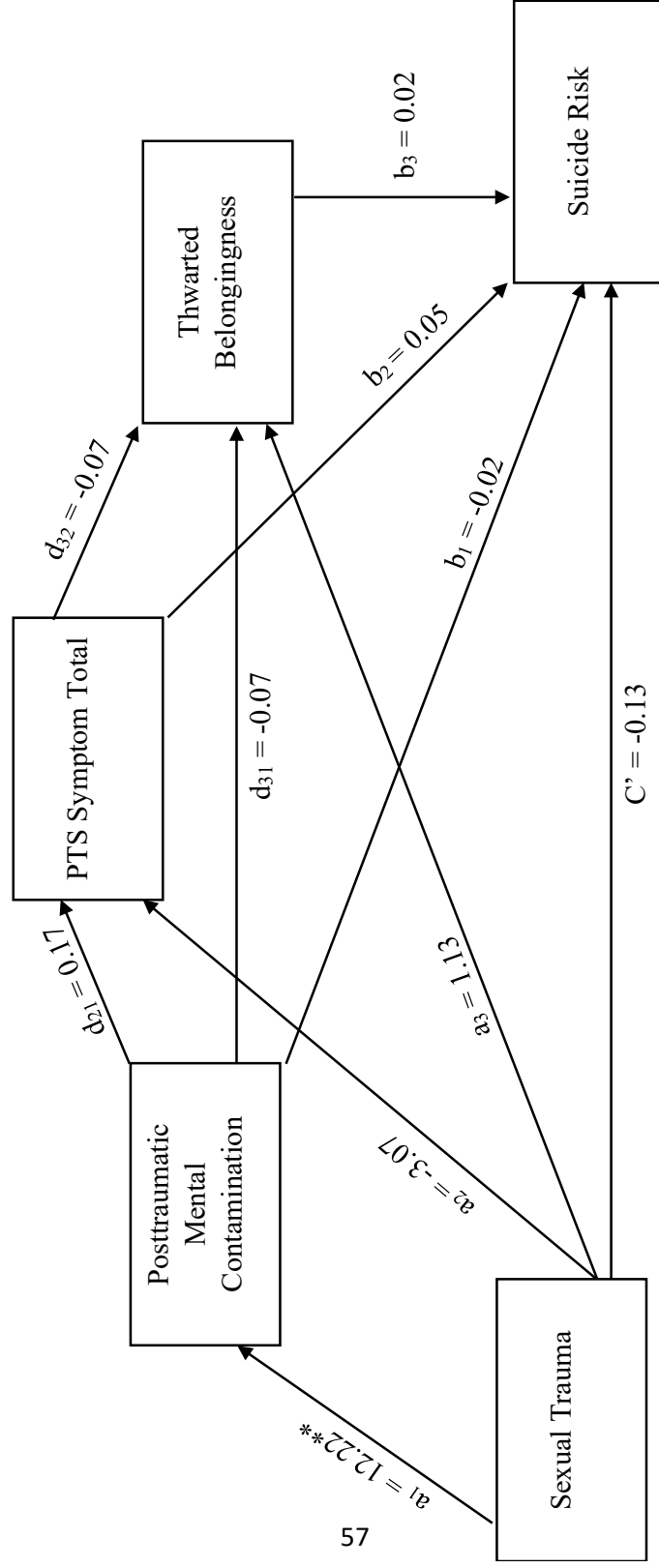
The overall model was not significant. Within this model the only statistically significant pathway is the relative direct effect pathway from PT to suicide risk (b_3 = 0.90; t = 2.48, p = .02). As mentioned above, this finding suggests that and increase in pain tolerance predicts and increase in suicide risk. There were no significant serial indirect effects on suicide risk through PMC, PTSD, and PT: -.09, 95% CI [-2.36, 0.59]. Additionally, there were no significant relative indirect effects through any other pathways (e.g., sexual trauma to AC to suicide risk). Please refer to Figure 9 for the model.

Sexual trauma's indirect effect on suicide risk mediated by PMC, PTS symptoms, and fear about death (FAD)

The overall model was not significant. There were also no significant direct effects. As with the previous model, there was not a significant serial indirect effect on suicide risk through PMC, PTS symptoms, and FAD: -0.01, 95% CI [-0.92, 0.61]. Additionally, there were no significant relative indirect effects through any other pathways (e.g., physical trauma to FAD to suicide risk). Please refer to Figure 10 for the model.

Figure 7

Figure 7

Sexual Trauma's Indirect Effect on Suicide Risk Mediated by PMC, PTS symptoms, and TB

Note. The reference group is non-interpersonal trauma. * p < .05. Depression, total amount of trauma exposure, and assigned gender were covariates. For readability, the models were split per respective antecedent category. Unstandardized coefficients are presented.

Serial indirect effect through PMC, PTS symptoms, and TB: .04, 95% CI = [-.07, .08]

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Figure 8

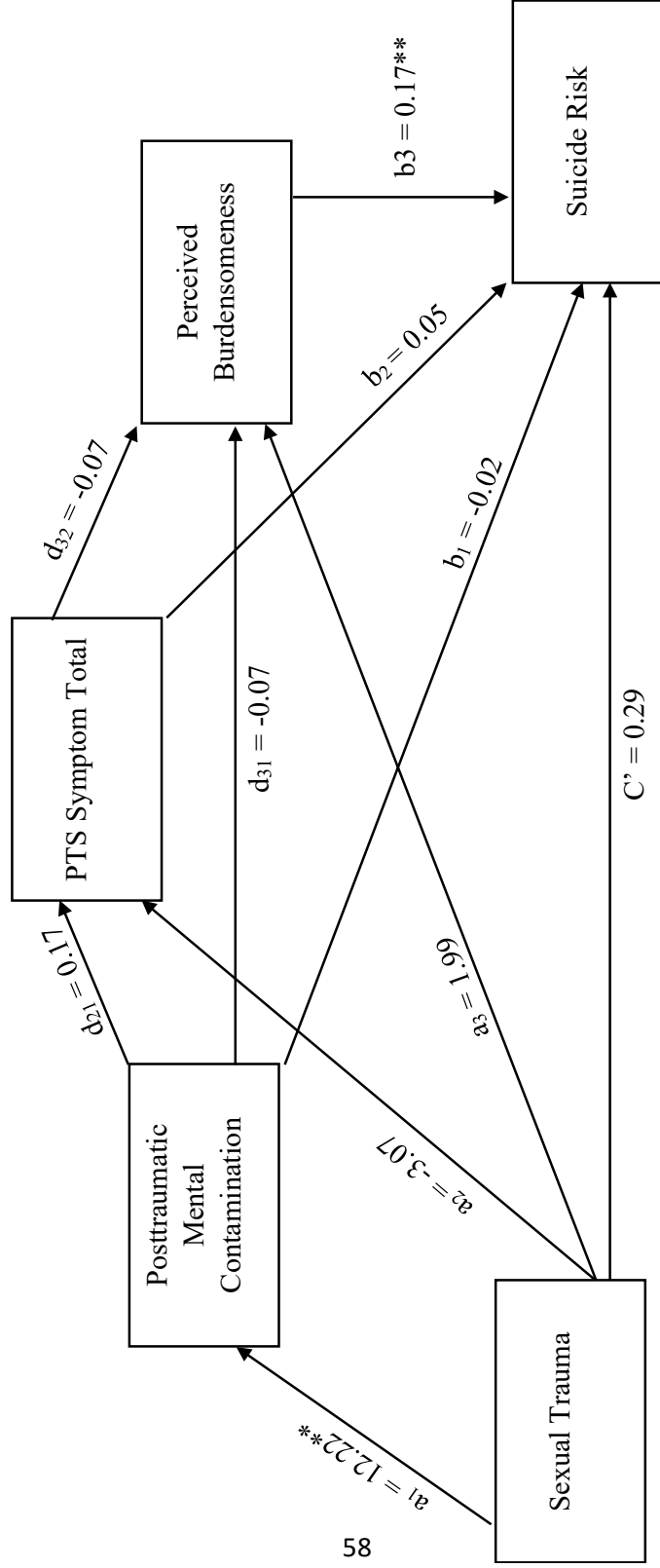*Sexual Trauma's Indirect Effect on Suicide Risk Mediated by PMC, PTS symptoms, and PB*

Note. The reference group is non-interpersonal trauma. ** p < .01. Depression, total amount of trauma exposure, and assigned gender were covariates. For readability, the models were split per respective antecedent category. Unstandardized coefficients are presented.

Serial indirect effect through PMC, PTS symptoms, and PB: .03, 95% CI = [-.08, .40]

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Figure 9

Sexual Trauma's Indirect Effect on Suicide Risk Mediated by PMC, PTS symptoms, and Pain Tolerance
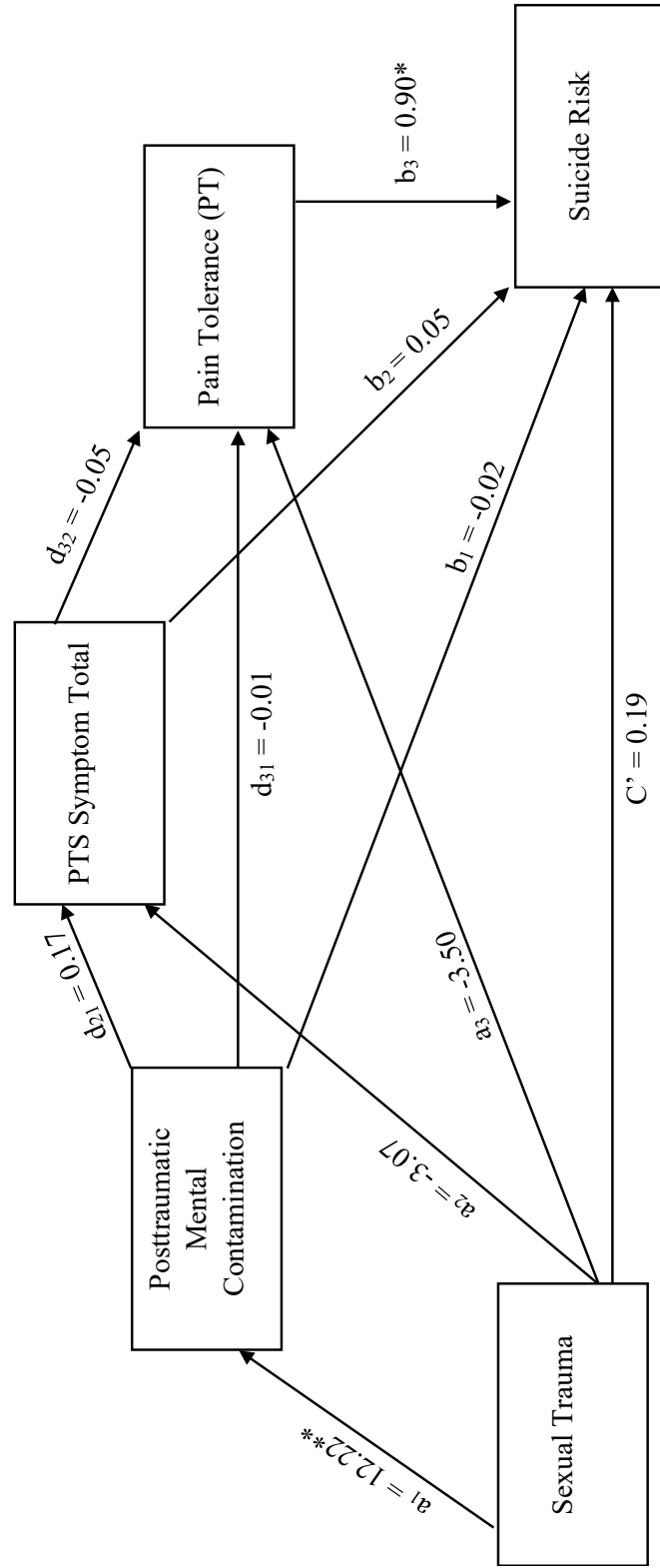

Note. The reference group is non-interpersonal trauma. ** $p < .01$. Depression, total amount of trauma exposure, and assigned gender were covariates. Pain tolerance is measured by the PPES. For readability, the models were split per respective antecedent category. Unstandardized coefficients are presented.

Serial indirect effect through PMC, PTS symptoms, and PT: -.09, 95% CI = [-2.36, .59]

Figure 10

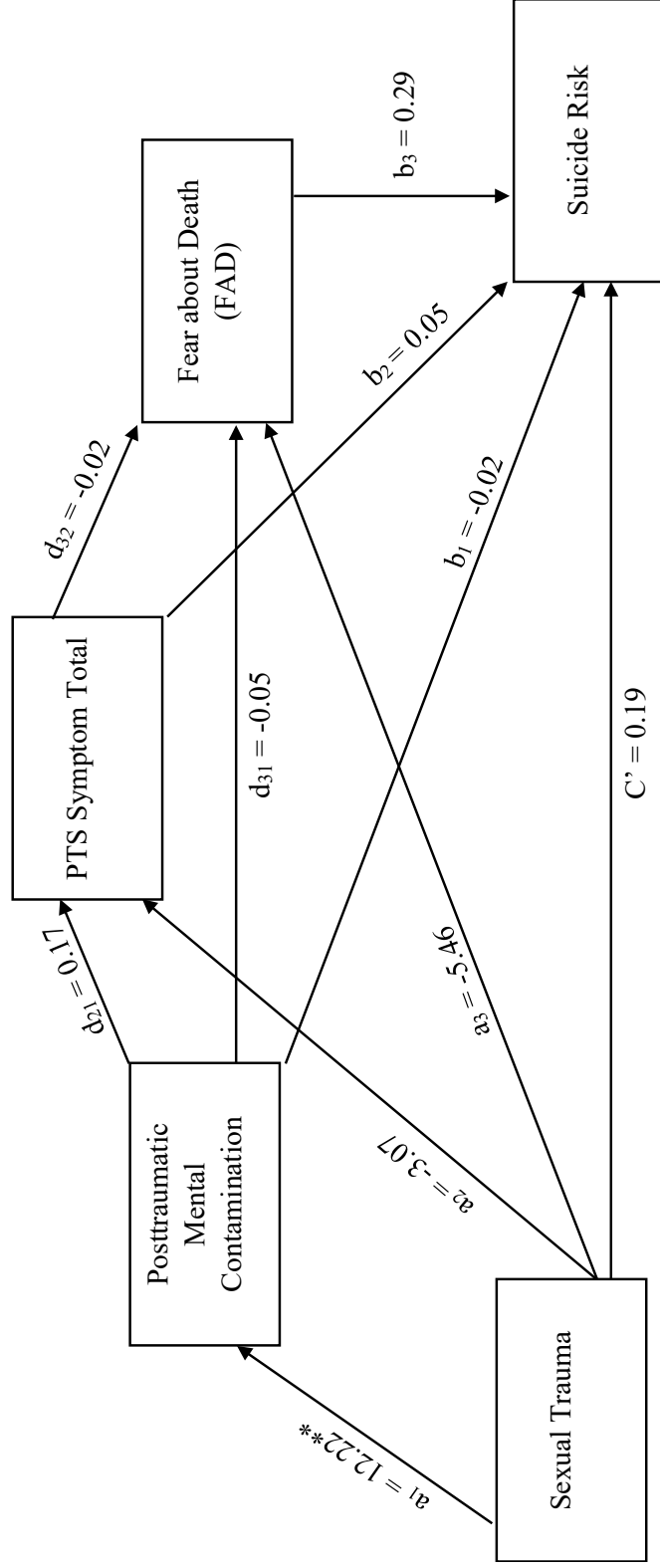*Sexual Trauma's Indirect Effect on Suicide Risk Mediated by PMC, PTS symptoms, and Fear about Death*

Note. The reference group is non-interpersonal trauma. ** $p < .01$. Depression, total amount of trauma exposure, and assigned gender were covariates. Fear of death is measured by the ACSS-FAD. For readability, the models were split per respective antecedent category. Unstandardized coefficients are presented.

Serial indirect effect through PMC, PTS symptoms, and FAD: -.01, 95% CI = [-.92, .61]

CHAPTER IV

DISCUSSION

Overall, this study adds to the literature with PMC being used in the place of MC. To briefly reiterate, the first hypothesis was that sexual assault would indirectly affect suicide risk via PMC, PTS symptom total, and TB, PB, and AC (broken down into pain tolerance and fear of death), respectively. Assigned gender, depression (i.e., CESD-R total), and total traumatic experiences (i.e., THQ total) were controlled for in each model. The overall serial indirect effect model was not significant and did not support the hypothesis. However, there were three significant relative direct effect pathways within the models with sexual trauma as the IV. The first was the relative direct effect pathway between sexual trauma and PMC. Broadly speaking, this relationship was originally expected due to past literature finding a relationship between negative sexual experience, like sexual assault, and MC (Adams et al., 2014; Badour, Feldner, Babson, et al., 2013a; Badour, Feldner, Blumenthal, et al., 2013b; Fairbrother & Rachman, 2004; Fergus & Bardeen, 2016; Ishikawa et al., 2015). With MC being found to exacerbate PTS symptoms (Rachman et al., 2015), knowing sexual traumas are directly related to PMC could allow for more specific and targeted treatment. While the clinician may initially be treating the PTS symptoms of a sexual assault survivor, understanding that PMC could be making PTS symptoms worse could help the clinician provide focused treatment on

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lessening feelings of contamination. Conceptually, this could then help alleviate the PTS symptoms. More specifics are discussed later on what this may look like in a clinical setting. The next significant pathway was between PB and suicide risk. The third pathway was between pain tolerance (a component of AC) and suicide risk. Both pathways are supported by past literature surrounding the IPTS (Bender et al., 2011; Davis et al., 2014; Heelis et al., 2016; Joiner, 2005). They both suggest that the presence of PB and pain tolerance increase the risk of suicide.

The second hypothesis was that physical assault would indirectly affect suicide risk via PMC, PTS symptom total, and TB, PB, and AC (broken down into pain tolerance and fear of death), respectively. Assigned gender, depression (i.e., CESD-R total), and total traumatic experiences (i.e., THQ total) were controlled for in each model. While the serial indirect effect model was insignificant, there were three significant relative direct effect pathways within the models with physical trauma as the IV. First, the relative direct effect of physical trauma on suicide risk is supported by past research. Literature has found physical assault to predict suicide risk across different populations (Bryan et al., 2013). Knowing this, clinicians, especially those who treat trauma survivors, can more intentionally assess for and monitor suicide risk based off the types of trauma a client has experienced. Even if a client does not appear to initially be at high risk for suicide, knowing its relationship with physical assault helps clinicians know and understand what to monitor over the course of treatment. Both direct effect findings discussed here provide trauma researchers with information to consider when conducting future research. For example, knowing physical assault is directly related to suicide risk,

researchers may need to control for and consider suicide risk, if it is not initially a primary concern of the experiment. As with the previously discussed model, there was a significant relative direct effect finding PB and pain tolerance are both related to suicide risk. Again, with the literature surrounding and supporting the IPTS, these findings were to be expected (Allbaugh et al., 2017; Heelis et al., 2016; Joiner, 2005; Smith et al., 2016).

While past literature has not categorized trauma into different types, significant serial indirect effects were found that suggested an indirect effect of PMC on suicide risk via PTS symptoms and TB and PB (Brake et al., 2019). As such, it was expected to see some of those similar findings, especially with sexual and physical trauma as the antecedents. As a reminder, interpersonal traumas, like sexual and physical traumas, are linked to higher levels of MC and other mental health difficulties (Badour et al., 2014; Fairbrother & Rachman, 2004; Fergus & Bardeen, 2016; Herba & Rachman, 2007; Ishikawa et al., 2015). With the literature supporting this, the results of the present study are perplexing and not supported by the years of research surrounding these issues. Related to the correlations, the differences in relationships between constructs could be the result of gendered experiences. For example, these differences could, in part, be due to women having a higher rate of trauma exposure, being more vulnerable to trauma exposure, and being 6% more likely to develop PTSD than men (Black et al., 2011; Mitchell et al., 2012; Tolin & Foa, 2006). Additionally, women and men are socialized differently creating gendered experiences. As a result, their mental health and what

impacts it varies (Ram et al., 2014; 2014; Sanchez et al., 2018; Strandh et al., 2013; Takagi et al., 2013).

The third hypothesis was that non-interpersonal traumas would not be a significant predictor of suicide risk. Past literature suggests that non-interpersonal traumas do not often evoke some of the core elements of mental contamination. For example, Badour and colleagues (2011) found non-interpersonal trauma did not elicit feelings of disgust. As discussed in chapter two, disgust is a key emotion involved in mental contamination (Rachman et al., 2015). As such, if this emotion is not being experienced, it can be argued that the individual is at low risk for developing mental contamination. Additionally, any type of contamination often has behaviors associated with them. These behaviors are an attempt to alleviate the feelings of contamination. One of the most common behaviors is washing. Any type of neutralization like this suggests the individual is dealing with feelings of being contaminated. Ojserkis and colleagues (2020) found non-interpersonal traumas to have low incidents of subsequent washing and neutralizing. The above research suggests that non-interpersonal trauma exposure places someone at low risk for PMC development. Per the models used in the current study, this would then place the individual at low risk of suicide compared to those who have experienced physical or sexual trauma.

As a reminder, the hypotheses in the current study were based on Brake and colleagues (2019) study in which the indirect effect of PMC on suicide risk via PTS symptoms and TB/PB were investigated. The current study then aimed to build on their

work. While some of the hypotheses and ideas were similar, there were several

variations between the projects which could, in part, explain the differences seen in the

results. First, the independent variable (IV) between the two studies was different. The

current study used trauma type as the IV where Brake and colleagues (2019) used PMC.

Second, the 2019 study admitted that the sample they used largely reported illness and

death of a loved one as trauma. Per the DSM-5, these are not traumatic unless

catastrophic or sudden. As such, it is possible their sample did not consist completely of

individuals who were trauma exposed. The current study, however, ensured the sample

used for analyses were trauma exposed. If the participant described an event that would

not be considered traumatic per the DSM-5, they were excluded from analyses. While

these differences seem minute, these are crucial aspects which could cause enough

dissimilarity to ultimately impact the results. Arguably, even if the IV was the same for

both studies and the only difference was ensuring the sample was trauma exposed, this

alone could create different results. Another major difference between the studies is the

samples used between the two studies. Brake and colleagues (2019) used a community

sample. The average age of their sample was 40 years of age and was more skewed

towards women. Samples with an older average age also means that sample has had

more potentially traumatic experiences and could have increased PTS symptoms than

younger samples. The current sample was younger and, while more balance in assigned

gender, is quite different from the community sample used in the other study.

Finding that PB was the only component of the IPTS to have a significant

relationship with suicide risk was perplexing. Remember, AC is made up of both pain

tolerance and fear of death. Conceptually, both of these relative direct pathways would need to be significant to consider to cohesive component of AC significant. That said, TB and AC are both core components of the IPTS and found to be strongly related to suicide risk, despite not being found in the current study (Christensen et al., 2013; Joiner, 2005; Van Orden et al., 2012). Nonsignificant findings like this contradict the validated and reliable IPTS (Joiner, 2005) and other past literature that has found a relationship between TB, AC, and suicide risk (Monteith et al., 2017; Pennings et al., 2017; Van Orden et al., 2010). There are a couple reasons the relationship between TB, AC, and suicide risk was not found in the current study. First, past research has found evidence to suggest PB is more salient at predicting suicide risk than the other IPTS components (e.g., Christensen et al., 2013, 2014; Monteith et al., 2013). It is possible that, despite its limitations, the current study found a significant relationship between PB and suicide risk due to PB's potency. This is not to say that TB is not related to suicide risk. However, it appears it is not as strongly related to suicide risk as PB. As such, an underpowered study may be another reason for the non-significant indirect effect through TB found in both the current study and past literature (i.e., Brake et al., 2019). Specifically, Brake and colleagues (2019) found the pathway through TB to be $p < .10$. The current study found it to be $p = .12$. Again, the sample size for both studies were smaller than ideal for the analyses used (i.e., serial indirect effect). With a more appropriate sample size, expecting this pathway to be significant is not outside of reason given the ample literature supporting this relationship.

Note, the participant sample met the cutoff score of PMC (i.e., ≥ 10). However, the current sample average did not meet the cutoff score for PTS symptoms (i.e., ≥ 33). As such, the nonsignificant indirect effects could be because individuals can experience PMC and not have a level of PTS symptoms that imply clinical concern (i.e., PTSD diagnosis). To better understand the relationship PMC has with PTS symptoms, future studies should collect data from both clinical and sub clinical populations. Testing these relationships in both samples can provide crucial information to researchers and clinicians alike. First, it contributes to an area of psychological literature that is understudied (i.e., PMC). The only literature on PMC has used samples in which few participants met the suggested cutoff score for PTS symptoms. In other words, the majority of the samples did not have a probable PTSD diagnosis. As such, the research is largely in subclinical populations. Knowing this, future research could shift the focus into clinical populations to investigate the differences between the two. For clinicians, understanding feelings of contamination, in general, can aid in treatment protocols and ensure the most accurate treatment-plans possible are used. Clients may present with subclinical PTS symptoms. Understanding that PMC is still a possible outcome of trauma exposure without severe or significant PTS symptoms is important to proper treatment. In populations with clinical PTS symptoms, the same is true, but the clinician also needs to understand that PMC can exacerbate PTS symptoms. So, while cognitive behavioral therapy (CBT) and exposure techniques have been found to be efficacious for both PTS symptoms and PMC (Rachman et al., 2015), how these are used varies on what is being treated (i.e., PMC or PTS symptoms). Being able to differentiate between the

two constructs and properly apply the treatments, or other empirically-based treatments (EBT), in a treatment setting is critical to promising and long-term treatment outcomes.

As mentioned, CBT and exposure techniques are often used for both PMC and PTS symptoms. CBT will focus on changing cognitions. Exposure will focus on desensitization. However, the cognitive work and type of exposure will be approached differently in these two conditions. Start by comparing the application of CBT between PMC and PTS symptoms. Therapy with PMC may focus more on changing self-directed thoughts, such as "I am disgusting." On the other hand, therapy with PTS symptoms may concentrate on changing thoughts of a client's surroundings, such as "I cannot trust anyone." A clinician may also utilize reframing, a key component of CBT. When reframing, the aim is to go from a negative event to a rational belief. That would then lead to healthy and adaptive emotions or responses. Issues tend to arise when individuals go from the event to an irrational belief, causing unhealthy and negative responses. For PMC, one of the difficulties is that feelings of being internally dirty are hard to pinpoint and alleviate. Also, these feelings are self-directed and defining (i.e., feeling dirty is equal to being dirty). In reframing, instead equating feeling dirty to being dirty, the client would work to understand, "my emotions do not define me or dictate my reality". For PTS symptoms, the focus would most likely be on reframing how the individual views their trauma. Self-blame is a common PTS symptom. Reframing for PTS symptoms may work on having the client change the narrative of "what happened is all my fault" to "what happened was out of my control". This could, in turn, mitigate the shame and guilt often experienced with PTS symptoms as well. Finally, exposure techniques are often

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used for both PMC and PTS symptoms. As mentioned, exposure therapy is used to desensitize a person to external or internal stimuli. This is done so their psychological and physiological reactions are less severe. The applications of these techniques will be similar for both constructs being discussed here while slightly different. For PMC, the focus will be on desensitizing the client to the emotions and feelings they are experiencing. This can be done by having the client think, write, and talk about those feelings as well as the person which evokes them. For PTS symptoms, exposure would largely center around desensitizing the client to the traumatic event although desensitizing emotions and feelings would be a part of the treatment for PTS symptoms as well. These examples and comparisons are only basic, but they provide a picture of the differences between how the same therapies or techniques could be applied to different psychological constructs, specifically those which can be comorbid.

With regards to trauma, situations/events that constitute a trauma have long been debated. For example, the previous version (the fourth edition-TR) of the DSM stated that a person would have to experience feelings of intense fear, helplessness, or horror for it to be considered traumatic (APA, 2011). This is not included in the definition of trauma in fifth edition, possibly due to the subjective nature of emotions. Moreover, in earlier versions, circumstances like severe medical diagnoses were considered traumatic. Now, the most current definition of trauma does not consider medical diagnoses/events as traumatic unless they are sudden and/or catastrophic (e.g., anaphylaxis, waking up during surgery, severe heart attack). In other words, while extremely distressing, a cancer diagnosis is no longer considered traumatic on its own. While this study solely relied on

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the most current definition of trauma, it is important to mention that this definition is continually developing, as are the diagnoses of which trauma exposure is a required criterion. As such, the current study acknowledges that the procedures and results of this study could drastically change should the definition of trauma shift again. However, that discussion is beyond the scope of this project and the definition of trauma should be heavily considered when conducting research as it will continue to evolve.

Additionally, some participants described traumas which occurred recently and during their adult life. However, broadly speaking, past literature has affirmed that developmental traumas (i.e., any traumatic event which happens during infant, childhood, and adolescent development) are more impactful in the long-term than those experienced after the brain is fully developed (Perry & Szalavitz, 2006; van der Kolk, 2014). Additionally, that same research, as well as others (Chasnoff et al., 2010; Dileo et al., 2017; Hambrick et al., 2019; Perry, 2001), found that trauma experienced during early development (i.e., infant, childhood, and adolescence) can negatively impact typical neurodevelopment. Per the IPTS, neurobiology plays an important role in suicide risk (Joiner, 2005). The serotonin system is a key factor in suicidal behavior. Lower levels of the serotonin metabolite, hydroxy indoleacetic acid (5-HIAA), were found in suicide attempters and completers than their non-suicidal peers (Lester, 1995). As such, developmental traumas and their impact on neurodevelopment could have negative repercussions on typical chemical balance and level of neurotransmitters in the brain. So, there is the possibility that the traumas described by the participants were, in fact, not the

most impactful but may be a result of the availability heuristic as some were more recent than others.

Limitations and future directions

      This study is not without its limitations. The first and, perhaps, most obvious limitation is the small sample size. For sufficient power of indirect effect models as used here, a large sample size is most ideal when paired with bootstrapping with replacement. The minimum sample size originally calculated for this project was 350 participants. As such, running models like that of this project with such a small sample size drastically impacts the results. In short, the results, while some direct effects were significant, are questionable due to being underpowered. These direct effects could be the result of type one errors. Without running these analyses with a proper sample size, these findings must be taken lightly. The small sample size, combined with only collecting data from college students, further compounds concerns when considering any of the significant finding discussed above. College students are not representative of the population. As such, these results are not generalizable. Another limitation of this study is that it is not longitudinal. While these types of projects are inherently less common due to being more time/resource consuming, this type of research is crucial for establishing any type of causal and temporal inferences. The construct of PMC is in its adolescence. Again, while MC can develop without trauma exposure and has long been studied (e.g., Badour, Feldner, Babson, et al., 2013; Coughtrey et al., 2012; Fairbrother et al., 2005; Herba & Rachman, 2007; Rachman, 1994; Thordarson et al., 2004), the proposition of a subtype of MC (i.e., PMC) is a new concept (i.e., Brake et al., 2019) and needs further investigation

to establish its reliability and validity. For all the above, longitudinal studies could assist in determining directionality, order, and strength of relationships between trauma type, PMC, PTS symptomology, and suicide risk.

Another limitation of this study was the use of survey-based collection methods. While the participants completed the survey in-person, interview-based assessments and observations are also important ways to collect data. One issue that arose in this study and that has already been briefly discussed was having the participant subjectively describe their most traumatic event. In having the participant do this, it appeared some struggled choosing one trauma while others described something that was not traumatic despite scoring a one or above on the THQ. Interview-based assessments could help mitigate this issue. Specifically, those trained in the understanding and differentiation of trauma versus distressing/stressful events could eliminate this issue completely. Additionally, future research needs to utilize more objective ways to determine which traumatic event(s) were most impactful for an individual and utilize those in categorizing the type of trauma. These methods should also consider gathering developmental history as this can impact later-life mental health (Perry & Szalavitz, 2006; van der Kolk, 2014). Because of the impact developmental trauma has on neurodevelopment, it is possible that obtaining one's developmental history could elucidate which individuals are predisposed to higher levels of suicide risk. As discussed above, serotonin plays a key role in suicidal behavior. Developmental history could give insight into events that may have negatively influenced neurodevelopment in a way that has disrupted the balance of neurotransmitters in the brain (e.g., serotonin)

Finally, for simplicity's sake, this study only categorized trauma into three categories (i.e., interpersonal sexual, interpersonal physical, and non-interpersonal). As previously mentioned, trauma has often been split into interpersonal and non-interpersonal traumas (Kessler & Üstun, 2004; Sharp et al., 2017; Woodward et al., 2015; Yoo et al., 2018). However, several participants in this study reported seeing a friend attempting to die by suicide or having walked in to find a loved one's body after dying by suicide. Interpersonal traumas are specifically those with the intent to do harm to another person (Lilly et al., 2011). But, in the case of suicide, this would technically be intrapersonal as the intent to do harm is to self rather than to another. Due to the original proposal of this project not having an intrapersonal trauma type group, these types of trauma were grouped with the interpersonal physical traumas due to the intent to physically harm. In fact, a brief search for literature pertaining to intrapersonal trauma resulted in no immediate results. It appears that intrapersonal strength and resilience are heavily studied alongside trauma (e.g. Besser et al., 2014, 2015; Kapoor et al., 2018; Webster & Deng, 2015), but studying intrapersonal traumas and their impact is less common. As such, future literature should consider this as a trauma type in and of itself. Additionally, trauma types should be further broken down into those directly experienced (e.g., personally going through it and witnessing it) and those indirectly experienced (e.g., learning about a trauma happening to a loved one, vicarious trauma, and secondary trauma). Refer to Table 6 for the types of trauma which should be considered in future research. Going back to the definition of trauma, the below trauma types should be continually evaluated for accuracy as the definition of trauma continues to change. As

such, elements of this table may need to be updated, eliminated, or moved around to account for any future changes.

Conclusion

In conclusion, the present study attempted to address previous limitations and build on recent literature (Brake et al., 2019), which investigated the serial indirect effects of trauma type on suicide risk via PMC, PTS symptom total, and TB/PB/AC. It appears that physical trauma directly impacts suicide risk. Additionally, sexual assault was related to increased levels of PMC. While none of the serial indirect effect pathways were significant, it is reasonable to expect to find the originally proposed hypotheses if the study were duplicated with a proper sample size. However, this research does provide a few novel ideas which should be considered in future studies. First, trauma research often focuses on trauma as a whole or only broken into two groups (i.e., interpersonal and non-interpersonal). As seen in Table 6, it is suggested that there are eight different trauma types. These trauma types should be researched, specifically how they individually impact various areas of mental health like PMC and PTS symptoms. Additionally, another goal was to address AC within the model which was not previously done in Brake and colleagues' (2019) research. While there were no significant findings related to AC – direct/indirect effects, the present study does present a case for the importance of considering AC in future literature as it is a crucial aspect of the IPTS.

Table 6.

Types of Trauma and Examples of Each for Future Studies

TYPE OF TRAUMA	EXAMPLES
DIRECT INTERPERSONAL – SEXUAL	Personally experiencing or witnessing a loved one or close friend, forced sexual penetration, alcohol/drug facilitated sexual penetration, sexual trafficking, noncontact sexual abuse, abusive sexual contact, etc.
INDIRECT INTERPERSONAL – SEXUAL	Being repeatedly exposed to the intimate details of or learning of a loved one or close friend experiencing, forced sexual penetration, alcohol/drug facilitated sexual penetration, sexual trafficking, noncontact sexual abuse, abusive sexual contact, etc.
DIRECT INTERPERSONAL – PHYSICAL	Personally experiencing or witnessing a loved one or close friend, physical attack, robbery, mugging, childhood physical abuse, torture, exposure to war, being taken hostage etc.
INDIRECT INTERPERSONAL – PHYSICAL	Being repeatedly exposed to the intimate details of or learning of a loved one or close friend experiencing, physical attack, robbery, mugging, childhood physical abuse, torture, exposure to war, being taken hostage etc.
DIRECT INTRAPERSONAL TRAUMA	Personally witnessing a loved one or close friend, attempt suicide, die by suicide, or engage in self-harm. This is to include finding the body of a loved one or close friend who recently died by suicide.
INDIRECT INTRAPERSONAL TRAUMA	Being repeatedly exposed to the intimate details of or learning of a loved one or close friend experiencing, attempt suicide, die by suicide, or engage in self-harm.
DIRECT NON-INTERPERSONAL	Personally experiencing, or witnessing or learning of a loved one or close friend experiencing, natural or man-made disasters, severe motor vehicle accidents, medial traumas like waking during surgery and anaphylactic shock, etc.
INDIRECT NON-INTERPERSONAL	Being repeatedly exposed to the intimate details of or learning of a loved one or close friend experiencing, natural or man-made disasters, severe motor vehicle accidents, medial traumas like waking during surgery and anaphylactic shock, etc.

Note. The examples above are also used in the DSM-5 (APA, 2013).

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