THE LAYERED IMPRINT OF TRAUMA ON THE SELF: A MULTIMETHOD INVESTIGATION OF PTSD AND MINORITY STRESS

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Lay Abstract

Trauma can strongly impact individuals in many ways, through several different experiences. Among those affected, some develop posttraumatic stress disorder (PTSD) and its dissociative subtype. These individuals may have symptoms related to feeling disconnected from their body and their surroundings, making it difficult for them to experience and understand themselves in the world. In addition to traditional traumatic events, experiences of minority stress and marginalization can also be traumatic and can lead to trauma-related symptoms. This is especially the case among sexual and gender minorities (SGMs), as they experience higher rates of traumatization and PTSD, compared to the general population. Therefore, it is important to consider aspects related to both trauma and minority stress when trying to understand trauma-related symptoms among SGM individuals. Using various methods, this dissertation explores how different experiences of trauma and stress are associated with trauma-related symptoms.

Abstract

The impact of trauma can be profound, altering the self at multiple levels (e.g., cognitive, social, and bodily levels), as demonstrated by the manifestations of PTSD symptoms. Importantly, these trauma-related symptoms can also arise from the consequences of minority stress and marginalization. In this vein, the dissertation aims to comprehensively investigate diverse experiences of trauma and stress, as well as to better understand how these experiences contribute to the development and expression of trauma-related symptoms by using a multidimensional research approach, including functional magnetic resonance imaging (fMRI) and mixed-method approaches.

The first study investigates how different symptom profiles of PTSD and its dissociative subtype relate to bodily self-consciousness. Using resting-state functional connectivity analysis, it examines the neural circuitry of the temporoparietal junction (TPJ), a critical region involved in this phenomenon, across individuals with PTSD, the dissociative subtype of PTSD, and healthy controls. Findings from this study demonstrate disruptions in the neural circuitry of the TPJ among individuals with PTSD and its dissociative subtype. As the TPJ plays a critical role in integrating multisensory information, these disruptions may have profound effects on various networks in which the TPJ is involved, significantly impacting how individuals engage with the world. Further advancing our understanding of the development and expression of trauma-related symptoms, study two uses a mixed-methods approach to investigate qualitative presentations of potential risk and protective factors among trauma-exposed sexual and gender minorities (SGMs) by comparing individuals quantitatively reporting low vs. high trauma symptom severity. Findings herein reinforce the importance of integrating minority stress and trauma frameworks when contextualizing trauma-related symptoms among SGMs. Lastly, study three examines the intersection of minority stress and moral injury, shedding light on the necessity to expand current trauma-related frameworks when contextualizing trauma-related symptoms among SGMs. Taken together, these findings elucidate the layered impact of trauma on the self, whereby trauma-related symptoms can affect individuals at multiple levels and emerge from diverse experiences, including Criterion A traumatic events and minority stress.

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This dissertation is just a stepping stone in a direction that we must continue to explore. I hope that these chapters contribute to the field by encouraging others to continue researching ways to help individuals from equity-deserving groups. I dedicate this work to our research participants. Without their efforts, this research would not be possible. Thank you for sharing your stories.

List of Abbreviations and Symbols

i. PTSD: Posttraumatic Stress Disorder
ii. DSM-5-TR: Diagnostic and Statistical Manual of Mental Disorders, 5th Edition, Text Revision
iii. TPJ: Temporoparietal Junction
iv. SGM: Sexual and gender minorities
v. raTPJ: Right Anterior Temporoparietal Junction
vi. laTPJ: Left Anterior Temporoparietal Junction
vii. rpTPJ: Right Posterior Temporoparietal Junction
viii. lpTPJ: Left Posterior Temporoparietal Junction
ix. PTSD+DS: Dissociative Subtype of Posttraumatic Stress Disorder
x. IAS: Innate Alarm System
xi. VAN: Ventral Attention Network
xii. ToM: Theory of Mind
xiii. CAPS-IV: Clinician-Administered PTSD Scale, version 4
xiv. CAPS-V: Clinician-Administered PTSD Scale, version 5
xv. DSM-5: Diagnostic and Statistical Manual of Mental Disorders, 5th Edition
xvi. SCID: Structured Clinical Interview for DSM-IV Axis 1 Disorders
xvii. MDI: Multiscale Dissociation Inventory
xviii. BDI: Beck Depression Inventory
xix. CTQ: Childhood Trauma Questionnaire
xx. RSDI: Response to Script-Driven Imagery Scale
xxi. fMRI: Functional Magnetic Resonance Imaging
xxii. MRI: Magnetic Resonance Imaging
xxiii. TR: Time Repetition
xxiv. TE: Echo Time
xxv. FOV: Field of View
xxvi. FA: Flip angle
xxvii. BOLD: Blood-oxygen level-dependent signal
xxviii. EPI: Echo Planar Imaging
xxix. SPM: Statistical Parametric Mapping
xxx. CSF: Cerebral Spinal Fluid
xxxi. MNI: Montreal Neurological Institute
xxxii. CONN: Functional Connectivity Toolbox
xxxiii. SPSS: Statistical Package for the Social Sciences Software
xxxiv. ANOVA: Analysis of variance
xxxv. FWE: Family-wise error rate
xxxvi. ROI: Region-of-Interest
xxxvii. FDR: False discovery rate
xxxviii. BA: Brodmann Area
xxxix. *k*: Cluster size
xl. PCL-5: PTSD Checklist for DSM-5
xli. TGD: Transgender and Gender Diverse
xlii. 2SLGBTQIA+: Two-Spirit, Lesbian, Gay, Bisexual, Transgender, Queer or Questioning, Intersex, and Asexual

xliii. LEC-5: Life events checklist for DSM-5
xliv. DERS: Difficulties in Emotion Regulation Scale
xlv. SASI: Self-acceptance of sexuality inventory
xlvi. SASI-SAS: Self-acceptance of Sexuality Inventory – Self-Acceptance of Sexuality subscale
xlvii. SASI-DSA: Self-Acceptance of Sexuality Inventory – Difficulty with Self-Acceptance of sexuality subscale
xlviii. DHEQ: Daily Heterosexist Experiences Questionnaire
xlix. DHEQ-O: Occurrence of Daily Heterosexist Experiences
l. DHEQ-D: Distress due to Daily Heterosexist Experiences
li. IHNI: Internalized Homonegativity Inventory
lii. IHP-R: Revised Internalized Homophobia Scale
liii. DART: Diagnostic Assessment Research Tool
liv. AFAB: Assigned Female at Birth
lv. AMAB: Assigned Male at Birth
lvi. IASMS: Integrated Attachment and Sexual Minority Stress Scale
lvii. HPA: Hypothalamic-pituitary-adrenal
lviii. DMN: Default Mode Network
lix. PMIEs: Potentially Morally Injurious Events
lx. MIES: Moral Injury Events Scale
lxi. SUD: Substance Use Disorders
lxii. AUD: Alcohol Use Disorders
lxiii. AUDIT: Alcohol Use Disorder Identification Test

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Declaration of Academic Achievement

This dissertation consists of three studies, which were led entirely or in part by the student. For the first study, conceptualization and analyses for the study were led by the student through guidance from co-authors Drs. Daniela Rabellino, Ruth Lanius, Sherain Harricharan, Andrew Nicholson and Maria Densmore. Study two conceptualization, design, and analyses were led by the student under the supervision of Dr. Nicholson. The student assisted heavily in the conceptualization and design of study three, alongside co-author Jakub Wolf. Data collection and analyses for studies two and three were led primarily by the student. Research for this dissertation took place between 2020 and 2025. To meet the requirements of a "sandwich thesis", further details on declaring the research contribution of the student and co-authors for each study are described below.

Study One was co-first authored by the student and Dr. Sherain Harricharan and co-authored by Dr. Daniela Rabellino, Maria Densmore, Dr. Jean Théberge, Jonathan Lieberman, Dr. Margaret McKinnon, Dr. Andrew Nicholson, and Dr. Ruth Lanius. All co-authors contributed to the review of the manuscript draft prior to publication submission. Notably, Drs. Daniela Rabellino, Sherain Harricharan, Andrew Nicholson and Ruth Lanius provided substantial guidance and support in study conception, design, and provided critical feedback. Maria Densmore provided critical assistance and guidance during neuroimaging analysis. Dr. Sherain Harricharan also contributed significantly with writing support and analyses. Initial draft of the submitted manuscript, as well as the analysis, was completed by the student.

Study Two was co-authored by Dr. Ruth Lanius, Dr. Margaret McKinnon, Dr. Taylor Hatchard, and Dr. Andrew Nicholson. All co-authors contributed significantly to providing guidance and feedback. Specifically, Dr. Nicholson and Hatchard provided substantial guidance related to study conception, design, and analyses. The student completed data collection, analysis, and writing for this study.

Study Three was co-first authored by Dr. Andrew Nicholson and the student, and co-authored by Jakub Wolf, Mina Pichtikova, Magdalena Siegel, James Mirabelli, Dr. Taylor Hatchard, Dr. Niki-Hosseini-Kamkar, Ella Bawagan, Dr. Sophia Roth, Dr. Christina Mutschler, Dr. Ruth Lanius, Fardous

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Chapter 1 | Introduction

1.1 Posttraumatic Stress Disorder and Criterion A

Although most individuals will have experienced at least one traumatic event at some point in their lives, only some will develop posttraumatic stress disorder (PTSD) (Bryant, 2019; Kessler et al., 2017). PTSD is a psychiatric disorder that is characterized by symptoms of reexperiencing (e.g. intrusions, flashbacks), avoidance, alterations in cognitions and mood (e.g., negative emotions, distorted thoughts), alterations in arousal and reactivity (e.g. hypervigilance, irritability), and dissociation (e.g., depersonalization and derealization) (American Psychiatric Association, 2022; Frewen & Lanius, 2006; Pacella et al., 2013; van der Kolk, 1994; Van Der Kolk, 2014; Yehuda et al., 2015). Unlike other Diagnostic and Statistical Manual of Mental Disorders, 5th edition, Text Revision (DSM-5-TR) disorders, a PTSD diagnosis requires that the individual endures exposure to what is termed a Criterion A traumatic event, consisting of exposure to death, threatened death, actual or threatened serious injury, or actual or threatened sexual violence by either experiencing it directly, witnessing it, learning about it happening to a close friend or family member, or indirect exposure to aversive details (American Psychiatric Association, 2022). Indeed, regardless of the presence of trauma symptoms (e.g., avoidance, hypervigilance, hyperarousal), if the most distressing traumatic event does not fall under the umbrella of "Criterion A" (for example, identity-based stressors like discrimination, oppression, and abandonment after disclosure), then the criteria for a PTSD diagnosis would not be satisfied. This poses a significant challenge for how trauma-related symptoms are currently conceptualized among equity-deserving groups, who experience disproportionately high rates of trauma and *additional* stigma-related stress exposure, which may or may not fit the definition outlined in Criterion A for PTSD (Holmes et al., 2016; Marx et al., 2024; Minshew, 2022; Nicholson et al., 2022, 2025; Roberts et al., 2012; Szymanski & Balsam, 2011).

1.1.2 Neurobiology of PTSD and its Dissociative Subtype

Symptoms of PTSD are thought to partly result from reduced activity (inhibition) from prefrontal regions involved in arousal modulation and emotion regulation (e.g., dorsolateral prefrontal

cortex, anterior cingulate cortex), leading to increased activity of critical limbic regions implicated in fear-related responses (e.g., amygdala, insula) (Hayes et al., 2012; Hopper et al., 2007; Lanius et al., 2010; Nicholson et al., 2017; Yehuda et al., 2015). Accordingly, PTSD (which commonly consists of hyperarousal and re-experiencing symptoms) can be understood as individuals experiencing emotion undermodulation from the failure of prefrontal inhibition of limbic regions (Arzy et al., 2006; Blanke, 2012; Blanke & Arzy, 2005; Harricharan et al., 2021; Ionta et al., 2014; Lanius et al., 2010, 2015; Nicholson et al., 2017). Conversely, between 14-30% of individuals with PTSD will have the dissociative subtype (Blevins et al., 2014; Lanius et al., 2010; Schiavone et al., 2013; White et al., 2022; Wolf, Lunney, et al., 2012), which is primarily characterized by additional symptoms of depersonalization (e.g., feeling detached from one's own self; out-of-body experiences) and derealization (e.g., feeling detached from one's own surroundings, which may feel unreal or strange) (American Psychiatric Association, 2022). The dissociative subtype is highly associated with chronic childhood and developmental trauma, whereby these symptoms are thought to manifest when threat is inescapable (Kearney & Lanius, 2022; Lanius et al., 2010; Stein et al., 2013; Wolf, Lunney, et al., 2012; Wolf, Miller, et al., 2012). Here, the brain responds by trying to control emotions that are too distressing through increased neural response in prefrontal regions (e.g., dorsolateral prefrontal cortex, anterior cingulate cortex), which, in turn, dampens limbic activity (e.g., amygdala, insula) (Hopper et al., 2007; Lanius et al., 2010, 2012; Yehuda et al., 2015). Therefore, the dissociative subtype can be understood as experiencing emotion overmodulation, driven by excessive prefrontal inhibition of limbic regions (Fani et al., 2019; Lanius, 2015; Lanius et al., 2010; Stein et al., 2013; Steuwe et al., 2012). In other words, the manifestation of these symptom profiles in PTSD (e.g., reexperiencing/hyperarousal) and its dissociative subtype (e.g., depersonalization/derealization) can be conceptualized as opposite patterns of emotion dysregulation (i.e., emotion undermodulation vs. emotion overmodulation) (Lanius et al., 2010). Notably, these PTSD symptoms, which may serve as emotional and physical coping responses in unsafe environments, can influence individuals' perception and understanding of themselves and their surroundings in the aftermath of trauma (Harricharan et al., 2017, 2021; Kearney & Lanius, 2022; Lanius et al., 2010). Consequently, trauma

can profoundly impact the representation of the self at multiple levels, including cognitive, social, and bodily levels among those with PTSD (Frewen & Lanius, 2014; Lanius et al., 2020; Rabellino et al., 2020; Van Der Kolk, 2014). As Van Der Kolk (2014) described, *"Trauma is not just an event that took place sometime in the past; it is also the imprint left by that experience on mind, brain, and body*." (p. 21).

1.1.3 PTSD and the Disembodied Self

As described above, symptoms of PTSD and its dissociative subtype are associated with a wide range of neural aberrations, whereby large-scale cortical neural networks may also be disrupted. Critically, several of these disrupted cortical networks (e.g., ventral frontoparietal attention network and default mode network) are crucial for facilitating complex functioning (e.g., attention, working memory, cognitive flexibility, sense of agency), which enable individuals to understand their bodily self and engage with their surroundings (Brown & Morey, 2012; Frewen et al., 2008; Harricharan et al., 2021; Hayes et al., 2012; Hopper et al., 2007). This is important to consider as trauma-related disruptions of the self at the bodily level can significantly impact the subjective experience of one's own body and surrounding environments (Blanke et al., 2002, 2005; Blanke & Arzy, 2005; Frewen & Lanius, 2014; Lanius, 2015; Lanius et al., 2020; Steuwe et al., 2012; Van Der Kolk, 2014). This is consistent with prior research on traumatized individuals who experience dissociation, as they commonly describe feelings of disembodiment, such as "I feel as if I am outside my body" and "I feel like there is no boundary around my body" (Foa et al., 1999; Frewen & Lanius, 2015; Kearney & Lanius, 2022; Lanius et al., 2020). These symptoms related to the conscious experience and perception of the bodily self in space are referred to as bodily self-consciousness (Blanke, 2012; Blanke & Arzy, 2005; Rabellino et al., 2020; Serino et al., 2013; Tsakiris et al., 2007; Tsakiris & Haggard, 2005).

Alterations in bodily self-consciousness have been previously documented in various psychiatric disorders (see Riva et al., 2021 for a review), including PTSD (Ataria, 2015; Lanius, 2015; Rabellino et al., 2018, 2020). In the context of PTSD, manifestation of bodily symptoms can include active defensive posturing such as fight-or-flight responses (relating to hyperarousal symptoms),

hyper-monitoring of salient stimuli in the environment (relating to hypervigilance symptoms), and increased representation of the space surrounding the body (i.e., peripersonal space), which may also relate to heightened threat detection (Brozzoli et al., 2011; Harricharan et al., 2016, 2021; Nicholson et al., 2020; Rabellino et al., 2020). Moreover, symptoms of dissociation (i.e., depersonalization and derealization) can alter the first-person perspective (i.e., perception of the self in the world) and self-location (i.e., locating the self in space), contributing to somatic disturbances of the bodily self (disembodiment) (Harricharan et al., 2016, 2021; Nicholson et al., 2020; Rabellino et al., 2020). Collectively, traumatic experience and subsequent symptoms of PTSD and dissociation can alter bodily self-consciousness (Rabellino et al., 2020).

Critically, extant literature suggests that the temporoparietal junction (TPJ) is central to this phenomenon (Arzy et al., 2006; Blanke et al., 2005; Ionta et al., 2011, 2014; Olivé et al., 2015; Rabellino et al., 2018, 2020). The TPJ is a cross-network hub primarily involved in bodily self-consciousness and social cognitive processes, including theory of mind, empathy, and attention (Arzy et al., 2006; Blanke, 2012; Blanke et al., 2005; Blanke & Arzy, 2005; Bukowski & Lamm, 2017; Bzdok et al., 2013; Decety & Lamm, 2007; Dunbar, 2012; Geng & Vossel, 2013; Ghosh et al., 2021; Ionta et al., 2014; Krall et al., 2015; Samson et al., 2004; Wilterson et al., 2021), which have been observed to be altered in the aftermath of trauma (Nazarov et al., 2014; Parlar et al., 2014). As evidenced in neuroimaging research, the TPJ is also implicated in PTSD (Blanke et al., 2002, 2005; Harricharan et al., 2016; Hopper et al., 2007; Lanius, 2015; Lieberman et al., 2023; Olivé et al., 2018), with emerging evidence suggesting unique distinctions in the TPJ's role in bodily self-consciousness among those with PTSD and its dissociative subtype (Andrews et al., 2023; Hopper et al., 2007; Steuwe et al., 2014). Accordingly, investigating the TPJ further in the context of trauma and PTSD can help elucidate the neural underpinnings of disembodiment (or altered bodily self-consciousness), which appears necessary for a deeper understanding of diverse presentations of PTSD subtypes involving disruptions to the bodily self.

1.2 Minority Stress and Trauma

Importantly, trauma-related symptoms, including disruptions to the self, can emerge amid

marginalization. The minority stress model postulates that marginalized individuals experience additional, chronic minority stressors on a distal-to-proximal continuum to the self, which leads to excess distress and consequently higher mental health burdens (J. A. Brown & Brooks, 1982; Meyer, 2003). Distal stressors refer to external, prejudice-related stressors (e.g., harassment, discrimination, and victimization) (Hatzenbuehler, 2009; Hatzenbuehler & Pachankis, 2016; Meyer, 2003). Proximal stressors and stress processes result from the internalization of these experiences, including identity nondisclosure, internalized stigma, and rejection sensitivity (Hatzenbuehler, 2009; Hatzenbuehler & Pachankis, 2016; Meyer, 2003; Pachankis et al., 2008; Szymanski & Balsam, 2011; Williamson, 2000). Given that these stressors are provoked by one's socially stigmatized identity, they can significantly impact one's sense of self (Hatzenbuehler, 2009; Hatzenbuehler & Pachankis, 2016; Meyer, 2003; Minshew, 2022; Nicholson et al., 2022, 2025; Szymanski & Balsam, 2011).

Considering the significant influence of minority stressors on the self, it is unsurprising that sexual and gender minorities (SGMs) experience disproportionately higher rates of psychological challenges, including PTSD, compared to the general population (Cochran et al., 2013; Hatzenbuehler, 2009; Hollinsaid et al., 2023; Keating & Muller, 2020; Livingston et al., 2020; Marchi et al., 2023; Meyer, 2003; Minshew, 2022; Nicholson et al., 2022, 2025; Riggle et al., 2023; Rostosky et al., 2022; Salomaa et al., 2023; Szymanski & Balsam, 2011; Valentine et al., 2022). Importantly, minority stressors, including those that are non-Criterion A (e.g., heterosexist discrimination and internalized heterosexism), have been previously documented to predict PTSD symptoms among SGM individuals (Dworkin et al., 2018; Keating & Muller, 2020; Straub et al., 2018; Szymanski & Balsam, 2011). Moreover, previous research has shown that SGM identity-based traumatic events are more closely linked with psychological distress (e.g., PTSD symptoms, dissociative symptoms, and emotion dysregulation) than traumatic events that were not identity-based (Keating & Muller, 2020). This may be explained, in part, by the insidious nature of minority stress, where these events are extremely difficult (and sometimes feel nearly impossible) to avoid and prepare for, which can lead to a myriad of psychological consequences (Hatzenbuehler, 2009; Hatzenbuehler & Pachankis, 2016; Hollinsaid et al., 2023; Keating & Muller, 2020). Importantly, these psychological effects related to

minority stress (e.g., intrusive thoughts and rumination, identity nondisclosure and social withdrawal, internalized stigma, chronic hypervigilance) often overlap with PTSD symptom clusters (i.e., intrusions, avoidance, negative alterations in cognitions and mood, and hyperarousal/reactivity) (Livingston et al., 2020). Ultimately, this underscores the importance of considering the intersections of minority stress and trauma exposure when contextualizing trauma-related symptoms among SGM individuals, as it appears likely that these symptoms extend beyond Criterion A events (Berke et al., 2022; Hatchard et al., 2024; Livingston et al., 2020; Marchi et al., 2023; Meyer, 2003; Minshew, 2022; Nicholson et al., 2022; Salomaa et al., 2023; Valentine et al., 2022).

In addition to conceptualizing these intersections, appropriate mitigation of these trauma symptoms among SGM populations necessitates a comprehensive understanding of factors related to both risk and resilience in the context of co-occurring trauma and minority stress. While research has examined risk and protective factors related to minority stress among SGM individuals, most studies lack a clear understanding of how these factors operate in the presence of co-occurring trauma and minority stress exposure (Hall, 2018; Hatzenbuehler, 2009; Hatzenbuehler & Pachankis, 2016; Henderson et al., 2022; Keating & Muller, 2020; Meyer, 2003, 2015; Pachankis, 2015; Riggle et al., 2008, 2011, 2014; Rostosky et al., 2010, 2018; Tankersley et al., 2021). Consequently, investigating potential risk and protective factors among trauma-exposed SGM individuals appears essential to inform and advance clinical interventions aimed at addressing trauma-related symptoms among SGM populations.

1.3 Intersections of Minority Stress and Moral Injury

Beyond PTSD, trauma-related symptoms among SGM individuals may also be understood through the lens of moral injury, offering a framework that extends beyond the limitations of Criterion A (Anderson et al., 2024; Griffin et al., 2019; Jones et al., 2022; Nicholson et al., 2022; Straub et al., 2018). Moral injury refers to psychological distress that may arise from moral transgressions committed by oneself or others (Griffin et al., 2019; Jinkerson, 2016; Litz et al., 2009). Initially referencing military-specific contexts, the term moral injury has expanded to include civilians, healthcare workers, and other related service personnel (e.g., first responders, public safety personnel)

(Bryan et al., 2018; D'Alessandro et al., 2022; Fani et al., 2021). While moral injury is not classified under the DSM-5-TR as a psychological disorder, it can be conceptualized as a distinct trauma syndrome, sharing some features with PTSD (Jinkerson, 2016), particularly in the PTSD symptom cluster of negative alterations in cognitions and mood (Cluster D; American Psychiatric Association, 2022). Moral injury is often associated with several core symptom profiles, including guilt, shame, anger, and existential conflict, as well as feelings of loss of trust and betrayal (Griffin et al., 2019; Jinkerson, 2016; Litz et al., 2009; Nicholson et al., 2022).

Transgressive events that can lead to moral injury, referred to as potentially morally injurious events (PMIEs), encompass transgressions committed by oneself or others, whether experienced directly, witnessed, or learned about (Litz et al., 2022). Although PMIEs can fall under the Criterion A definition for trauma, it is not an identified prerequisite for the development of moral injury. Additionally, exposure to PMIEs may not always lead to the development of moral injury. However, individuals impacted are deeply affected by psychological, existential/spiritual, behavioural, and interpersonal challenges (Jinkerson, 2016; Litz et al., 2009). Notably, SGMs may perceive minority stressors as PMIEs, including viewing their SGM identity as a moral violation because of internalized stigma, and understanding others' negative reactions to one's SGM identity as a moral transgression (Anderson et al., 2024; Jackson & Mohr, 2016; Jones et al., 2022; Nicholson et al., 2022). This is consistent with prior research demonstrating higher levels of explicit and implicit shame among SGM individuals, which may further explain the disproportionately high rates of SGM health disparities (Pachankis et al., 2024). Furthermore, shame has been shown to partially account for associations between minority stress and psychopathology (Mereish et al., 2019, 2021; Mereish & Paul Poteat, 2015). Despite this knowledge, research investigating moral injury in the context of minority stress is limited, with some focusing on racial minorities (Elbasheir et al., 2024; Hoffman et al., 2018; McEwen et al., 2022), and even fewer focusing on SGM populations (Anderson et al., 2024; Jones et al., 2022; Kondrath et al., 2024).

1.4 Dissertation Objectives

The overall aim of the dissertation is to examine how diverse experiences of trauma and stress

shape the development and expression of trauma-related symptoms, using a multidimensional research approach. In the second chapter, we investigate the critical role of the TPJ in the context of trauma among those with PTSD and its dissociative subtype to elucidate how symptoms of altered bodily self-consciousness uniquely manifest on the neurobiological level. Here, we used functional magnetic resonance imaging (fMRI) to investigate functional connectivity of TPJ subregions at rest among those with PTSD, PTSD dissociative subtype, and healthy controls. Furthering our understanding of trauma-related symptoms among marginalized communities, Chapter three examines potential risk and protective factors for PTSD symptoms associated with co-occurring minority stress and trauma exposure among SGM individuals using a mixed-methods approach. Chapter four expands our understanding of trauma-related symptoms among SGM individuals by investigating core features of moral injury in the context of minority stress, also using a mixed-methods approach. Finally, Chapter five presents a global discussion of the dissertation findings, including key limitations and implications.

Chapter 2 | Study One

Overview

Individuals affected by posttraumatic stress disorder (PTSD) and its dissociative subtype often describe alterations in the conscious experience of the bodily self and its position in space. This phenomenon, known as bodily self-consciousness, is well-documented to be disrupted across several psychiatric disorders. A wide body of evidence suggests disruptions to the temporoparietal junction (TPJ) may explain these bodily symptoms. This is partly due to the role it serves as a cross-network hub, whereby the TPJ is involved in allocating the attentional control necessary for embodiment and understanding contextual information in social situations – processes which are directly impacted by symptoms observed in clinical profiles of PTSD and its dissociative subtype. While the TPJ has been previously implicated in PTSD and its dissociative subtype, it remains understudied among this population in the context of bodily self-consciousness and embodiment. To our knowledge, this is the first study to investigate the bilateral anterior and posterior TPJ among individuals with PTSD, its dissociative subtype, and healthy controls at rest. These findings reveal distinct alterations in TPJ neural circuitry among PTSD and its dissociative subtype. Findings herein have implications for trauma-focused interventions targeting symptoms of disembodiment, especially among those affected by symptoms of depersonalization and derealization.

The following work has been submitted to *NeuroImage: Clinical* and is under review.

Bridging the Self to the World: Resting-state functional connectivity of the temporoparietal junction in post-traumatic stress disorder and its dissociative subtype

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2.1 Abstract

Background: The temporoparietal junction (TPJ) is a cross-network hub involved in social cognition and attention, processes which are directly impacted by symptoms observed in clinical profiles of post-traumatic stress disorder (PTSD) and its dissociative subtype (PTSD+DS).

Methods: Using SPM12 and CONN, seed-based TPJ resting-state functional connectivity patterns were analyzed in individuals with PTSD (*n*=81), PTSD+DS (*n*=49), and healthy controls (*n*=54) using four seeds [right anterior TPJ (raTPJ), left anterior TPJ (laTPJ), right posterior TPJ (rpTPJ), left posterior TPJ (lpTPJ)]. Post-hoc graph theoretical analyses were performed for raTPJ connectivity in PTSD+DS and healthy controls.

Results: As compared to healthy controls, PTSD+DS showed decreased raTPJ functional connectivity with critical anterior frontal lobe nodes involved in the ventral attention and social cognition networks (i.e., left ventrolateral and dorsomedial prefrontal cortices). PTSD showed decreased lpTPJ functional connectivity with the left superior parietal lobule as compared to healthy controls. When comparing PTSD to PTSD+DS, we observed increased bilateral TPJ functional connectivity with the cerebellum. Lastly, compared to healthy controls, both PTSD and PTSD+DS displayed decreased bilateral TPJ functional connectivity with the occipital lobe. Graph theoretical analyses revealed that PTSD+DS showed limited raTPJ involvement and instead more efficient neural communication between occipital lobe and frontal lobe structures as compared to healthy controls, suggesting a possible compensatory neural network in PTSD+DS.

Conclusions: These findings reveal disruptions in TPJ neural circuitry in PTSD and PTSD+DS, which may carry cascading effects on intersecting neural networks involving the TPJ. Implications for psychotherapeutic treatments targeting disembodiment and social cognition are discussed.

2.2 Introduction

Individuals who experience prolonged levels of stress after a traumatic event or suffer from cumulative effects of a repeated series of events (e.g., long-term childhood traumatization) can go on to develop post-traumatic stress disorder (PTSD) (Boyd et al., 2018; van der Kolk, 1994a; Yehuda et al., 2015), a psychological disorder characterized by reliving traumatic memories through flashbacks or nightmares (American Psychiatric Association, 2022). In addition, these individuals can experience extreme fluctuations in arousal, avoidance of trauma-related thoughts and feelings, as well as negative alterations in cognition and mood related to one's own self, others, and the world-at-large (American Psychiatric Association, 2022; Lanius et al., 2010; Pacella et al., 2013). These symptoms are thought to be mediated, in part, by the failure of corticolimbic inhibition, where activation of frontal cortical brain regions associated with arousal modulation and emotional regulation over subcortical structures is abnormally low (Ehlers & Clark, 2000; Etkin & Wager, 2007; Fenster et al., 2018; Lanius et al., 2006, 2010; Nicholson et al., 2017; Olivé et al., 2018). In turn, the locus of control in the brain is thought to shift from top-down cortical control towards an array of subcortical structures known as the innate alarm system (IAS) (Lanius et al., 2017). Furthermore, between 14-30% of such individuals with PTSD present with the dissociative subtype of PTSD (PTSD+DS) (Blevins et al., 2014; Lanius et al., 2010; Schiavone et al., 2018; White et al., 2022; Wolf et al., 2012) characterized by *additional* symptoms of depersonalization (altered perception of the bodily self; e.g., out-of-body experiences) and derealization (altered perception of the environment and other people; e.g., feeling like the world is not real or dreamlike) (American Psychiatric Association, 2022; Lanius et al., 2010; Melara et al., 2018; Ross et al., 2018; Sierra & Berrios, 1998; Swart et al., 2020). In contrast to the classic presentation of PTSD, PTSD+DS is also associated with a significant history of repeated childhood trauma, higher levels of comorbid psychiatric disorders, severe functional impairment, and suicidality (Schiavone et al., 2013; Stein et al., 2013; van Huijstee & Vermetten, 2018). The neural signatures of the PTSD+DS symptom profile are thought to involve excessive corticolimbic inhibition, where activation of frontal brain regions associated with arousal modulation and emotion regulation are abnormally *high*, resulting in the overmodulation of emotions that may

manifest as emotional numbing (Hopper et al., 2007; Fani, Fulton & Botzanowski, 2024; Lanius et al., 2010; Nicholson et al., 2015; 2017; van Huijstee & Vermetten, 2018; von Schroder et al., 2025). Considering the unique symptom profiles described above, the self-representation of individuals with PTSD and PTSD+DS can be altered at multiple levels, including cognitive, bodily, and social dimensions (Rabellino et al., 2020).

These constellations of symptoms are associated with widespread neural aberrations, particularly at the frontal lobe level, which can disrupt large-scale cortical neural networks that are responsible for carrying out more complex functioning, such as attention and working memory, cognitive flexibility (i.e., the ability to shift perspectives), agency to engage with others and one's surroundings, as well as understanding the self in relation to an individual's surroundings (Brown & Morey, 2012; Frewen et al., 2008; Harricharan et al., 2021; Hayes et al., 2012; Hopper et al., 2007). In particular, attention is a neurocognitive process that can be functionally separated into two distinct dorsal and ventral systems that work in collaboration for flexible attentional control. Here, the dorsal frontoparietal attention network, which consists of the frontal eye field and the intraparietal sulcus, mediates top-down guided voluntary allocation of attention (Beauchamp et al., 2001; Corbetta et al., 2002; Hopfinger et al., 2000; Kincade et al., 2005). By contrast, the ventral frontoparietal attention network (VAN) attends to bottom-up sensory stimuli that initiate shifts in attention (Farrant & Uddin, 2015; Proskovec et al., 2018; Vossel et al., 2014). The VAN includes the ventral prefrontal cortex and the temporoparietal junction (TPJ), where the TPJ is thought to serve as a node for switching between the dorsal and ventral networks and plays a key role in visuospatial attention, especially in terms of understanding self-location in spatial contexts (Machner et al., 2022; Poskanzer & Aly, 2023; Proskovec et al., 2018).

Anatomically, the TPJ lies in the posterior cortex and exists at the intersection of the superior temporal sulcus, the inferior parietal lobule, and the lateral occipital cortex (Bukowski & Lamm, 2017; Bzdok et al., 2013; Corbetta et al., 2008; Decety & Lamm, 2007). Due to its position in the posterior brain, the TPJ is implicated in several key cognitive functions, including, but not limited to, guiding attention to sensory stimuli (Alves et al., 2022; Ghosh et al., 2021; Langner & Eickhoff,

2013), bodily self-consciousness (Blanke et al., 2004; Blanke & Arzy, 2005; Ionta et al., 2011, 2014; Rabellino et al., 2020), self-other distinction (Quesque & Brass, 2019), language processing (Binder et al., 2009; Donaldson et al., 2015), episodic memory (Vilberg & Rugg, 2008; Wagner et al., 2005), and theory of mind (ToM) (Decety & Lamm, 2007; Dunbar, 2012; Harricharan et al., 2017; Samson et al., 2004; Van Overwalle, 2009).

In addition to these core functional distinctions, the TPJ is parcellated into posterior and anterior subregions, each unique in function. Specifically, the anterior TPJ is thought to be involved in attention and monitoring salience (i.e., detection and attention reorienting) (Bukowski & Lamm, 2017; Cabeza et al., 2012; Corbetta et al., 2008), while the posterior TPJ is theorized to be more associated with higher-level social cognitive processes, such as ToM (Bzdok et al., 2013), as well as sense of agency (Decety & Lamm, 2007), bodily self-consciousness (Seghier, 2013), autobiographical memory (Seghier, 2013), self-referential thinking (Seghier, 2013), and semantic processing (Bukowski & Lamm, 2017; Cabeza et al., 2012; Seghier, 2013). Furthermore, the TPJ is distinguished by hemisphere, where the right TPJ (rTPJ) is involved in lower-level attentional processes (e.g., spatial reorienting) and higher-level processing of social information (e.g., ToM) (Bzdok et al., 2013; Cabeza et al., 2012; Corbetta et al., 2008; Decety & Lamm, 2007), while the left TPJ (lTPJ) is involved in language and semantic processing (e.g., concept retrieval, conceptual integration, processing of words and sentences conveying meaning) (Bukowski & Lamm, 2017; Cabeza et al., 2012; Seghier, 2013).

Critically, emerging evidence suggests that the TPJ is an intersecting cross-network hub for allocating the attentional control necessary for the conscious experience of one's own body (i.e. bodily self-consciousness) and understanding contextual information in social situations (Geng & Vossel, 2013; Krall et al., 2015; Wilterson et al., 2021). Specifically, the TPJ plays a central role in bodily self-consciousness, referring to the conscious experience and perception of one's own body and its location in space (Blanke, 2012; Blanke & Arzy, 2005; Rabellino et al., 2020; Serino et al., 2013; Tsakiris et al., 2007; Tsakiris & Haggard, 2005). This specific domain of self-consciousness is fundamental to everyday life, allowing one to identify one's particular location in space (i.e., self-

location), perceive one's own self in the world (i.e., first-person perspective), and experience ownership of one's body (self-identification, i.e., body ownership) (Blanke & Metzinger, 2009; De Vignemont, 2011; Serino et al., 2013; Vogeley & Fink, 2003). These aspects of bodily self-consciousness form the basis of embodied awareness, which refers to the meta-cognitive sense of being localized within one's physical body and distinguishing between one's own self from others(Gallagher, 2006; Gibbs, 2005; Varela et al., 2016). This embeds the right TPJ's role in social cognition and theory-of-mind, where feeling grounded in one's body allows for perspective-taking and facilitates social bonds (Martin et al., 2019, 2020; H. Wang et al., 2016). Recent conceptual models in social neuroscience suggest that some mental health disorders can be characterized, in part, by dysfunctions in embodied cognition, where the manner in which the brain integrates multisensory bodily information may be impaired (Paulus et al., 2019; Riva et al., 2021; Scalabrini et al., 2022). In line with this hypothesis, alterations in bodily self-consciousness are associated with several psychiatric disorders (Riva et al., 2021), including xenomelia (Brugger et al., 2013; Brugger & Lenggenhager, 2014), schizophrenia (Möller et al., 2021), autism (Brugger et al., 2013; Brugger & Lenggenhager, 2014; Möller et al., 2021; Riva et al., 2021; Tordjman et al., 2019), and PTSD (Ataria, 2015; Ruth A. Lanius, 2015; Rabellino et al., 2020; Rabellino, Burin, et al., 2018).

Manifestations of PTSD symptoms within the body can include distress associated with active defensive posturing (e.g., fight-or-flight responses) and hyper-monitoring of salient stimuli within the environment (Harricharan et al., 2016, 2021; Nicholson et al., 2020; Rabellino et al., 2018). Specifically, it appears probable that individuals with PTSD may develop an expanded peripersonal space boundary (i.e., the multisensory representation of one's proximal space surrounding their body) (Brozzoli et al., 2011; Rabellino et al., 2020), as compared to healthy individuals, to accommodate their increased propensity for heightened threat detection. Moreover, dissociative symptoms that manifest in PTSD+DS directly point to alterations in bodily self-consciousness in the domains of self-identification and self-location (i.e., depersonalization) (Harricharan et al., 2016, 2021; Nicholson et al., 2020; Rabellino et al., 2018), which can have cascading effects on identity, emotion, perception, and bodily awareness (American Psychiatric Association, 2022; Putnam et al., 1996; van Huijstee &

Vermetten, 2018). As bodily self-consciousness relates to an array of symptoms associated with both PTSD (i.e., hyperarousal, hypervigilance, avoidance) and PTSD+DS (i.e., depersonalization and derealization), exploring brain regions associated with alterations in bodily self-consciousness, such as the TPJ, is necessary to understand how these symptoms may uniquely manifest between individuals with PTSD and PTSD+DS.

Current research also points towards differences between the TPJ's involvement in bodily self-consciousness among PTSD and PTSD+DS. For example, recent studies investigating eye contact, a process fundamental to bottom-up attentional processing (facilitated by the ventral attention network) and theory-of-mind (ToM), found that direct eye gaze from avatars led to greater activation in the left and right TPJ, the right temporal pole, and the dorsomedial prefrontal cortex among healthy controls as compared to individuals with PTSD (Andrews et al., 2023; Steuwe et al., 2014), where decreased activation of critical anterior frontal lobe structures like the dorsomedial prefrontal cortex may limit one's capacity for understanding contextual information about social cues (Hartwright et al., 2014; Isoda & Noritake, 2013). These results may also reflect a bilateral hemispheric role in higher-level social cognition and, critically, a possible altered state of consciousness experienced by PTSD patients where individuals demonstrate a heightened response to others' distress, compromised cognitive empathy, and alterations in the ability to reflect about others' purposes and intentions (i.e., ToM) (Lanius et al., 2005; Nazarov et al., 2014; Parlar et al., 2014; Steuwe et al., 2014). Among individuals with PTSD+DS, increased functional connectivity has also been found between the rTPJ and the superior colliculus during rest (Lanius et al., 2005; Olivé et al., 2015, 2018), where the latter is a critical region of the IAS responsible for rapid detection of potential threat (Lanius et al., 2017). As such, increased superior colliculus connectivity with the rTPJ may represent an alternative IAS pathway involved in bodily self-consciousness among individuals with PTSD+DS that is related to the TPJ's role in attending to bottom-up attentional processing of sensory stimuli through the VAN.

Taken together, the evidence described above suggests that the TPJ is associated with bodily self-consciousness, a phenomenon which can be compromised in the aftermath of trauma and uniquely implicated in PTSD and PTSD+DS. Despite this knowledge, the functional connectivity of

the different TPJ subregions among individuals with PTSD and its dissociative subtype has yet to be explored with fMRI. Here, we aimed to uncover potential alterations in functional connectivity of the TPJ at rest among PTSD and PTSD+DS as compared to healthy controls. Relative to healthy controls, both PTSD and PTSD+DS were expected to show alterations in TPJ functional connectivity patterns with regions linked to bodily self-consciousness and disruptions in the neural networks where the TPJ serves as a key node for embodied awareness. Specifically, we hypothesized that individuals with the PTSD dissociative subtype will show decreased TPJ connectivity with frontal lobe structures in the ventral attention network and social cognition network, which may carry negative implications for sensory processing and emotion regulation.

2.3 Methods

Sample description

One hundred and eighty-four participants (*N*=184), including 54 healthy controls, 81 PTSD patients (PTSD), and 49 PTSD patients with the dissociative subtype (PTSD+DS) were included in the study. Participants from the current study were recruited between 2009 and 2018 through referrals from family physicians, mental health professionals, psychology/psychiatric clinics, community programs for traumatic stress, and posters/advertisements within the London, Ontario, community. The inclusion criteria for the PTSD and PTSD+DS groups included a primary diagnosis of PTSD as determined by the Clinician-Administered PTSD Scale (CAPS) (versions CAPS-IV was administered for 137 participants and CAPS-5 was administered for 47 participants). Individuals with the PTSD dissociative subtype were identified by scoring at least two in frequency and intensity on the CAPS-IV scale or at least two in symptom severity on the CAPS-5 for depersonalization and/or derealization. The exclusion criteria for both PTSD and PTSD+DS patients included alcohol or substance use/dependence not in sustained full remission and concurrent diagnosis of bipolar disorder or any psychotic disorder. For the control group, exclusion criteria included any lifetime Axis-I psychiatric disorders, which was determined by using the Structured Clinical Interview for DSM-IV Axis 1 Disorders (SCID-I) and the CAPS. All comprehensive clinical assessments were administered by

highly trained clinical personnel under the supervision of a psychiatrist specializing in the treatment of PTSD and its dissociative subtype. Furthermore, additional exclusion criteria for all participants included: contraindications with fMRI safety standards (e.g., metal implants), significant untreated medical illness, a history of neurological or pervasive developmental disorders, previous head injury with loss of consciousness, and pregnancy.

Ethics approval for the study was received by the research ethics board at Western University of Canada and all participants in the study provided written informed consent. Demographic and clinical characteristics of the sample are reported in Table 1.

Depressive symptomatology severity and trait dissociation were assessed using the Beck Depression Inventory (BDI) (Beck et al., 1997) and the Multiscale Dissociation Inventory (MDI) (Briere et al., 2005), respectively. Additionally, childhood traumatization was assessed using the Childhood Trauma Questionnaire (CTQ) (Bernstein & Fink, 1997a). State trauma-related symptoms and state derealization/depersonalization during the fMRI scan were assessed immediately after the scanning session using the Response to Script-Driven Imagery Scale (RSDI; Hopper et al., 2007).

Table 1. *Clinical and demographic characteristics of study participants*.

Measure	**PTSD**	**PTSD+DS**	**Healthy Controls**
N	81	49	54
Sex (# of Females)	47	39	35
Age (mean ± SD)	39 ± 12	40 ± 14	34 ± 12
CAPS-IV Total (*n* = 137) (mean ± SD)	68 ± 13 (*n* = 53)	82 ± 13 (*n* = 30)	0.3 ± 1 (*n* = 54)
CAPS-5 Total (*n* = 47) (mean± SD)	36 ± 9 (*n* = 28)	41 ± 8 (*n* = 19)	n/a
MDI Total (mean ± SD)	54 ± 15	81 ± 22	34 ± 4
CTQ Total (mean ± SD)	56 ± 23	70 ± 19	32 ± 9
BDI Total (mean ± SD)	23 ± 8	35 ± 12	1 ± 2

Abbreviations: CAPS: Clinical Administered PTSD Scale (CAPS-IV = version 4; CAPS-V = version 5); *MDI:* Multiscale Dissociation Inventory; *CTQ:* Childhood Trauma Questionnaire; *BDI:* Beck Depression Inventory; *PTSD:* post-traumatic stress disorder; *PTSD+DS:* post-traumatic stress disorder with the dissociative subtype; SD: standard deviation; n/a, not applicable.

Resting-state fMRI data collection

Resting-state fMRI images were collected via a whole-body 3.0 Tesla MRI scanner (Siemens Medical Solutions, Erlangen, Germany) either at the Lawson Health Research Institute for Imaging (Magnetom Verio/Biograph mMR; n = 58) or at the Robarts Research Institute for Functional and Metabolic Mapping (Magnetom Trio/Magnetom Prism; n = 126) in London, Ontario, Canada with a manufacturer's 32-channel phased array head coil. T1-weighted anatomical images were collected with 1-mm isotropic resolution (TR/TE/TI = 2300 ms/2.98 ms/900 ms, FA 9°, FOV = 256 mm × 240 mm × 192 mm, acceleration factor = 4, total acquisition time = 192s; FOV = field of view; TR = repetition time; TE = echo time; FA = flip angle).

Blood-oxygen level-dependent signal (BOLD) fMRI images were collected for 6 minutes via the standard gradient echo planar imaging (EPI) pulse sequence using 2-mm isotropic resolution. The following parameters were used to acquire EPI volumes: FOV = 192 mm×192 mm×128 mm (94×94 matrix, 64 slices), TR/TE = 3,000 ms/20 ms, flip angle = 90°, totalling to 120 volumes collected.

During the 6-minute resting-state scan, participants were instructed to close their eyes and let their minds freely wander, avoiding focus on a particular topic as per previous methods (Bluhm et al., 2009; Fox et al., 2009).

fMRI data preprocessing

Images were preprocessed using Statistical Parametric Mapping (SPM12, Wellcome Trust Center for Neuroimaging, London, UK) within MATLAB 8.3 (The Mathworks Inc, MA). All functional images were realigned to the first image in the series for each participant, from which mean functional images were created. The mean image was then co-registered to the individual subject anatomical template collected at the beginning of the scan and the resulting deformation matrix was applied to all functional images in the series. Functional images were smoothed using a 6mm full-width-half-maximum isotropic Gaussian filter. Anatomical data were segmented into grey matter, white matter, and CSF tissue classes using SPM unified segmentation and normalization algorithm with the default MNI (Montreal Neurological Institute) probability map template. Band-pass

filtering was completed using high-pass (0.008 Hz) and low-pass (0.09 Hz) filtering via in-house software created by JT. In addition, functional data were denoised using a standard denoising pipeline using the CONN toolbox, an SPM12-based cross-platform software for the computation, display, and analysis of functional connectivity magnetic resonance imaging. This denoising pipeline included the regression of potential confounding effects characterized by white matter timeseries, CSF timeseries, and outlier scans determined by the artifact removal toolbox. From the number of noise terms included in this denoising strategy, the effective degrees of freedom of the BOLD signal after denoising were estimated to range from 39.4 to 50.7 (average 48.4) across all subjects.

Data Analyses

Demographic and clinical data

Clinical variables (i.e., CAPS, CTQ, MDI, and BDI) were compared across groups via one-way analysis of variance (ANOVA) using Statistical Package for the Social Sciences software (SPSS, IBM, version 30.0). We performed Kruskal-Wallis H tests, followed by post-hoc Mann–Whitney tests if the normality assumptions of one-way ANOVA were not met. Sex differences were examined using Pearson's chi-square tests between groups.

Neuroimaging data

First-level Analysis (*Within-Subject)*. Seed masks were created using the PickAtlas toolbox in SPM12 (Maldjian et al., 2003), where 6mm spheres were defined separately for TPJ subregions and extracted using coordinates from a previous resting-state fMRI study (Bzdok et al., 2013; Penner et al., 2018) referencing a multi-modal connectivity-based parcellation analysis (Bzdok et al., 2013): left anterior TPJ (laTPJ) (MNI *x,y,z*: -58, -39, 16), right anterior TPJ (raTPJ) (MNI *x,y,z*: 58, -39, 16.5), left posterior TPJ (lpTPJ) (MNI *x,y,z*: -54, -54, 16), right posterior TPJ (rpTPJ) (MNI *x,y,z*: 54, -54, 16.5). The mean signal intensity time course was extracted from each of the four TPJ spheres defined in PickAtlas using in-house software by JT. All fMRI statistical analyses were conducted using the CONN toolbox. Regression analyses were performed at the whole-brain level for each of the TPJ

seeds, and outlier and movement regressors determined from the Artifact Removal Tool were included as a nuisance variable.

Second-Level Analysis (Between-Group). Group-level analyses were conducted in CONN for each of the four TPJ seed regions. The first-level results were used to perform a split-plot 3x2x2 full-factorial ANOVA that included the between-subject factor of group (controls, PTSD, PTSD+DS), and within-subject factors of subregion (anterior, posterior) and hemisphere (left, right). All statistical analyses were evaluated at a family-wise error (FWE) voxel-level threshold of $p<.05$, $k=50$ (Eklund et al., 2016; Roiser et al., 2016). Age was included as a covariate in the full-factorial ANOVA since age significantly differed between groups and to account for any variance arising from the two separate locations, respectively.

Post-hoc graph theoretical metrics

An exploratory post-hoc region-of-interest to region-of-interest (ROI) analysis was conducted to further investigate the between-group differences among brain regions that were in the original full-factorial TPJ functional network connectivity analysis. ROI-level graph metrics can assist in understanding further the functional organization of a collection of brain nodes when analyzed as a global network, including global efficiency of the nodes in communicating information (Kearney et al., 2023; Rubinov & Sporns, 2010; Shaw et al., 2021). In the current study, this was included as a post-hoc analysis to elaborate on the most widespread results based on the original full-factorial analysis. The ROIs included in the analysis were clusters extracted from thresholded groupwise results at an FDR-level ($p<0.05$; $k=50$; Eklund et al., 2016) level for the healthy control>PTSD+DS raTPJ connectivity t-test. The ROIs were: raTPJ seed region (MNI *x,y,z*: 58, -39, 16.5), the right cerebellar lobule II (MNI *x,y,z*: 48, -56, -46), the right cerebellar lobule I (MNI *x,y,z*: 30, -90, -32), the right occipital pole (MNI *x,y,z*: 28, -100, 0), the left inferior temporal gyrus (MNI *x,y,z*: -48, -46, -18), the right temporal pole (MNI *x,y,z*: 62, 12, -8), the left precentral gyrus (MNI *x,y,z*: -62,12, 10), the left ventrolateral prefrontal cortex (MNI *x,y,z*: -54, 40, 4), and the dorsomedial prefrontal cortex (MNI *x,y,z*: 0, 56, -28). For the ROI-to-ROI analysis, pairwise bivariate correlation coefficients were computed between each pair of ROIs using their preprocessed BOLD timeseries. A graph adjacency

matrix was extracted from the ROI-to-ROI connectivity matrix and results were thresholded using an edge-defining threshold (cost-level) of 0.15 (one-sided) and FDR-correction threshold of $p<0.05$ (two-sided). The emerging network topological characteristics were compared for both the healthy control and PTSD+DS groups given that the ROIs were extracted from this between-group comparison from the original full-factorial analysis.

Linear regression with clinical symptoms. To explore the association between resting-state functionality of the seed regions (i.e., raTPJ, laTPJ, rpTPJ, lpTPJ) and clinical variables, regression analyses were performed within each participant group (PTSD, PTSD+DS, healthy controls). The level of significance was set to family-wise error (FWE) voxel-level threshold of $p<.05$, $k=50$. Clinical variables explored in this analysis included measures of PTSD symptom severity (CAPS), childhood traumatization (CTQ), depressive symptomatology (BDI), and dissociative symptoms (MDI), as well as state trauma symptoms during the scan (RSDI).

2.4 Results

Demographic and clinical variables

A significant difference was found with respect to biological sex among groups [χ^2 (2, N = 184) = 6.34, p = 0.042], which showed a higher proportion of female participants in the PTSD+DS group relative to the PTSD and healthy control groups. A significant difference was also found for age [H(2)= 7.78, p = 0.02] and was accounted for when exploring results from the imaging analysis (see below). Consistent with previous research, Kruskal-Wallis analysis of variance showed that symptoms of depression, PTSD severity, childhood trauma, and dissociation were significantly higher in the PTSD+DS group than the PTSD group (CAPS, MDI, CTQ, BDI, $p < .001$). (Armour et al., 2014; Ginzburg et al., 2006; Hansen et al., 2017; Harricharan et al., 2016; Nicholson et al., 2015; Rabellino et al., 2022; Stein et al., 2013; Thome et al., 2019; Wolf et al., 2012). In addition, as expected, both PTSD and PTSD+DS groups showed significantly higher scores across all psychological measures as compared to the healthy control group (CAPS, MDI, CTQ, BDI, $p < .001$).

Resting-state functional connectivity results – full-factorial and between-group resting-state

functional connectivity

The full-factorial analysis yielded one significant interaction effect: group by subregion. The group by subregion interaction effect was observed for the left cerebellar lobule VIII and the bilateral occipital pole. Additionally, the full-factorial ANOVA analysis on BOLD versus age effect across groups did not yield any significant results. Post-hoc between-group results will be presented in order at a FWE voxel-level threshold set to $p<.05$, $k=50$.

Table 2. *Split-plot full-factorial analysis of variance: F-test results.*

Effect	L/R	Brain Region	k	F-Statistic	Peak Z	Peak p-FWE	MNI Coordinate *x*	*y*	*z*
Interaction: Group x Seed	L	Cerebellar Lobule VIII	1446	8.80	6.64	<0.001	-14	-58	-64
	R	Occipital Pole	743	7.22	5.84	<0.001	22	-102	-10
	L	Occipital Pole	447	6.41	5.34	0.011	-26	-102	0
Interaction: *Seed x Hemisphere Group x Hemisphere*		*None*							
Main Effect *Group Seed Hemisphere*		*None*							

Abbreviations: BA: Brodmann Area; *k:* Cluster size; *L/R:* Left or Right Hemisphere

Healthy controls versus PTSD group differences

As compared to the PTSD group, the healthy control group showed increased lpTPJ functional connectivity with the right occipital pole, the right inferior temporal gyrus (spanning the fusiform gyrus), as well as the bilateral superior parietal lobule. No significant group differences were observed for the raTPJ, rpTPJ or laTPJ seed regions.

Table 2. *Healthy controls versus PTSD between-group differences: Follow-up t-tests*

Seed Region	L/R	BA	Brain Region	k	T-Statistic	Peak Z	Peak *p*-FWE	MNI Coordinate *x*	*y*	*z*
raTPJ			*None*							
rpTPJ			*None*							
laTPJ			*None*							
lpTPJ	R		Occipital Pole	764	5.84	5.50	0.005	22	-100	-6
	R		Inferior Temporal	860	5.64	5.33	0.012	50	-42	-18

			Gyrus, Fusiform Gyrus							
	L		Superior Parietal Lobule	138	5.64	5.33	0.012	-30	-56	54
	R		Superior Parietal Lobule	762	5.39	5.12	0.032	26	-56	48

Abbreviations: BA: Brodmann Area; *k:* Cluster size; *L/R:* Left or Right Hemisphere; *raTPJ*: right anterior temporoparietal junction; *rpTPJ*: right posterior temporoparietal junction; *laTPJ*: left anterior temporoparietal junction; *lpTPJ*: left posterior temporoparietal junction.

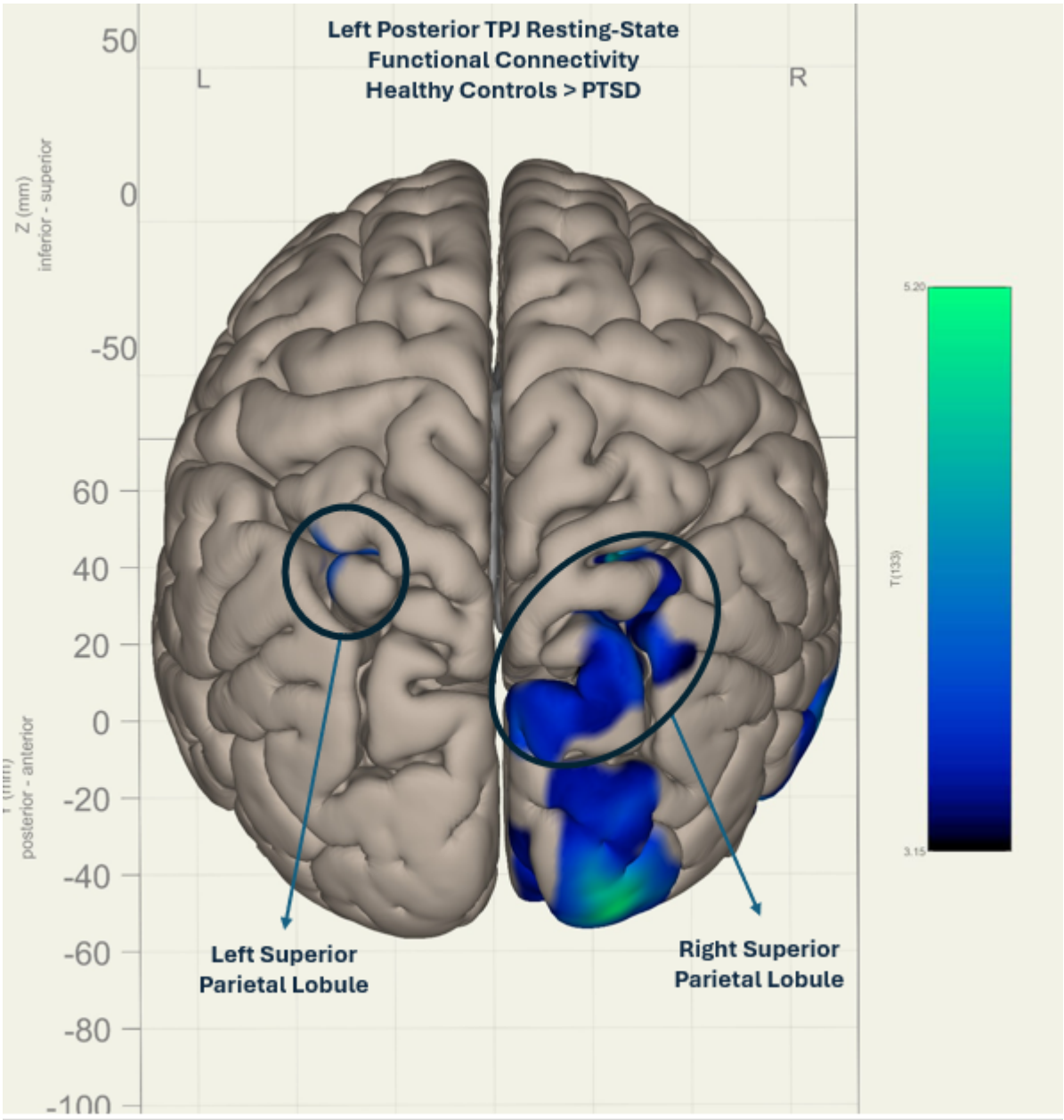

Figure 1. Left posterior TPJ functional connectivity in healthy controls versus the PTSD group.

Healthy controls versus PTSD+DS group differences

When compared to the PTSD+DS group, the healthy control group displayed increased raTPJ

functional connectivity with the dorsomedial and the left ventrolateral prefrontal cortices, as well as the left parietal operculum. Moreover, increased rpTPJ functional connectivity was observed with the left parietal operculum. In addition, the healthy control group showed increased laTPJ functional connectivity with the right occipital pole and increased lpTPJ connectivity with the lateral occipital cortex as compared to the PTSD+DS group.

Table 3. *Healthy controls versus PTSD dissociative subtype between-group differences: Follow-up t-tests*

Seed Region	L/R	BA	Brain Region	k	T-Statistic	Peak Z	Peak p-FWE	MNI Coordinate *x*	*y*	*z*
raTPJ	L	44	Parietal Operculum	92	5.84	5.41	0.008	-62	12	10
	L/R	10	Dorsomedial PFC	83	5.42	5.07	0.041	0	56	-28
	L	45	Ventrolateral PFC	101	5.41	5.05	0.043	-54	40	4
rpTPJ	L		Parietal Operculum	137	5.72	5.31	0.013	-62	8	6
laTPJ	R		Occipital Pole	436	5.49	5.12	0.032	48	-86	-6
lpTPJ	L/R		Lateral Occipital Cortex, Fusiform Gyrus	2878	7.33	6.54	<0.001	-24	-102	-6

Abbreviations: BA: Brodmann Area; *k:* Cluster size; *L/R:* Left or Right Hemisphere; *raTPJ*: right anterior temporoparietal junction; *rpTPJ*: right posterior temporoparietal junction; *laTPJ*: left anterior temporoparietal junction; *lpTPJ*: left posterior temporoparietal junction.

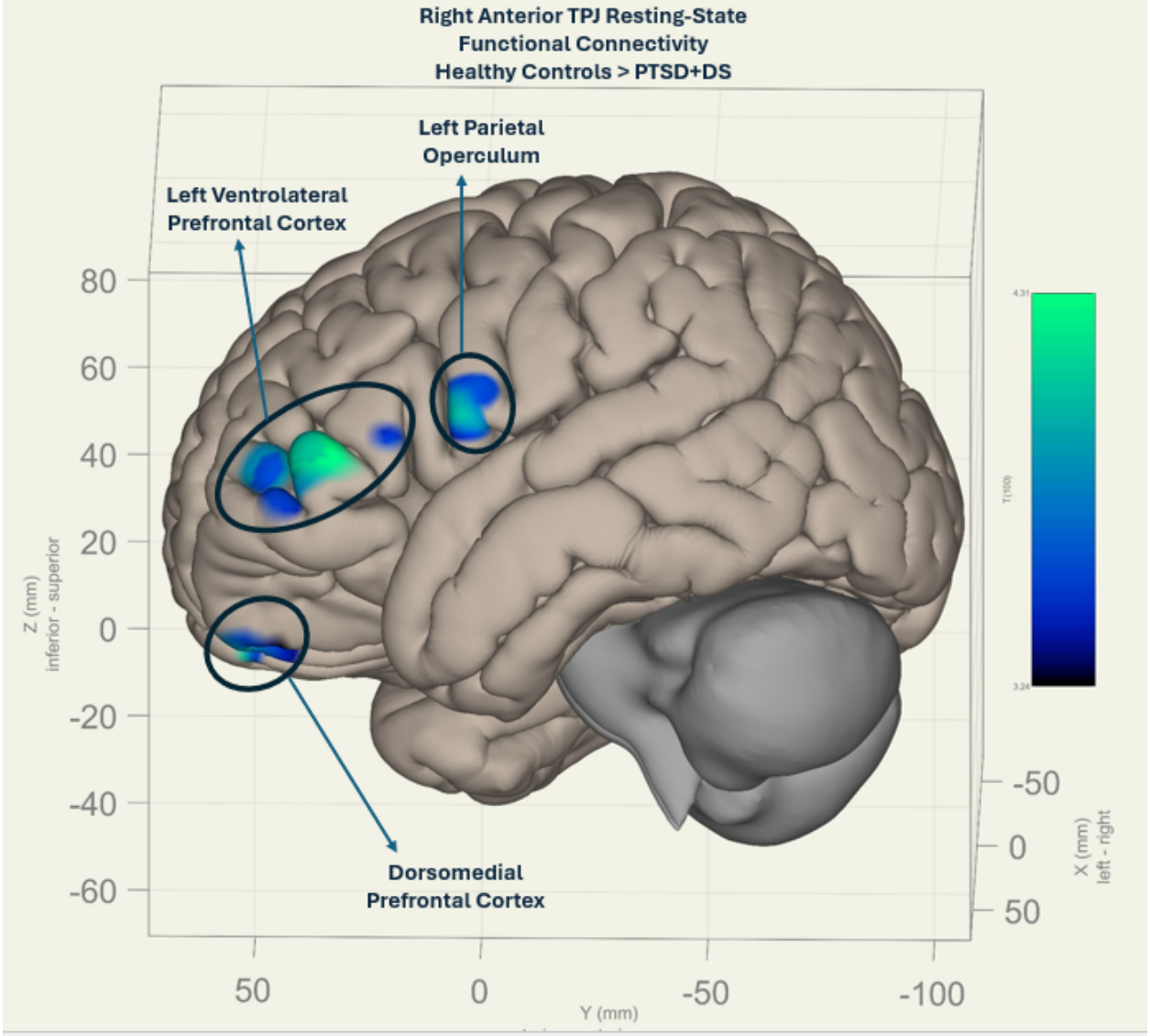

Figure 2. Right anterior TPJ functional connectivity in healthy controls versus the PTSD+DS group.

PTSD versus PTSD+DS group differences in functional connectivity

In contrast to the PTSD+DS group, the PTSD group showed increased raTPJ, rpTPJ, and laTPJ functional connectivity with the left cerebellar lobule VIII. In addition, the PTSD group also showed increased raTPJ functional connectivity with the left precentral gyrus. No significant group differences were observed for the lpTPJ seed region.

Table 4. *PTSD versus PTSD dissociative subtype between-group differences: Follow-up t-tests*

Seed Region	L/R	BA	Brain Region	k	T-Statistic	Peak Z	Peak p-FWE	MNI Coordinate *x*	*y*	*z*
raTPJ	L		Cerebellar Lobule VIII	2149	6.99	6.41	<0.001	-14	-58	-64
	L	6	Precentral Gyrus	81	5.71	5.37	0.009	-66	-2	12

rpTPJ	L		Cerebellar Lobule VIII	1844	5.58	5.27	0.016	-2	-58	-62
laTPJ	L		Cerebellar Lobule VIII	746	5.55	5.24	0.018	-34	-46	-62
lpTPJ			*None*							

Abbreviations: BA: Brodmann Area; *k:* Cluster size; *L/R:* Left or Right Hemisphere; *raTPJ*: right anterior temporoparietal junction; *rpTPJ*: right posterior temporoparietal junction; *laTPJ*: left anterior temporoparietal junction; *lpTPJ*: left posterior temporoparietal junction.

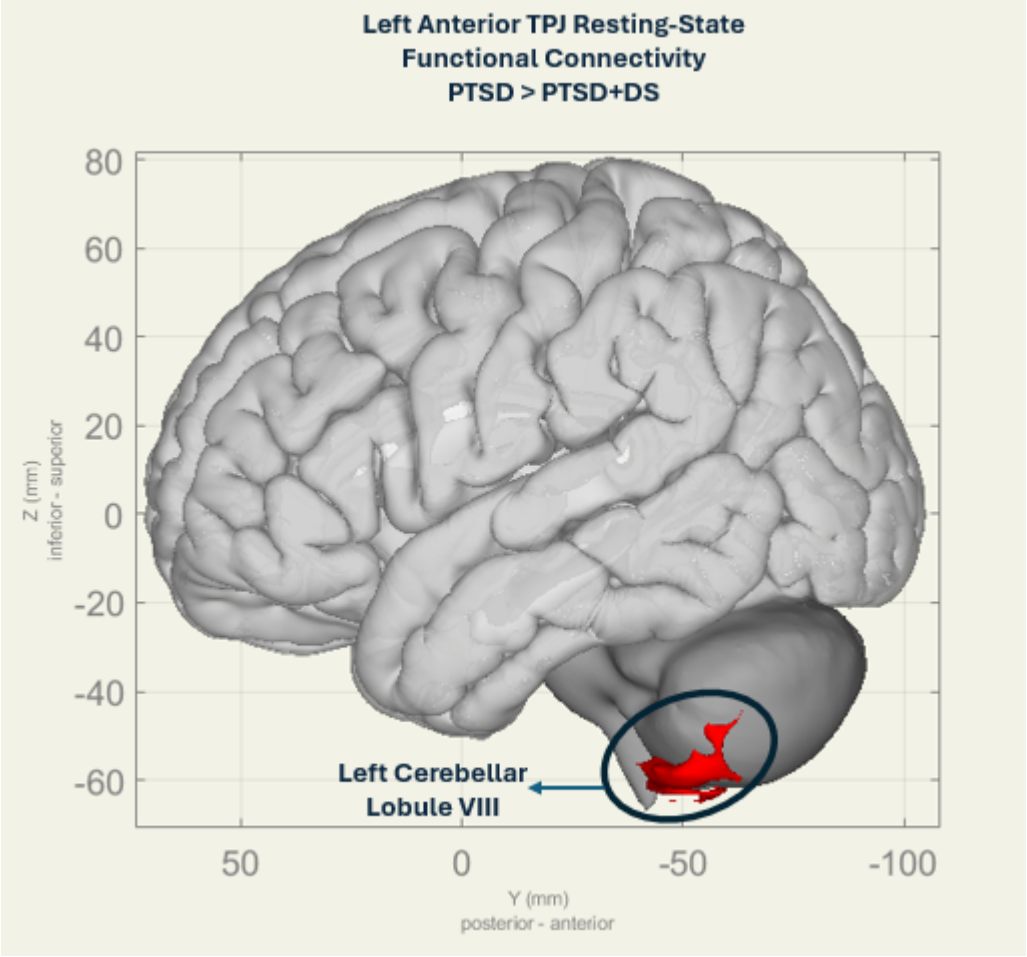

Figure 3. Left anterior TPJ functional connectivity in the PTSD group versus the PTSD+DS group.

Conversely, as compared to the PTSD group, the PTSD+DS group showed increased raTPJ connectivity with the left supplementary motor cortex. No significant group differences were observed for the rpTPJ, laTPJ or lpTPJ seed regions.

Table 5. *PTSD dissociative subtype versus PTSD between-group differences: Follow-up t-tests*

Seed Region	L/R	BA	Brain Region	k	T-Statistic	Peak Z	Peak p-FWE	MNI Coordinate

								x	*y*	*z*
raTPJ	L	6	Supplementary Motor Cortex	80	5.32	5.04	0.044	-20	18	58
rpTPJ			*None*							
laTPJ			*None*							
lpTPJ			*None*							

Abbreviations: BA: Brodmann Area; *k:* Cluster size; *L/R:* Left or Right Hemisphere; *raTPJ*: right anterior temporoparietal junction; *rpTPJ*: right posterior temporoparietal junction; *laTPJ*: left anterior temporoparietal junction; *lpTPJ*: left posterior temporoparietal junction.

Post-hoc graph theoretical analysis

Within the healthy control group, the graph metrics showed a pattern of global efficiency among the ROIs included in the network analysis [T(53)=34.76, beta=0.23, *p*FDR <0.001] that indicated a network topology map depicting increased communication between the raTPJ seed region and an anterior node of the proposed network (i.e., right temporal pole). Within the same map, the posterior regions of the network (i.e., right occipital pole, right cerebellar lobules I and II) showed more local communication with each other rather than with the other anterior nodes of the defined network (i.e., the left precentral gyrus, the left ventrolateral prefrontal cortex, the dorsomedial prefrontal cortex). Conversely, among the PTSD+DS group, the graph metrics revealed significant global efficiency [T(47)= 39.49, beta=0.24, *p*FDR<0.001], where the network topology map demonstrated increased communication between posterior nodes (e.g., right occipital pole, right cerebellar lobules I and II) and anterior nodes (e..g., right temporal pole, right dorsomedial prefrontal cortex) of the proposed network. Critically, the raTPJ seed region ROI was not considered significant for efficient communication between nodes included in this network, which is in direct contrast to the healthy control group. Figure 4 visualizes a direct comparison of these two network topological maps at a pFDR<0.05 level for both the PTSD+DS and healthy control groups.

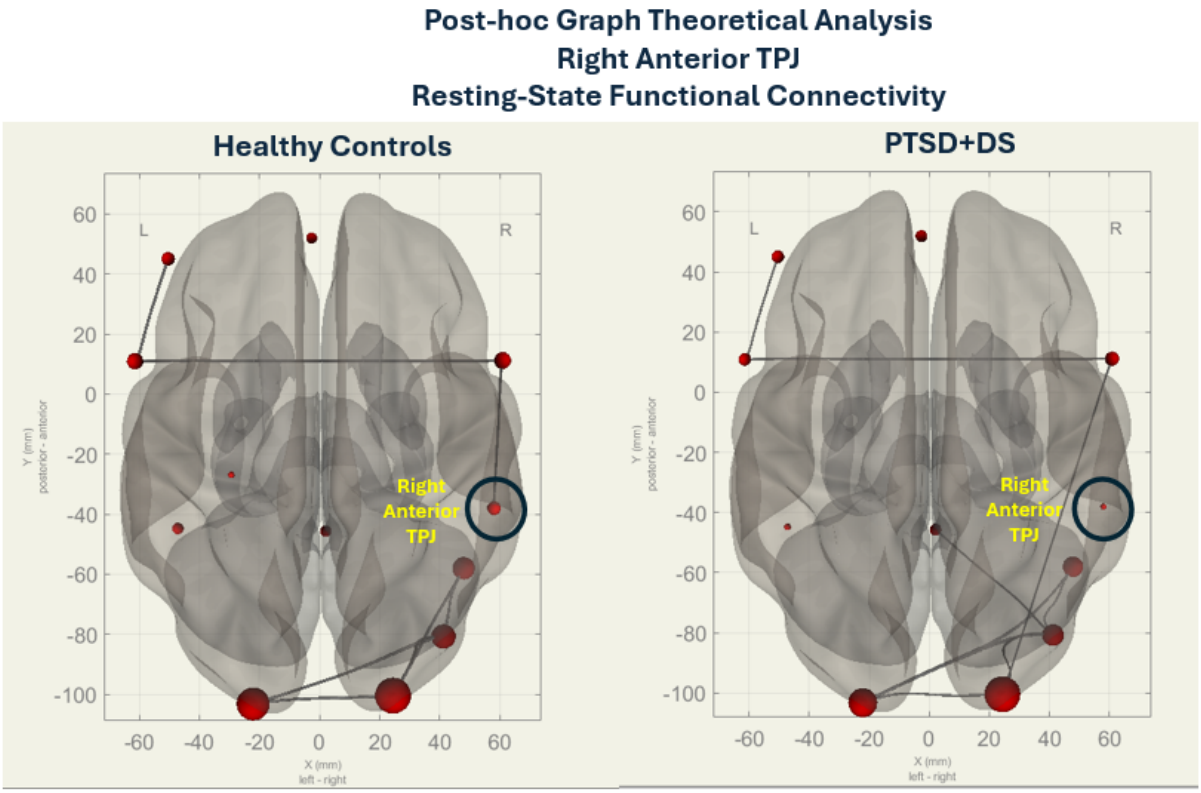

Figure 4. Post-hoc graph theoretical analysis of the right anterior TPJ functional connectivity in healthy controls (left) and PTSD+DS (right).

Table 6. *Clinical correlations*

	Correlation	Seed Region	L/R	BA	Brain Region	k	Peak Z	Peak p-FWE	MNI Coordinate *x*	*y*	*z*
CTQ	Negative correlation	laTPJ	L		Superior Parietal Lobule	75	4.33	0.038	-28	-52	56

Abbreviations: BA: Brodmann Area; *k:* Cluster size; *L/R:* Left or Right Hemisphere; *laTPJ*: left anterior temporoparietal junction.

Symptom correlations with resting-state functional connectivity patterns

Regression analyses revealed a significant correlation (*p*FWE=0.038) between resting-state functional connectivity of the laTPJ and CTQ scores among all participants when the samples were combined (see Table 6 for an overview of the results). Specifically, childhood trauma severity, as measured by the CTQ, correlated negatively with laTPJ functional connectivity with the left superior parietal lobe.

2.5 Discussion

To our knowledge, this is the first study that investigated resting-state functional connectivity patterns of the bilateral anterior and posterior temporoparietal subregions among individuals with PTSD and its dissociative subtype, as compared to healthy controls. The TPJ is increasingly recognized as an intersecting cross-network hub for allocating the attentional control necessary for the conscious experience of one's own body (Arzy et al., 2006; Martin et al., 2020; Wu et al., 2015, and understanding contextual information in social situations (Maliske & Kanske, 2022; Ogawa & Matsuyama, 2023; Van Overwalle, 2009), which are directly impacted by symptoms observed in clinical profiles of PTSD and its dissociative subtype (PTSD+DS). Thus, this study allowed for a more comprehensive understanding of the TPJ neural circuitry during rest among individuals with PTSD and PTSD+DS as compared to healthy controls using unique parcellations that separated the TPJ into left and right hemispheres, as well as its anterior and posterior subregions.

In line with our hypotheses, we found that, as compared to healthy controls, PTSD+DS showed significantly decreased right anterior TPJ connectivity with critical anterior frontal lobe nodes of the ventral attention and social cognition networks, including the left ventrolateral and dorsomedial prefrontal cortices. Moreover, post-hoc graph theoretical analyses revealed that PTSD+DS showed limited raTPJ involvement and instead more efficient neural communication between occipital lobe and frontal lobe structures as compared to healthy controls. Critically, the raTPJ seed region ROI was not considered significant for efficient communication between nodes included in this network, which is in direct contrast to the healthy control group, suggesting a possible compensatory neural network in PTSD+DS that may emerge if the TPJ is sub-optimally engaged among these individuals.

The PTSD group showed decreased lpTPJ connectivity with the left superior parietal lobule as compared to healthy controls, where the superior parietal lobule plays key roles in mediating top-down attention and emotion regulation through the dorsal attention network and central executive network, respectively. The dorsal and ventral attention networks are well-integrated to help orient the brain to determine which sensory stimuli to filter to the higher-level dorsal attention network, where

Suo et al. (2021) identified the TPJ as a functional connector to signal interactions between the dorsal and ventral attention networks. In the present study, laTPJ functional connectivity with the left superior parietal lobule connectivity was also shown to be negatively correlated with increased childhood traumatization. Collectively, these findings suggest a weakened integration between top-down (i.e., dorsal) and bottom-up (i.e., ventral) attentional networks among traumatized individuals, and particularly those that experienced increased childhood maltreatment. Furthermore, as compared to PTSD+DS, the PTSD group showed increased bilateral TPJ connectivity with the left cerebellar lobule VIII, which is located in the inferior cerebellum and involved with motor coordination, sensorimotor tasks and spatial processing (Stoodley et al., 2012), which may be partially attributed to dissociative symptoms (i.e., depersonalization and derealization) contributing to a lack of bodily and environmental spatial awareness among these individuals. Finally, healthy controls additionally demonstrated increased left TPJ connectivity with areas in the occipital lobe, which is critical for visuospatial perception. Notably, the findings did not yield a significant main effect for either hemisphere (left and right) or subregion (anterior and posterior), suggesting a lack of distinction between the TPJ regions in their previously theorized functions in the context of the traumatized populations explored in the current study. Taken together, these findings show the neural circuitry of the TPJ is disrupted among individuals with PTSD and its dissociative subtype, which can have cross-modal effects on the various networks of which it serves as a neural hub, including the ventral attention network, the social cognition network, as well as the indirect effects on networks involved in mediating top-down attention and emotion regulation.

Limited PTSD+DS raTPJ functional connectivity with areas involved in the first-person perspective

In the present study, the PTSD+DS group showed significantly decreased raTPJ functional connectivity during rest with key anterior frontal nodes of networks that the TPJ is a part of, including the left ventrolateral and dorsomedial prefrontal cortices of the ventral attention and the social cognition networks, respectively. Regarding the ventral attention network, the TPJ and the ventral prefrontal cortex have been shown to be functionally connected, where these structures work in tandem to help shift attention towards attending to incoming bottom-up sensory stimuli (Alves et al.,

2022; Bukowski & Lamm, 2017; Cabeza et al., 2012; Corbetta et al., 2008; Ghosh et al., 2021; Langner & Eickhoff, 2013). Moreover, the right TPJ plays a central role in processing self-location and self-other distinction, which are critical aspects of bodily self-consciousness and guiding an individual's sense of agency (i.e., act of initiating movement) (Quesque & Brass, 2019).

Bodily self-consciousness encompasses the conscious experience of occupying a volume of space within the environment, body ownership within that space, and the first-person perspective of one's own self in the world (Blanke, 2012; Blanke & Arzy, 2005; Ionta et al., 2011). A recent review by Dary and Lopez (2023) identified the right TPJ as an overlapping neural substrate involved in the conscious experiences of the bodily self *and* higher-level forms of self (i.e., the cognitive or autobiographical self). Given that the TPJ plays an overlapping role in bodily self-consciousness, the ventral attention network (e.g., attention to incoming sensory stimuli) as well as the higher-level forms of the cognitive self, we postulate that it is critical for *embodied awareness*, where connectivity between the right TPJ and the ventrolateral prefrontal cortex via the ventral attention network may play a key role in one's own bodily orientation and awareness to time, place, and person.

In the present study, PTSD+DS showed weaker raTPJ connectivity with the ventrolateral prefrontal cortex as compared to healthy controls, which may suggest a weakened sense of embodied awareness consistent with depersonalization and derealization characteristic of PTSD+DS. Specifically, decreased raTPJ functional connectivity with an anterior area of the ventral attention network (i.e., the ventrolateral prefrontal cortex) among individuals with the PTSD dissociative subtype may suggest limited attention to incoming sensory stimuli. This can have negative downstream effects on one's contextual understanding of self-location with respect to one's surroundings, thus leading to a sense of bodily disorientation. Critically, the ventrolateral prefrontal cortex has also been implicated in the generation and regulation of emotion and goal-directed behaviour. Here, weakened embodied awareness at the level of the ventrolateral prefrontal cortex among traumatized individuals who experience depersonalization and derealization may be associated with emotional numbing and subjective disengagement also observed in this clinical symptom profile (Briere, 2006; Ellickson-Larew et al., 2020; Herzog et al., 2018; von Schroder et al.,

2025).

Limited PTSD+DS raTPJ functional connectivity with areas involved in social cognition

The TPJ is also essential to the sociocognitive ToM network, playing a critical role in the mentalization of the self and others' behavioural and emotional states, which are maintained through dense connections with cortical midline structures involved in self-referential processing, including the dorsomedial prefrontal cortex (Decety & Lamm, 2007; Dunbar, 2012; Harricharan et al., 2017; Kang et al., 2013; Le Petit et al., 2022; Northoff & Bermpohl, 2004; Samson et al., 2004; Van Overwalle, 2009). Critically, weaker raTPJ connectivity with the dorsomedial prefrontal cortex in PTSD+DS versus healthy controls may suggest a decreased capacity for understanding cognitive-emotional states of themselves and others, limiting embodied perspective-taking, or, in other words, imagining an experience in the body of another. This finding suggests traumatized individuals who experience depersonalization and derealization may have a hindered capacity for self-reflection and emotional attunement to others, which can make it difficult to engage with the world and may, in part, contribute to emotional numbing and foster feelings of self-isolation. Given that PTSD+DS may have more weakened embodied awareness as discussed above, this may also negatively affect somatic self-referential processing and perspective-taking, where compromised bodily self-consciousness can weaken one's ability to mentalize and connect with others' experiences (Kearney & Lanius, 2022; Lanius, 2015; Nazarov et al., 2014).

These findings also align with the post-hoc graph theoretical analysis, which suggest that the raTPJ has a more limited role among individuals with the PTSD+DS versus healthy controls when considering a neural network involving the TPJ, the medial prefrontal cortex, the ventral prefrontal cortex, as well as the occipital areas. In this analysis, the PTSD+DS group showed more efficient neural communication between the occipital and anterior frontal nodes of the brain that did not include the raTPJ. This finding may be indicative of a compensatory neural network that emerges in PTSD+DS if the TPJ is sub-optimally engaged and may carry negative cascading effects on the ToM and ventral attention networks, which critically rely on the TPJ for cross-network communication (Quesque & Brass, 2019). Instead, these individuals may have to become more reliant on visual

processing of information in the occipital lobe, which may amplify hypervigilance symptoms through visual threat processing; however, they may lack the social contextual information necessary from the TPJ for embodied awareness of the self in the context of their surroundings, leading to more extreme states of emotional reactivity (i.e., hyperarousal or emotional blunting).

Weakened lpTPJ connectivity with the posterior emotion regulation network

As compared to healthy controls, individuals with PTSD showed decreased resting-state functional connectivity between the lpTPJ and the bilateral superior parietal lobe, a critical structure in the dorsal attentional network involved in selective ("holding") attention rather than switching attention in response to salient stimuli (i.e., VAN) (Alahmadi, 2021; Coull & Frith, 1998; Sani et al., 2021; Spreng et al., 2017). While attention has been previously described as a *flash of light* illuminating our surroundings (Husserl, 1980; Jacobs, 2016), emerging research suggests that attention is deeply linked to bodily movements, referred to variously in the existing literature as embodied attention (Clark et al., 2015; D'Angelo, 2020; Noë, 2008; Wilson & Golonka, 2013). Here, a weakened connection between the posterior aspects of the dorsal (i.e., superior parietal lobule) and ventral (i.e., TPJ) attention networks in the PTSD group may reflect a decreased ability to switch between holding attention and responding to salient stimuli. This may be associated with concentration difficulties and hypervigilance symptoms often identified among traumatized individuals and can also carry significant negative downstream effects on key cognitive processes that rely on the left superior parietal lobule, including emotion regulation and sensory attunement to an individual's surroundings (Haws et al., 2022; Punski-Hoogervorst et al., 2023; van der Kolk, 2006; Viviani, 2013). Moreover, the superior parietal lobule is also hypothesized to be a key part of the emotion regulation network, along with the angular gyrus (which spans the TPJ), the ventrolateral and the dorsolateral prefrontal cortices, the insula, as well as subcortical structures such as the amygdala, cerebellum, and periaqueductal gray (Kohn et al., 2014; Li et al., 2021; Wager et al., 2008; Zilverstand et al., 2017). The superior parietal lobule is key for voluntary attention that can guide towards and away from emotional stimuli, where its dense connections with the prefrontal cortices involved in the reappraisal of emotional stimuli allow for sustained attention to help facilitate emotion regulation (Lake et al.,

2017; Li et al., 2021; Li et al., 2022). In the present study, weakened connections between the lpTPJ and the bilateral superior parietal lobule may reflect a disconnection between embodiment and disruptions in higher-order attention (i.e., internal awareness of the self), which may impede cortical emotion regulation processes necessary for the reintegration of traumatic memories (Rabellino, Burin, et al., 2018; Rabellino et al., 2020; Terpou et al., 2018).

Further substantiating this hypothesis, our results revealed that resting-state functional connectivity of the laTPJ with the left superior parietal lobe correlated negatively with CTQ scores among all participants, indicating that higher severity of childhood traumatization was associated with weakened laTPJ connectivity with the left superior parietal lobule, a brain region critical to mediating top-down attention and emotion regulation. These correlational results align with past studies that have demonstrated alterations in higher-order attention among PTSD individuals (Punski-Hoogervorst et al., 2023; Shang et al., 2014; Wen et al., 2022). Furthermore, Flechsenhar et al. (2024) recently identified that severity of childhood trauma was linked to attentional biases relevant for social interactions, including deficits in emotion processing. The findings in the current study align with Flechsenar et al. (2024), where disruptions in embodied attention at the level of the superior parietal lobule may increase with the severity of childhood trauma and could have cascading effects on core cognitive processes like emotion regulation.

Decreased bilateral TPJ connectivity with cerebellum in PTSD+DS versus PTSD

Findings from the analysis also showed that compared to the PTSD group, individuals with PTSD+DS showed decreased bilateral TPJ connectivity with the anterior cerebellar lobule VIII, a part of the cerebellum that is critical to several functions in the brain, including motor coordination, balance, the innate alarm system for threat detection, as well as attention (Brissenden et al., 2016; da Silva et al., 2023; Grodd et al., 2001; Lanius et al., 2017; Witter & De Zeeuw, 2015). Previous research on individuals with PTSD has shown alterations cerebellar lobules IV and V, including increased activation during the subliminal processing of threat and its critical role in the innate alarm threat detection network that may be exacerbated during rest and manifests as hypervigilance in the PTSD clinical symptom profile (Cesari et al., 2023; Lanius et al., 2017; Terpou et al., 2019). Particularly,

the cerebellar lobule VIII is posited to be central to motor coordination, including spatial judgments and navigation, making it also central to bodily self-consciousness and one's understanding of where the self is in space (Stoodley & Schmahmann, 2010). Within the realm of bodily self-consciousness, previous data from our group have also demonstrated that one's own concept of peripersonal space (i.e., the immediate space surrounding the body where we can reach or be reached by external entities) can be disrupted among traumatized individuals, affecting the classic PTSD and PTSD+DS clinical profiles differently(Rabellino et al., 2020). Among individuals with PTSD, an individual's peripersonal space tends to be larger with sharply defined boundaries, which may account for heightened alertness and hypervigilance symptoms to ensure safety in their proximity. By contrast, individuals with PTSD+DS tend to form a smaller peripersonal space with more shallow boundaries, likely owing to the lack of coherent body representation due to depersonalization and derealization symptoms. Moreover, the cerebellum has been theorized to be a key node for the peripersonal space network, where previous findings have shown decreased connectivity between the supramarginal gyrus (which is part of the TPJ) and regions of the anterior cerebellum (vermis and lobule IV-V) in PTSD+DS versus PTSD participants, which align with the findings of the current study (Rabellino et al., 2018; Rabellino et al., 2020). Taken together, these findings further strengthen the theory that PTSD+DS show a weaker sense of bodily self-consciousness than individuals with a classic PTSD symptom profile, which may lead to impaired motor coordination and a lack of coherent representation of the body in one's own peripersonal space. In turn, this likely carries negative downstream effects on the integration and processing of bottom-up sensory inputs that enter the brain at the subcortical level to exacerbate threat detection and contribute to hyperactivation of the innate alarm system among traumatized individuals.

Increased left TPJ connectivity with occipital lobe in healthy controls versus PTSD and PTSD+DS

In contrast to individuals with PTSD and PTSD+DS, healthy controls showed increased left TPJ connectivity with areas in the occipital lobe, the posterior area of the brain responsible for visual processing and visuospatial perception. Visual processing in the occipital lobe has been conceptualized into two streams: the dorsal visual stream that initiates actions related to visuospatial

awareness and the ventral visual stream that governs object recognition (Cloutman, 2013; Goodale et al., 2005; Goodale & Milner. 2018). The dorsal visual stream is facilitated through functional connectivity with areas responsible for attention, including the TPJ and the superior parietal lobule, while the ventral visual stream operates through functional connections with the inferior temporal gyrus and the medial temporal lobe (Bonnen et al., 2021; Choi et al., 2023; Cloutman, 2013; Conway, 2018; Siegel et al., 2008). Notably, the dorsal visual stream's key role in visuospatial navigation makes it critical for embodied awareness of the self in the context of one's surroundings, as it is essential for guiding the self about where to move in the context of an individual's surroundings (Brown, 2009; Choi et al., 2023; Rizzolati & Matelli, 2003). Here, the current findings suggest aberrations that exist among both individuals with PTSD and PTSD+DS, where limited TPJ connectivity with the occipital lobe, as compared to healthy controls, could be indicative of limited embodied attention among traumatized individuals that can negatively impact visuospatial navigation. Based on the current findings, the TPJ may play a modulatory role in the dorsal visual network that facilitates embodiment of the self when carrying out motor actions that require visual attention.

Limitations

There are several limitations to the current study worth noting. Despite the large sample size, data were collected at a single, cross-sectional, point in time, which may limit the interpretation of these findings and require further validation in future studies. In addition, the PTSD+DS group had a statistically higher sampling of females relative to the other participant groups, which warrants further research into potential sex differences. Despite meeting the threshold for the common use of standard seed-based functional connectivity and post-hoc graph theoretical analysis, our analysis does not provide information on the directionality of functional connectivity between brain regions or whether these connections are inhibitory or excitatory in nature. Accordingly, we cannot draw conclusions regarding the direction of the level of impact of one region's activity over another.

2.6 Conclusion

Taken together, our study sheds further light on the role of the TPJ in the relationship between bodily

self-consciousness and attention, as well as its cascading effects on emotion regulation and social engagement with the world among traumatized individuals with and without the dissociative subtype of PTSD. The TPJ is increasingly recognized as an intersecting cross-network hub for allocating the attentional control necessary for the conscious experience of one's own body (referred to as bodily self-consciousness) and understanding contextual information in social situations, which are directly impacted by symptoms observed in clinical profiles of PTSD and its dissociative subtype (PTSD+DS). Here, reduced raTPJ functional connectivity with critical anterior frontal lobe nodes of the ventral attention and social cognition networks among individuals with the PTSD dissociative subtype point to a limited embodied awareness of the self in relation to an individual's surroundings, weakening their capacity to contextualize social interactions and incoming sensations where they do not have the full experience of a coherent body representation in space. Moreover, reduced lpTPJ connectivity with the left superior parietal lobule among individuals with PTSD suggests a weakened integration between top-down and bottom-up attentional networks, increasingly among those with increased childhood traumatization, which may have negative downstream effects on emotion regulation networks that require selective attention for emotional reappraisal that is key for reintegration of traumatic memories. The present analysis also points to weakened bilateral TPJ connectivity with the occipital lobe among all traumatized individuals, further strengthening the notion of limited embodied attention, as evidenced by reduced connectivity with areas of the dorsal visual stream required for visuospatial navigation of the self in the environment. Furthermore, increased bilateral TPJ connectivity with the cerebellar lobule VIII observed among individuals with PTSD in contrast to those with PTSD+DS may be indicative of how the contrasting symptom profiles engage with the world differently, where a weakened cohesive representation of oneself may be, in part, due to a lack of stabilizing attentional control capable of responding to and modifying responses to the external emotional world. Accordingly, to mitigate these effects, psychotherapeutic treatments should be developed to target this disembodiment, specifically for traumatized individuals with depersonalization and derealization symptoms. Such treatments include Deep Brain Reorienting, a neuroscientifically-guided mind-body treatment that requires individuals to attend to tension neck

muscle tension as means to process traumatic memories at a somatic level (Corrigan, Young & Christie-Sands, 2024; Kearney et al., 2023), and Somatic Experiencing, a body-oriented approach to trauma healing, aiming to release physical and emotional tension stored in the body as a result of past traumatic experiences (Kuhfußet al., 2021; Payne et al., 2015). These treatments may benefit from focusing first on a gradual rebuild of an individual's capacity for embodied attention through mindful awareness of understanding the self in the context of their surroundings to better facilitate the downstream cognitive emotion regulatory processes that are often used in front-line treatments for PTSD.

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Chapter 3 | Study Two

Overview

Individuals from marginalized groups experience disproportionately higher rates of health disparities compared to the general population. For sexual and gender minorities (SGMs), this may be explained by the minority stress theory, which posits that health disparities result from the excess stress and discrimination SGMs face due to their stigmatized social identities. SGMs also experience higher rates of traumatization than their cisgender counterparts. Some research, including published work from our group, indicates that trauma-related symptoms can emerge from these adverse experiences, which may or may not fall under the traditional definition of a Criterion A traumatic event (which is necessary for a PTSD diagnosis). This poses a challenge for how trauma-related symptoms are currently conceptualized among SGM populations, as one must consider how minority stress and trauma experiences may contribute to the development and presentation of these symptoms. However, to appropriately address and mitigate these symptoms, it is essential to have a clear understanding of risk and protective factors in the context of minority stress and trauma. To remedy this gap, the following study qualitatively investigates risk and protective factors among trauma-exposed SGMs who quantitatively report low and high PTSD symptoms. Findings from this study indicate potential factors for overcoming stress and trauma among those with low PTSD symptom severity (i.e., positive coming out experiences and supportive post-disclosure environments, positive SGM identity factors, social safety, and positive representation and empowerment), as well as factors that contribute to potential risk pathways (i.e., negative alterations to the sense of self and distress associated with the anticipation of minority stress and insufficient social safety). Additionally, the study has the potential to inform clinical interventions tailored toward SGMs by identifying factors that should be targeted and promoted (strengthened) to enhance SGM well-being.

The following study is prepared for publication submission.

Chapter 3 | Study Two

Protective Factors and Risk Pathways for PTSD Symptoms among Sexual and Gender Minorities in the Context of Co-occurring Minority Stress and Trauma: A Mixed-methods Study

Sandhya Narikuzhy, Ruth Lanius, Margaret McKinnon, Taylor Hatchard, Andrew Nicholson

3.1 Abstract

Background: Sexual and gender minority (SGM) individuals experience disproportionately high rates of trauma-related symptoms, driven by both elevated exposure to trauma and pervasive societal stigma. To better mitigate these symptoms, it is essential to understand the risk and protective factors that emerge at the intersection of trauma and minority stress. The current study aims to deepen this understanding using a mixed-methods approach—a design, to our knowledge, not previously applied in this context.

Methods: Forty trauma-exposed SGM participants with multidimensional minority identities completed a comprehensive clinical assessment, a 1:1 semi-structured interview, and a quantitative battery of questionnaires. Data collection followed a convergent-parallel design, with analyses conducted sequentially. Here, we aimed to compare qualitative presentations of risk and protective factors among participants quantitatively endorsing low vs. high PTSD symptoms. Qualitative thematic analyses were stratified by severity of trauma symptoms (low vs. high), as measured by the Posttraumatic Stress Disorder Checklist for DSM-5 (PCL-5).

Results: Among participants with low PTSD symptoms, four key themes emerged: positive coming-out experiences and supportive post-disclosure environments, positive SGM identity factors, experiences of social safety, and exposure to positive representation and empowerment, which may suggest potential protective factors. In contrast, participants with high PTSD symptoms endorsed two core themes: negative alterations to the sense of self and distress related to the anticipation of minority stress and lack of social safety, which may reflect potential risk factors for trauma-related symptoms. Quantitative analyses revealed that internalized homonegativity was negatively associated with self-acceptance, and trauma symptom severity was positively associated with both exposure to and distress from daily heterosexist experiences.

Conclusions: Contextualizing trauma-related symptoms among SGM populations requires attention to both trauma exposure and minority stress processes. Further elucidation of risk and protective pathways can inform the development of more targeted and affirming mental health interventions for SGM individuals.

3.2 Introduction

3.2.1 Minority Stress and PTSD

Sexual and gender minority (SGM) individuals are severely impacted by high rates of minority stress exposure and its consequences (e.g., discrimination, violence, internalized stigma, rejection sensitivity, and microaggressions) due to their socially stigmatized minority identities (Hunter et al., 2021; Jorgensen, 2012; Meyer, 2003; Nicholson et al., 2022; Pachankis, 2015). As a result, SGMs are disproportionately affected by mental health burdens, such as posttraumatic stress disorder (PTSD), depression, problematic alcohol and substance use, and suicidality (Hendricks & Testa, 2012; Nicholson et al., 2022, 2025; Pachankis, 2015; Valentine & Shipherd, 2018; White Hughto et al., 2015). Indeed, the minority stress model posits that elevated rates of mental health challenges among SGM individuals stem from chronic stressors associated with their marginalized identities (J. A. Brown & Brooks, 1982; Meyer, 1995, 2003). Under this framework, distal stressors are classified as external experiences of stigma, including discrimination, harassment, and victimization (Frost & Meyer, 2023; Meyer, 2003). In contrast, proximal stressors are classified as internal psychological processes shaped by these experiences, such as internalized stigma, negative expectations for the future, rejection sensitivity, and identity nondisclosure (Meyer, 2003; Pachankis et al., 2008; Testa et al., 2015; Williamson, 2000). Together, these stressors contribute to increased risk for adverse mental health outcomes and diminished well-being among SGM populations (Hatzenbuehler, 2009; Meyer, 2003; Nicholson et al., 2022; Pachankis, 2015). The minority stress model initially only encompassed sexual minority identities within its framework; more recently, however, minority stress theory has expanded to incorporate other socially stigmatized minority identities related to race, ethnicity, and gender (Rivas-Koehl et al., 2023; Tan et al., 2020; Testa et al., 2015). Relatedly, these models have evolved from single-axis theories to those that encompass broader intersections of identity (Rivas-Koehl et al., 2023). Here, the integration of intersectionality frameworks is essential, as each individual will have unique experiences influenced by their multidimensional minority identities (Nicholson et al., 2022; Rivas-Koehl et al., 2023). Notably, within the context of minority stress, PTSD has emerged as a particularly concerning outcome among

SGM individuals, given the heightened exposure to both identity-related stressors and traumatic events within this population.

Of importance, SGM individuals experience disproportionately high rates of trauma exposure throughout their lifetime (Marchi et al., 2023), events which may or may not also fall under the umbrella of 'minority stress'. For example, SGM individuals are nearly four times more likely to experience violent assault than their cisgender, heterosexual counterparts (Flores et al., 2020; Valentine et al., 2022), and transgender and gender diverse (TGD) individuals have significantly higher rates of intimate partner violence when compared to cisgender individuals (Peitzmeier et al., 2020). PTSD is a mental health disorder that may develop in some individuals after experiencing a traumatic event; this disorder is characterized by symptoms of intrusions (e.g. flashbacks, unwanted memories), avoidance, negative alterations in cognition and mood, as well as alterations in arousal and reactivity and dissociation (American Psychiatric Association, 2022). In the general population, approximately 6.8 to 8.3% meet criteria for PTSD (American Psychiatric Association, 2022; Kessler et al., 2005; Livingston et al., 2020). Strikingly, the prevalence rate of PTSD rises to 48% and 42% among sexual minorities and TGD individuals, respectively (Livingston et al., 2020). Critically, it has been found that this may be directly related to minority stress and identity-based trauma exposure among SGM individuals (Marchi et al., 2023; Nicholson et al., 2022; Valentine et al., 2022). Given the elevated rates of PTSD among SGMs, advancing our understanding of trauma-related symptoms within the context of minority stress is essential for improving treatments and addressing mental health disparities in this population (Livingston et al., 2020). Indeed, the complex relationship between minority stress and criterion A trauma exposure must be considered when contextualizing trauma-related symptomatology among SGM individuals (Nicholson et al., 2022; 2025; Livingston et al., 2020).

3.2.2 Trauma-related Symptomatology among SGM Populations

One challenge associated with addressing the higher prevalence of trauma-related symptoms among SGM individuals relates to how PTSD is currently classified according to the Diagnostic and

Statistical Manual of Mental Disorders, 5th edition, Text Revision (DSM-5-TR) (American Psychiatric Association, 2022). Distinct from other psychiatric disorders, the diagnostic criteria for PTSD requires that the individual endures exposure to what is termed a Criterion A traumatic event, consisting of actual or threatened death, serious injury, or sexual violence either through direct exposure, witnessing the event, learning that the trauma happened to a close relative or close friend, or indirect exposure to aversive details of the trauma (American Psychiatric Association, 2022). Notwithstanding, the strict definition of what constitutes a Criterion A traumatic event, particularly within equity-deserving groups, has been subject to ongoing debate among clinicians and scientists (Holmes et al., 2016; Marx et al., 2024; Roberts et al., 2012). Nevertheless, it is imperative to consider how both distal and proximal minority stressors may contribute to the development of trauma-related symptoms among SGM individuals. For example, previous research on sexual minority women demonstrated that minority stressors (i.e., internalized stigma and heterosexist discrimination) predicted PTSD symptom severity (Dworkin et al., 2018; Straub et al., 2018; Szymanski & Balsam, 2011). Furthermore, among TGD individuals, discriminatory experiences are associated with greater PTSD symptom severity, even when controlling for prior criterion A traumas (Reisner et al., 2016; D. T. Solomon et al., 2021). Additionally, exposure to identity-based morally injurious events has also been shown to be associated with trauma-related symptoms and hazardous alcohol consumption among SGM individuals (Nicholson et al., 2025). Notably, a recent systematic review from our group identified neuroimaging research which illustrates neural network alterations among SGM individuals which parallel brain perturbations implicated in PTSD (Nicholson et al., 2022). This may suggest similar neuropsychological pathways that are impacted by chronic minority stress and trauma exposure (Nicholson et al., 2022). In the context of co-occurring minority stress and trauma, research has shown that TGD individuals perceive non-Criterion A minority stressors to be more closely linked to psychiatric symptoms (e.g. depression, avoidance, anxiety, stress, substance use, and shame) than Criterion A events (Salomaa et al., 2023). Collectively, these findings underscore the need for a more comprehensive and nuanced understanding of trauma-related symptoms among SGM individuals, whereby integrating minority stress theory with PTSD frameworks may offer deeper insight into the

risk and resilience pathways that shape the development and expression of trauma symptoms in marginalized communities.

3.2.3 Risk and Protective Factors for Trauma Symptoms among SGM Individuals

The minority stress model is widely used as a foundational framework for examining risk factors associated with adverse mental health outcomes and for advancing understanding of health disparities among SGM populations. As previously mentioned, minority stress can impact the risk for negative mental health outcomes among SGM individuals through proximal (e.g., internalized stigma, identity nondisclosure, and rejection sensitivity) and distal (e.g., violence, microaggressions, and discrimination) stress pathways (Meyer, 2003). In this vein, minority stressors can be conceptualized as social determinants of health, referring to the nonmedical social and economic conditions that contribute to one's overall health and well-being (Hatzenbuehler & Pachankis, 2016; Henderson et al., 2022; White Hughto et al., 2015). In their review of social determinants of SGM mental health, Henderson and colleagues (2022) identified factors related to social and community contexts as the most extensively studied risk processes, such as discrimination in social settings (e.g., health care, employment, and housing environments), violence (e.g., intimate partner violence), and lack of social support. These factors were found to adversely impact psychological outcomes (Henderson et al., 2022). Further emphasizing the significant impact of minority stressors on SGM mental health disparities, recent systematic reviews on SGM youth populations identified distal factors, including family rejection, victimization, and harassment, as well as proximal factors, such as internalized stigma, identity nondisclosure, and social isolation, as common risk factors for developing poor mental health outcomes (O'Shea et al., 2025; Tankersley et al., 2021). Importantly, these stressors are thought to contribute to health disparities through several potential mechanistic pathways informed by extensions of the minority stress model. Indeed, Hatzenbuehler's Psychological Mediation Framework posits that stigma-related stress affects mental health by interacting with several key psychological processes, such as emotion regulation, cognitive control, and social-cognitive functioning, which, in turn, impact the relationship between minority stress and

psychopathology (Hatzenbuehler, 2009; Hatzenbuehler & Pachankis, 2016). Similarly, Pachankis (2015) described that minority stress exposure is likely linked to adverse mental health outcomes through several transdiagnostic biopsychosocial mechanisms, including negative valence pathways (e.g., avoidance and hypervigilance), positive valence pathways (e.g., approach motivation and reward learning), and social functioning pathways (e.g., disrupted attachment, low agency, and self-knowledge). Critically, however, some researchers contend that minority stress theory on its own does not entirely account for the health disparities experienced by SGM individuals. For instance, Diamond and Alley (2022) proposed an alternative conceptualization focused on the absence or deficiency of social safety, which is characterized by the presence of social connection, inclusion, protection, recognition, and acceptance. Minority stress can erode social safety through various psychological and social processes, which may then contribute to health inequities as individuals are required to navigate ongoing anticipation of threat and its emotional, cognitive, and behavioural consequences (e.g., hypervigilance, anxiety, withdrawal, and social isolation) (Diamond & Alley, 2022).

Concerning PTSD, several risk factors have been identified, which can be classified into pre-trauma (or pre-trauma vulnerability), traumatic event, and post-trauma risk factors (Brewin et al., 2000; Sareen, 2014). Pre-trauma risk factors that have been well-documented include, but are not limited to, a prior history of psychiatric disorders and exposure to trauma or chronic stress before the focal trauma (e.g., childhood trauma and neglect), as well as personality factors (DiGangi et al., 2013; Halligan & Yehuda, 2000; Ozer et al., 2003; Sareen, 2014). Another empirically supported pre-trauma risk factor is biological sex, where individuals assigned female at birth have repeatedly been shown to be at higher risk for developing PTSD compared to individuals assigned male at birth (Sareen, 2014). Moreover, research on traumatic event-related risk factors suggests that peritraumatic dissociation and emotional responses predict PTSD (Birmes et al., 2003; Ozer et al., 2003). Finally, certain post-trauma risk factors that have been previously identified include socioeconomic considerations (for example, financial stress) and a lack of adequate social support (Halligan & Yehuda, 2000; Sareen, 2014). While understanding the risk factors for trauma-related disorders

among SGM individuals is essential, it is equally important to explore protective factors within these populations to inform strategies that promote health and well-being (Hendricks & Testa, 2012; Meyer, 2015; Riggle et al., 2008; Szymanski et al., 2017; Szymanski & Gonzalez, 2020).

Protective factors refer to individual or social qualities that can buffer the impact of negative and challenging life events (Meng et al., 2018; Rutter, 1985). In relation to stress/adversity, these factors are typically investigated to further elucidate resilience, a term that is often varied in its definition. In the context of social stigma, resilience refers to successful adaptation in the face of minority stressors (i.e., distal or proximal stressors) (Meyer, 2015; Szymanski & Gonzalez, 2020). Understanding protective factors that may contribute to resilience among SGM individuals is critical, as many SGM individuals demonstrate positive adaptation and psychological growth despite disproportionate exposure to minority stressors and trauma, often through developing effective coping and resistance strategies (Riggle et al., 2008; Szymanski et al., 2017; Szymanski & Gonzalez, 2020).

Prior research with SGM populations has highlighted a range of protective factors that mitigate the impact of minority stress (Hendricks & Testa, 2012; Meyer, 2015; Riggle et al., 2008; Szymanski & Gonzalez, 2020). For instance, adaptive coping and empowerment strategies (including addressing internalized stigma, identity disclosure, self-care strategies, dismissing prejudice, engaging in social activism, social connectedness, and maintaining hope and optimism about the future) contribute to resilience in response to social stigma among SGM individuals (Austin et al., 2017; Craig et al., 2021; Hatchard et al., 2024; Szymanski & Gonzalez, 2020). Another essential element related to overcoming minority stress is the presence of positive identity factors related to one's SGM identity (e.g., self-awareness, authenticity, enhanced interpersonal connections, intimacy, social justice, a positive sense of self, empathy for others, etc.) (Riggle et al., 2011, 2014; Rostosky et al., 2010, 2018; Testa et al., 2015). It appears likely that these factors buffer the impact of minority stress, as they have been associated with reduced psychopathology (e.g., depression) (Hall, 2018; O'Shea et al., 2025).

In relation to research that has been conducted on PTSD, more specifically, there is significant

heterogeneity surrounding the definition of *resilience*. Resilience has been defined as a course of sustained healthy levels of mental well-being before and after the occurrence of adversity; positive adaptation amid adversity; and the absence of negative mental health symptoms (Infurna & Jayawickreme, 2019; Bonanno & Diminich, 2013; Infurna, 2020; Luthar et al., 2000; Rutter, 1987; Cicchetti, 2010; Daigneault et al., 2007; Meng et al., 2018). The lack of a clear operationalization of this construct partly adds to the difficulties in accurately measuring and studying resilience (Infurna & Jayawickreme, 2019; Infurna & Luthar, 2018; Southwick et al., 2015; Yehuda et al., 2006). Despite this, research suggests several factors (e.g., genetic, developmental, neurobiological, and psychosocial) that may be associated with resilience in the context of traumatic stress (Southwick et al., 2015; Yehuda et al., 2006). Specifically, psychosocial factors, including cognitive flexibility, referring to the ability to perceive adverse events differently to find meaning and opportunity, and social support (e.g., love, attachment, intimacy, and social integration), have been linked to reduced risk for psychopathology and reduced trauma-related symptoms, respectively (Aldwin et al., 1994; Jonzon & Lindblad, 2005; Joseph et al., 1993; Southwick et al., 2015; Yehuda et al., 2006). Moreover, individual-level (e.g., biological sex, socioeconomic status, and personality traits such as hope and optimism) and community-level (e.g., social cohesiveness and well-resourced communities) factors are also associated with reduced risk for psychopathology (e.g., PTSD and depressive symptoms) and prolonged distress in the general population (Bosmans & van der Velden, 2015; Cherry et al., 2015; Hikichi et al., 2016; Lowe et al., 2015; *Resilience and Risk Factors After Disaster Events*, n.d.). Taken together, addressing the trauma-related mental health impacts of minority stress exposure among SGM individuals necessitates a comprehensive understanding of both *risk* and *protective factors* underlying these symptoms. To date, however, no mixed-methods investigation has systematically examined these factors in the context of intersecting experiences of minority stress and trauma exposure among SGM individuals.

3.2.4 Purpose

The goal of the current study was to employ a mixed-methods approach to better understand risk and protective factors for trauma-related symptoms among a trauma-exposed sample of SGM

individuals. Here, we aimed to compare qualitative presentations of risk and protective factors among participants quantitatively endorsing low vs. high PTSD symptoms. We hypothesized that our analyses would reveal distinct thematic presentations of minority stress-related risk and protective factors within the high and low PTSD symptom groups, respectively.

3.3. Methods

3.3.1 Design

This mixed-methods investigation is an extension of a larger study known as the *Minority Mosaic Study*, which aims to uncover the impact of minority stress on the brain and body and how this may contribute to risk or protective factors (Nicholson et al., 2025). Within this overarching program of research, forty individuals participated in the qualitative mixed-methods component of the study *(n* = 40). This involved completing a semi-structured DSM-5-based clinical assessment, as well as one-on-one semi-structured qualitative interviews, and a quantitative survey battery on minority stress and mental health. To ensure a deep understanding of the development of trauma-related symptoms within the context of minority stress, data collection procedures employed a convergent-parallel mixed-methods design (i.e., qualitative and quantitative data were collected concurrently), adhering to the guidelines suggested by Creswell and Clark (2017). Data analysis involved a sequential component, as the quantitative data analysis served as a precursor to the qualitative analysis. Specifically, the Posttraumatic Stress Disorder Checklist for DSM-5 (PCL-5) was used to split participants into two groups (low vs. high PCL-5 groups) based on previously established cut-point scores (Bovin et al., 2016; Weathers, Bovin, et al., 2018; Weathers, Litz, et al., 2018). Qualitative comparisons between these groups were based on this quantitative split using joint displays, a method which visually integrates quantitative and qualitative data (most commonly in the form of a table or graph) (Creswell & Plano Clark, 2017; McCrudden et al., 2021). Here, the goal was to compare qualitative presentations of risk and protective factors among participants quantitatively endorsing low vs. high PTSD symptoms.

The current mixed-methods study was conceptualized from a pragmatist and constructivist

standpoint, using an intersectionality-informed approach (Bowleg et al., 2023; Creswell & Plano Clark, 2017; Frost et al., 2020; Rivas-Koehl et al., 2023). Intersectionality refers to how multiple intersecting power relations (e.g., oppression, racism, sexism, heterosexism, or classism) structure individual-level experiences as they relate to privilege and oppression, especially among those with multiple marginalized minority identities (Crenshaw, 1989). In addition, we employed a critical-ideological approach to examine social inequalities, power dynamics, and structures of oppression within society as they relate to experiences of trauma and PTSD (Ponterotto, 2005). In designing our study, we intentionally grounded our approach within intersectionality-informed frameworks, guided by the recommendations of Bowleg and colleagues (2023), to meaningfully capture the nuanced and diverse lived experiences within our SGM sample. This was achieved by incorporating targeted recruitment strategies to ensure diverse representation in our sample, as well as implementing creative data collection methodologies, including an identity mapping exercise (see data collection section below) (Frost et al., 2020). Additionally, this study employed a participatory action research approach through collaborations with 2SLGBTQIA+ community organizations, including the LGBT Purge Fund Canada, which offered valuable insights and guidance on key aspects of the research, ranging from study design and recruitment to data interpretation and dissemination.

3.3.2 Participants

This study was approved by the Hamilton Integrated Research Ethics Board (REB #13564) and the University of Ottawa Institute of Mental Health Research Ethics Board (REB #2022028). The current study included n = 40 SGM individuals with diverse intersecting identities (i.e., regarding sexual orientation, gender, race, and ethnicity), who were recruited from various online platforms, including social media sites (e.g., Facebook, Instagram, etc.), clinics and agencies serving SGM individuals, and community partner organizations (i.e., LGBT Purge Fund and the Atlas Institute for Veterans and Families). Individuals eligible for the current study self-identified as SGMs, were between the ages of 18 and 65 years, were fluent in English, and had access to electronic devices to complete the various components of the study. As part of the larger *Minority Mosaic* neurobiological fMRI project, which aims to investigate associations between minority stress and trauma-related

disorders, the current study employed standard exclusion criteria used in PTSD neuroimaging studies (Nicholson et al., 2024, 2025). This included a history of psychotic spectrum disorders, bipolar disorder, and dementia, as well as acute suicidality within the past three months (see clinical assessment section below). A description of participant demographics is included in Table 1.

Table 1. Descriptive statistics of demographic and clinical variables.

Age, M (std)	35.83 (13.86)
Biological Sex Assigned at Birth , % (N)	
Male	22.5 (9)
Female	75 (30)
Prefer not to answer	2.5 (1)
Sexual Orientation, % (N)	
Queer	35 (14)
Lesbian	22.5 (9)
Gay	15 (6)
Bisexual	10 (4)
Pansexual	10 (4)
An orientation not listed	5 (2)
Prefer not to answer	2.5 (1)
Gender Identity, % (N)	
Cis-man	12.5 (5)
Cis-woman	37.5 (15)
Trans-man/masculine	12.5 (5)
Trans-woman/feminine	7.5 (3)
Non-binary/gender-queer	15 (6)
Two-spirit	5 (2)
Unsure	5 (2)
Questioning	5 (2)
Racial Identity, % (N)	
Indigenous	5 (2)
East Asian	5 (2)
South Asian	12.5 (5)
South American	2.5 (1)
White-North American	45 (18)
White-European	25 (10)
Mixed-race	5 (2)
Education (in years), M (std)	16.40 (3.38)
Household income, % (N)	
< $15,000	10 (4)
$15,000-$30,000	17.5 (7)
$30,000-45,000	7.5 (3)
$45,000-$60,000	5 (2)
$60,000-$75,000	17.5 (7)
$75,000-$90,000	7.5 (3)
$105,000-$120,000	12.5 (5)
> $120,000	10 (4)
Prefer not to answer	12.5 (5)
Marital status, % (N)	
Married/Common-law	30 (12)
Single	47.5 (19)
Long-term relationship	15 (6)
Divorced	2.5 (1)
Separated	2.5 (1)
Widowed	2.5 (1)
PCL-5 Total, M (std)	35.24 (16.26)
CTQ Total, M (std)	48.22 (17.73)
DHEQ-D, M (std)	2.08 (.61)
DHEQ-O, M (std)	19.03 (7.45)
DERS, M (std)	88.38 (26.07)
IHP-R, M (std)	1.785 (.71)
IHNI, M (std)	36.67 (12.14)
SASI-SAS, M (std)	22.05 (2.98)
SASI-DSA, M (std)	20.47 (4.73)

Notes: Table 1 provides an overview of the demographic characteristics of the sample and total scores for clinical variables of interest. Age was only provided by 36 participants. Education was provided by only 39 participants. Abbreviations: PCL-5 = Posttraumatic Stress Disorder Checklist for DSM-5

Table 2. Descriptive statistics of demographic and clinical variables by group.

	Low PCL-5 group (N= 19)	High PCL-5 group (N=21)
Age, M (std)	37.56 (14.44)	34.11 (13.44)
Biological Sex Assigned at Birth , % (N)		
Male	21.1 (4)	23.8 (5)
Female	78.9 (15)	71.4 (15)
Prefer not to answer		4.8 (1)
Sexual Orientation, % (N)		
Queer	36.8 (7)	33.3 (7)
Lesbian	21.1 (4)	23.8 (5)
Gay	26.3 (5)	4.8 (1)
Bisexual		19 (4)
Pansexual	10.5 (2)	9.5 (2)
An orientation not listed	5.3 (1)	4.8 (1)
Prefer not to answer		4.8 (1)
Gender Identity, % (N)		
Cis-man	10.5 (2)	14.3 (3)
Cis-woman	47.4 (9)	28.6 (6)
Trans-man/masculine	15.8 (3)	9.5 (2)
Trans-woman/feminine	5.3 (1)	9.5 (2)
Non-binary/gender-queer	5.3 (1)	23.8 (5)
Two-spirit	5.3 (1)	4.8 (1)
Unsure	5.3 (1)	4.8 (1)
Questioning	5.3 (1)	4.8 (1)
Racial Identity, % (N)		
Indigenous	5.3 (1)	4.8 (1)
East Asian	5.3 (1)	4.8 (1)
South Asian	10.5 (2)	14.3 (3)
South American	5.3 (1)	
White-North American	42.1 (8)	47.6 (10)
White-European	26.3 (5)	23.8 (5)
Mixed-race	5.3 (1)	4.8 (1)
Education (in years), M (std)	16.66 (4.02)	16.15 (2.72)
Household income, % (N)		
< $15,000		19 (4)
$15,000-$30,000	21.1 (4)	14.3 (3)
$30,000-45,000	5.3 (1)	9.5 (2)
$45,000-$60,000	10.5 (2)	
$60,000-$75,000	21.1 (4)	14.3 (3)
$75,000-$90,000	10.5 (2)	4.8 (1)
$105,000-$120,000	10.5 (2)	14.3 (3)
> $120,000		19 (4)
Prefer not to answer	21.1 (4)	4.8 (1)
Marital status, % (N)		
Married/Common-law	31.6 (6)	28.6 (6)
Single	47.4 (9)	47.6 (10)
Long-term relationship	15.8 (3)	14.3 (3)
Divorced	5.3 (1)	
Separated		4.8 (1)
Widowed		4.8 (1)
PCL-5 Total, M (std)*	21.18 (8.07)	47.95 (9.98)
CTQ Total, M (std)	43.11 (12.42)	52.84 (20.66)
DHEQ-D, M (std)*	1.79 (.44)	2.33 (.63)
DHEQ-O, M (std)*	16.21 (6.20)	21.57 (7.70)
DERS, M (std)*	73.74 (14.87)	101.62 (5.93)
IHP-R, M (std)*	1.57 (.65)	1.98 (.71)
IHNI, M (std)	35.08 (10.96)	38.1 (13.22)
SASI-SAS, M (std)	22.84 (2.83)	21.33 (2.99)
SASI-DSA, M (std)	20.84 (5.35)	20.14 (4.19)

Notes: Table 2 provides an overview of the demographic characteristics of the sample and total scores of clinical variables of interest, organized by low vs. high PCL-5 groups. Variables with an '*' indicate measures that significantly differed between groups (p <.05).

3.3.3 Data Collection

Data collection for the current study occurred between 2020 and 2023. Individuals who expressed interest in participating in the current study first completed a comprehensive telephone screener (n = 74), during which study procedures were explained and initial eligibility was assessed. Next, participants who were still interested in participating in the study and were initially deemed

eligible provided written and verbal consent before the study began. These individuals were then scheduled for a clinical assessment appointment to determine the presence of mental health disorders as classified within the DSM-5. During this stage, of the seventy-four individuals who initially completed the telephone screener, twenty-nine were unable to complete the clinical assessment, primarily due to loss of contact. Fully eligible participants who completed the clinical assessment (n = 45) then completed a semi-structured qualitative interview with a trained researcher. Four individuals did not complete this component due to personal reasons or ineligibility (n = 41). Finally, participants completed a battery of self-report measures related to minority stress exposure and experiences, as well as mental health; however, one participant did not complete the quantitative battery (total n = 40).

Semi-structured Qualitative Interviews

The goal of the qualitative arm of this study was to capture the lived experiences of SGM individuals to better understand how minority stress relates to both risk and protective factors for trauma-related symptoms. These interviews, which were semi-structured and standardized across all participants, were conducted virtually using Zoom and took approximately 2 to 3 hours to complete. As part of the larger research program, the interviews covered a broad range of minority stress-related topics (Nicholson et al., 2025). This included experiences with minority stressors, intersectionality and community, moral affect, disclosure of identity and coming out, authenticity, relationships and attachments, mental and physical health, and resilience over the lifetime. At the start of the interview, trained researchers provided participants with a brief psychoeducation on minority stress, covering a range of distal and proximal stressors (e.g., discrimination, harassment, internalized stigma, and rejection sensitivity). Following this, we used an 'identity map' activity to ensure that qualitative data was rooted in an intersectionality-informed framework (Frost et al., 2020). Here, participants were asked to create a diagram using words and phrases that represent different aspects of their identity, including those they felt defined who they are and those they perceived as heavily stigmatized by society (e.g., related to gender, race, ethnicity, sexuality, class, occupation, etc.) (Frost et al., 2020). The identity map was then used throughout the interview to help participants discuss

various experiences related to the intersecting dimensions of their identity. These interviews were audio-recorded and later transcribed to text format by a third-party company, with which confidentiality agreements were in place before transcription.

Quantitative Instruments

A battery of self-report measures was administered via REDCap, a secure, online, web-based software program designed to assist in research data collection, hosted at both McMaster University and the University of Ottawa (Harris et al., 2009). As part of the larger *Minority Mosaic Study*, this included several scales related to identity-based minority stress exposure, trauma, morally injurious events, and mental health (e.g., depression, anxiety, and problematic alcohol-use, etc.). Questionnaires that are out of scope for the current study will be analyzed and reported elsewhere. For the current investigation, select questionnaires were analyzed as they were *a priori* hypothesized to be associated with the development of trauma-related symptoms among SGMs. Specifically, as outlined below, we examined questionnaire measures of traumatic events and associated symptoms, along with minority stress exposures and outcomes, to identify factors that may contribute to high or low levels of trauma-related symptoms.

Trauma-related symptom and outcome measures

The **Posttraumatic Stress Disorder Checklist for DSM-5 (PCL-5)** was used to assess for the presence and severity of trauma-related symptoms (as classified within the DSM-5) within the past month (Weathers, Litz, et al., 2013). Symptoms assessed in this scale include intrusions (e.g., unwanted traumatic memories), avoidance, negative alterations in cognition and mood (e.g., distorted blame of self or others), and alterations in arousal and reactivity. This 20-item self-report measure ranges from 0 (Not at all) to 4 (Extremely), with total severity scores (sum scores) ranging from 0 to 80. Prior research suggests that PCL-5 scores between 31 to 33 are indicative of probable PTSD across samples (Weathers, Litz, et al., 2013). Of importance, because SGM individuals are disproportionately affected by the co-occurrence of Criterion A traumas, insidious identity-based trauma, and chronic minority stress exposure (Arnett et al., 2019; Berlin et al., 2023; Cook & Calebs,

2016; Minshew, 2022; Szymanski & Balsam, 2011), participants were not restricted to a single most distressing traumatic event when completing this scale (Nicholson et al., 2025).

The short form of the **Childhood Trauma Questionnaire** (CTQ; Bernstein et al., 2003; Bernstein & Fink, 1997) is a self-report measure used to capture individuals' experiences with childhood abuse and neglect. This scale consists of 28 items, with 5 subscales, including emotional, physical, and sexual abuse, as well as emotional and physical neglect. Total scores from 25 to 35 suggest minimal childhood trauma; 41 to 51 indicate low to moderate trauma; 56 to 68 reflect moderate to severe trauma; and scores above 72 signify severe to extreme trauma (Bernstein et al., 2003).

The **Life Events Checklist for DSM-5 (LEC-5)** is a self-report measure used to capture direct and indirect experiences of potentially traumatic events in an individual's lifetime (Weathers, Blake, et al., 2013). This measure assesses exposure to 16 events that may potentially lead to PTSD or distress (e.g., natural disasters, various forms of assault, severe accidents, etc.) and additionally includes a single item assessing any other stressful event or experience that was not captured from the first 16 items. When completing this measure, respondents were asked to indicate whether the events had happened to them directly/personally, if they had been witnessed, learned about happening to a close family member or friend, were part of their job, or if they were unsure. Employing the LEC-5 in the current study allows for a comprehensive understanding of the different types of traumatic events that participants have experienced in their lifetime. This is especially important considering that SGM individuals are disproportionately exposed to these traumatic events in comparison to the general population (Meyer et al., 2021; Minshew, 2022; Tan et al., 2020).

The **Difficulties in Emotion Regulation Scale (DERS)** is a 36-item self-report measure used to assess emotion dysregulation (Gratz & Roemer, 2004). DERS total scores are calculated by summing scores after select items are reverse-scored (as directed by scoring guidelines outlined by

Gratz & Roemer, 2004). Higher scores are reflective of greater problems with emotion regulation. Additionally, the DERS consists of 6 subscales, including nonacceptance of emotional responses, difficulty engaging in goal-directed behaviour, impulse control difficulties, lack of emotional awareness, limited access to emotion regulation strategies, and lack of emotional clarity.

The **Self-Acceptance of Sexuality Inventory (SASI)** is a 10-item self-report measure designed to measure self-acceptance of sexuality for SGM individuals (Camp et al., 2022). Positively framed items on this scale are administered on a 5-point Likert scale ranging from totally true for me (5) to totally untrue for me (1), whereas negatively framed questions are scored 1 (totally true for me) to 5 (totally untrue for me). Notably, this scale contains two subscales, self-acceptance of sexuality (SASI-SAS) and difficulties with self-acceptance (SASI-DSA), which can be calculated by summing scores of the positively and negatively framed items, respectively. Higher scores on the self-acceptance of sexuality subscale reflect higher self-acceptance. Additionally, higher scores on the difficulties with self-acceptance scale reflect higher self-acceptance (or less difficulty with self-acceptance), as negatively worded items are reverse-scored.

Distal and proximal minority stress-related measures

The **Daily Heterosexist Experiences Questionnaire (DHEQ)** is a 50-item self-report measure used to assess the frequency and impact of unique aspects of minority stress among SGM individuals in the past 12 months (Balsam et al., 2013). Within this measure, there are nine subscales, including vigilance, harassment and discrimination, gender expression, parenting, victimization, family of origin, vicarious trauma, isolation, and HIV/AIDS. However, for the current study, only the first eight subscales were administered, as we removed the "HIV/AIDS" subscale. We intentionally removed this subscale as the piloting phase of our study indicated that this portion of the scale may not apply to all participants recruited for the study. The DHEQ can be interpreted in two ways. The first is to examine the Occurrence of Daily Heterosexist Experiences (DHEQ-O), which indicates how many of these minority stress experiences participants have had. This is done by recoding

response 0 = 0 (did not occur) and 1 through 5 = 1 (did occur) and then summing for a total score. Typically, the DHEQ-O total score would yield a range from 0 to 50; however, given that one subscale was removed, our total score ranges between 0 to 44. The second way to examine the DHEQ is by looking at the Distress due to Daily Heterosexist Experiences (DHEQ-D), which indicates the mean level of distress respondents feel related to these experiences. This is achieved by recoding responses so that 0 and 1 = 1 (did not bother) and the rest of the responses remain the same. Following this, a mean is then computed for all items.

The **Internalized Homonegativity Inventory (IHNI)** is a 23-item self-report measure designed to measure internalized stigma. The items on this scale are administered from 1 (strongly disagree) to 6 (strongly agree) (Mayfield, 2001). The IHNI consists of 3 subscales, including personal homonegativity (11 items), gay affirmation (7 items), and morality of homosexuality (5 items). While this measure was initially designed to capture internalized stigma among gay men, we adjusted the language (e.g., from "gay" to "LGBTQ+") in this measure to apply to all participants. Scores are calculated by summing responses for each item, with gay affirmation items reverse-scored. Higher scores reflect greater internalized stigma.

The **Revised Internalized Homophobia Scale (IHP-R)** (Herek et al., 2012) is a 5-item self-report questionnaire designed to measure internalized stigma among SGM individuals. The IHP-R is a shorter version of the IHP questionnaire that was initially developed for administration to gay men. In the current study, the language in the IHP-R was slightly adjusted to be more inclusive of our entire SGM sample (e.g., replacing lesbian/bisexual with LGBTQ+). The items are administered on a 5-point Likert scale ranging from 1 (disagree strongly) to 5 (agree strongly). IHP-R scores are calculated by summing responses and dividing by the total number of items. Higher scores on the IHP-R reflect more negative self-attitudes (or internalized stigma).

Clinical Assessment

Participants in the current study completed a comprehensive DSM-5-based semi-structured clinical interview to capture the presence of mental health disorders using the Diagnostic Assessment Research Tool (DART) (Schneider et al., 2022). Initial validation provides support for the DART as

a valuable tool for the assessment of psychiatric disorders, demonstrating construct, convergent, and discriminant validity across several DSM-5 disorders (Schneider et al., 2022). DART assessments, which took approximately 1-3 hours to complete, were administered online via Zoom by clinically trained research staff who were formally trained in DART administration. Complete participant eligibility was determined only after the clinical assessment was completed.

3.3.4 Data Analysis

Mixed methods analysis

For the current study, participants were categorized into two groups using PCL-5 total scores, summing all 20 items, with a cut-point score of 33 indicating probable PTSD [i.e., low PCL-5 group (total score <33), and high PCL-5 group (total score ≥ 33)] (Bovin et al., 2016; Weathers, Bovin, et al., 2018; Weathers, Litz, et al., 2018). These cut-point scores were used solely for stratification of participants into low versus high symptom groups, and were not used to interpret results in terms of meeting or not meeting diagnostic criteria for PTSD. This categorization into low and high symptom groups enabled us to examine and compare qualitative themes in relation to varying levels of trauma-related symptom severity, allowing for the exploration of potential risk and protective factors amid co-occurring minority stress and trauma exposure within our SGM sample. Here, there were 19 participants in the low PCL-5 group (PCL-5 score $M = 21.18$, $std = 8.07$), and 21 participants in the high PCL-5 group (PCL-5 score $M = 47.95$, $std = 9.982$). An independent samples t-test confirmed a significant difference with respect to PTSD symptom severity between the high and low PCL-5 groups ($p < .001$, PCL-5 total scores normally distributed).

This study employed a sequential approach to data analysis, in which the qualitative analysis was conducted after participants had been stratified into two groups. Qualitative themes pertaining to both risk and protective factors were investigated in both low and high PCL-5 groups. A joint display method (McCrudden et al., 2021) was used to visually integrate quantitative and qualitative data, allowing us to explore potential qualitative differences between the low and high PCL-5 groups. Taken together, this mixed-methods analysis enabled us to investigate potential qualitative differences regarding risk and protective factors among SGM participants with low vs. high PTSD

symptom severity (as measured quantitatively using the PCL-5).

Qualitative Analysis

Qualitative interviews were transcribed verbatim into a text format and de-identified by a third-party company, with which confidentiality agreements were in place prior to transcription. To ensure accuracy, these transcriptions were thoroughly reviewed by trained research members. In the current study, a qualitative descriptive design (Sandelowski, 2000) employing a Thematic Analysis (TA) was used to address the research questions stated above (Braun & Clarke, 2012). TA was selected as the appropriate method of analysis for the current investigation, as it facilitates a comprehensive examination capable of capturing the distinctive nuances of our SGM sample. This approach thus aids in understanding how SGMs perceive and experience minority stress, as well as how they may or may not surmount these challenges. As the interviews consist of a wide range of minority stress-related topics, TA was also chosen for its flexibility in categorizing and analyzing the data (Braun & Clarke, 2012; Nicholson et al., 2025). In line with Braun & Clarke's definition (2006), a "theme" was understood as identifying something important in the data related to the research question that reflects some level of patterned response or meaning within the dataset. Furthermore, TA analysis was completed at the latent level to ensure that we captured the unique nuances and implicit aspects/meanings of the data (Braun & Clarke, 2006).

Interviews were coded by three experienced researchers who had a deep understanding of the minority stress literature using MAXQDA software (VERBI Software, 2021). The first step in data analysis involved the researchers familiarizing themselves with the data, which involved active, repeated reading of the transcripts to search for any meanings or patterns (Braun & Clarke, 2012). Specifically, researchers thought critically about how participants understood their experiences, described their beliefs about the world, and how they perceived them. For the current study, complete coding was employed, where we identified all aspects of interest within the entire dataset related to the research question. We used a combination of deductive (theory-driven) and inductive (data-derived) coding throughout this iterative process. For instance, we began with several deductive codes, many of which were derived from the minority stress theory (Meyer, 2003) and other trauma-

related frameworks (Nicholson et al., 2022, 2025). As described in Nicholson et al. (2025), this included codes related to SGM identity development (e.g., relationship with identity labels, fear/anxiety related to identity, coming out experiences), minority stressors (e.g., internalized stigma, microaggressions, discrimination, rejection-related experiences, identity non-disclosure), and other related topics (e.g., safety concerns, moral affect, etc.). Further in this process, we used an inductive approach, identifying new codes, including attachment injuries, mental guard/hypervigilance, importance of representation, perceived social support, self-worth, negative coping mechanisms, and love and acceptance (Nicholson et al., 2025). Integrating this approach strengthened the analysis by enabling the discovery of new themes in the dataset, expanding upon previous research while remaining receptive to unexpected findings in the exploration of new phenomena (Braun & Clarke, 2006).

Following guidelines for data trustworthiness (Lincoln & Guba, 1985), a collaborative coding process was used to ensure the validity, reliability, and rigour of our qualitative analysis. This was achieved by having several researchers independently code single interviews to develop a consistent coding framework/coding tree. This approach enabled us to improve the credibility of our findings, as well as develop a strong and comprehensive framework for the analysis. After the research team agreed upon the coding tree, the remaining interviews were split among the researchers and coded independently. Given the iterative nature of the coding process, regular team meetings were held to discuss the coding tree and modify it as needed, thereby ensuring continued cohesiveness and alignment in our analytical approach. Following the established coding framework, researchers independently reviewed and coded the same qualitative interview during several audit trials to maintain analytic rigour. This approach helped cultivate a culture of reflexivity on our team as it enabled a deep examination of interpretations, potential biases, and positionality in the research process.

Quantitative Analysis

As a critical control, we tested for potential differences between the low vs high PCL-5 groups

with respect to age, biological sex assigned at birth, exposure to potentially traumatic events (LEC-5), and childhood trauma (CTQ). Mann-Whitney tests were performed for age and the CTQ (including the total scores and subscales), as the data violated assumptions of normality. Chi-square tests were performed for biological sex assigned at birth and the LEC-5. Specifically, for the LEC-5, chi-square tests were performed for the total number of traumatic events directly experienced ("happened to me" only category, summing the number of direct occurrences), as well as for each individual type of traumatic event that was directly experienced (i.e., comparing the occurrence of direct trauma exposure for each item on the LEC-5). Additionally, to better characterize our sample, we examined potential low vs high PCL-5 group differences with respect to minority stress and trauma-related symptom scales, including the DHEQ-O, DHEQ-D, IHNI, IHP-R, SASI, and DERS. Specifically, Mann-Whitney tests were performed for DHEQ-O, DHEQ-D, IHNI, IHP-R, SASI-SAS, and SASI-DSA, as the data violated the assumptions of normality. Moreover, a Mann-Whitney test was also performed for the DERS, as the data violated the assumptions of equal variances.

A correlation analysis was performed to examine associations between distal and proximal minority stress-related measures (DHEQ-O, DHEQ-D, IHP-R, IHNI) and trauma-related symptom and outcome measures (PCL-5, DERS, SASI-SAS, SASI-DSA). Nonparametric Spearman's rank correlations were used as data from the DHEQ-O, DHEQ-D, IHP-R, IHNI, SASI-SAS, SASI-DSA, and DERS violated assumptions of normality. The multistage Bonferroni procedure was used to control Type 1 error when analyzing multiple dependent correlations (Larzelere & Mulaik, 1977). This procedure involves adjusting the significance threshold at each stage based on the number of remaining hypotheses, allowing for a better balance between Type 1 error control and statistical power. In the current study, the significance level was divided by the total number of comparisons ($p < .05/16 = 0.0031$). If any test was found to be significant, the threshold was then recalculated by dividing the significance level by the difference between the initial number of tests and the number of significant results already identified. This process was repeated until no further significant results were detected. For the current study, this process was conducted once ($p < .05/12 = .0041$).

Of importance, all participants included in this study completed the questionnaire dataset

fully. However, participants were provided a "prefer not to answer" option for each scale. This option was chosen for one item on the PCL-5, 6 items on the DHEQ, 4 items on the IHNI, and 13 items on the CTQ. Considering these instances were found to be missing completely at random (MCAR), we implemented mean imputation to estimate missing item responses for our analyses.

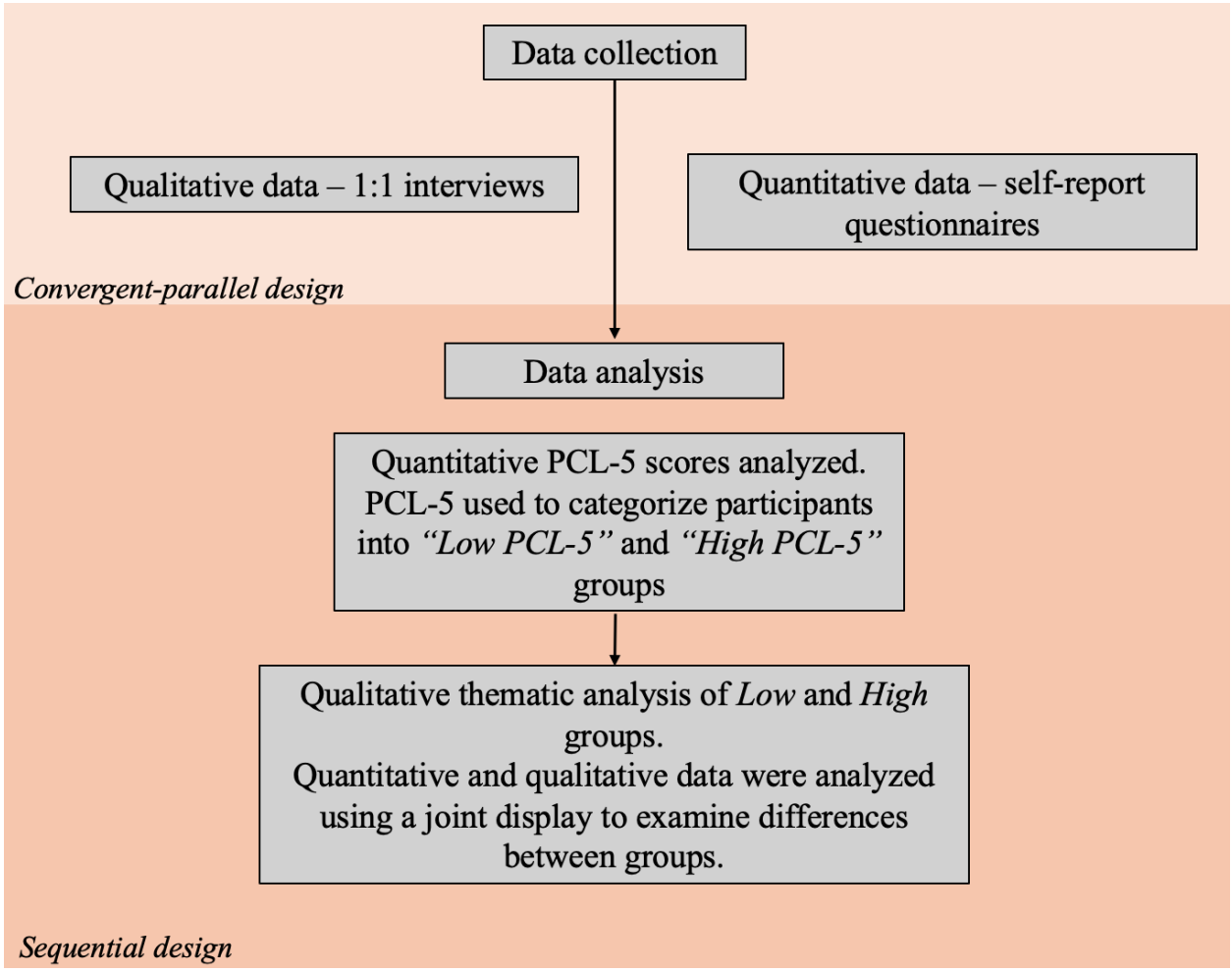

Figure 1. Summary of mixed-methods design. Abbreviations: PCL-5 = Posttraumatic Stress Disorder Checklist for DSM-5.

3.4 Results:

Administering the LEC-5 in our study provided a comprehensive understanding of the different types of potentially traumatic events experienced among our sample. Exposure frequencies to various types of traumatic events are shown in Figure 2. Critically, all participants reported having experienced at least one traumatic event (either direct or indirect) as defined by the LEC-5. Moreover, nearly all participants reported having experienced a direct traumatic event (n=38/40). Of these events, direct exposure to unwanted sexual experiences (83%) and physical assault (58%) were the most common, which is in line with previous research demonstrating the disproportionately high rates

of trauma exposure among SGM individuals (Berger & Sarnyai, 2015; Katz-Wise & Hyde, 2012; Nicholson et al., 2025; Rothman et al., 2011; Tan et al., 2020).

Event	Happened Directly	Witnessed	Learned about it	Part of job	Not sure
Other unwanted or uncomfortable sexual experience	83%	18%	40%	5%	0%
Physical assault	58%	33%	40%	8%	8%
Other very stressful event or experience	50%	28%	25%	8%	18%
Transportation accident	35%	28%	53%	3%	0%
Sexual assault	35%	3%	55%	5%	10%
Serious accident at work, home, or during recreational activity	30%	20%	25%	3%	5%
Natural disaster	27%	20%	27%	8%	3%
Exposure to toxic substance	13%	3%	15%	10%	5%
Severe human suffering	13%	30%	28%	8%	18%
Assault with a weapon	10%	5%	30%	8%	10%
Life-threatening illness or injury	10%	48%	43%	0%	0%
Fire or explosion	8%	18%	33%	3%	3%
Serious injury, harm, or death you caused to someone else	8%	0%	5%	3%	3%
Captivity	5%	0%	8%	3%	5%
Sudden violent death	5%	8%	50%	5%	10%
Combat or exposure to a war-zone	3%	3%	13%	5%	3%
Sudden accidental death	3%	8%	38%	8%	5%

Figure 2. Life Events Checklist for DSM-5.

Notes: Each row corresponds to an event type, each column corresponds to the way in which a participant experienced the event (e.g. happened directly to them, witnessed it, learned about it happening to a close family member or close friend etc.), and each cell represents the percentage of respondents for the given category. The color intensity represents the percentage value, with red indicating higher percentages. Results were rounded to zero decimal places. All participants had either directly or indirectly experienced one of the events mentioned in the LEC-5.

Moreover, administration of the DART revealed high rates of comorbid substance use, generalized anxiety disorder, PTSD, and major depressive disorder among our SGM sample (see Figure 3). Indeed, these findings align with prior research, which shows that SGM individuals experience higher rates of psychiatric symptoms compared to the general population (Akdeniz et al., 2014; Cochran et al., 2013; Dürrbaum & Sattler, 2020; Frost, 2017; Fulginiti et al., 2021; Hatzenbuehler & Pachankis, 2016; Lehavot & Simoni, 2011; Meyer, 2016; Nicholson et al., 2025; Pachankis, 2015; Pitoňák, 2017; Plöderl & Tremblay, 2015). Together, the DART and LEC-5 help contextualize the findings of the current study and are consistent with previous research highlighting the complexity of co-occurring psychiatric symptoms and trauma exposure among SGM individuals.

Notably, in comparison to 7 participants meeting criteria for PTSD on the clinician-administered DART, 21 participants scored above the threshold for probable PTSD on the PCL-5. As

previously described (Nicholson et al., 2025), this may be partly because, unlike the DART, we did not restrict participants to anchor their responses on the PCL-5 to a single, most distressing traumatic event, as SGM individuals are disproportionately affected by the co-occurrence of Criterion A traumas, insidious identity-based trauma, and chronic minority stress exposure (Arnett et al., 2019; Berlin et al., 2023; Cook & Calebs, 2016; Minshew, 2022; Szymanski & Balsam, 2011). Additionally, it has been found previously that participants tend to score higher on self-report measures (i.e., PCL-5) than clinician-administered semi-structured assessments of PTSD (Bovin et al., 2016; Krüger-Gottschalk et al., 2022; Resick et al., 2023). Nevertheless, in the current mixed-methods study, we use the PCL-5 cut-off score solely to group participants by low versus high trauma symptoms; we do not interpret the results in terms of meeting or not meeting diagnostic criteria for PTSD.

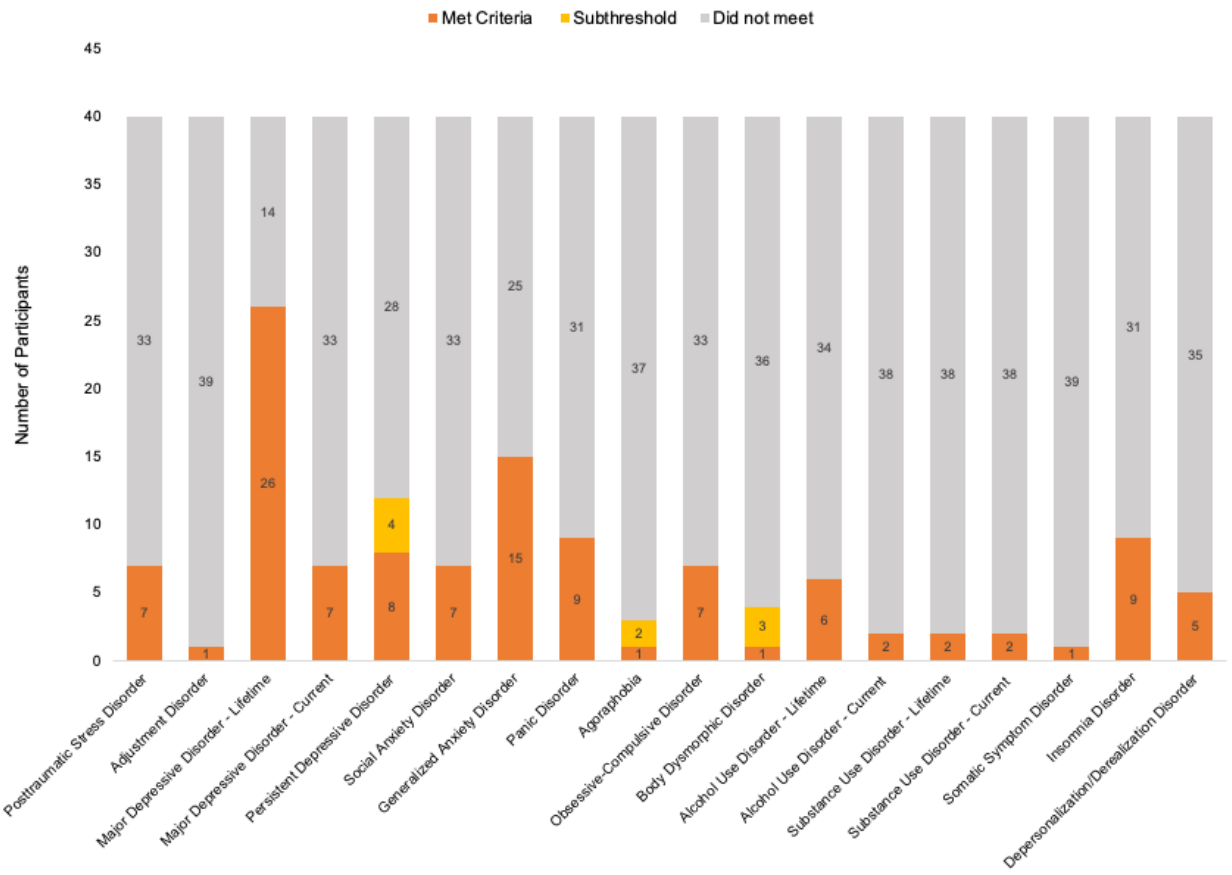

Figure 3. Mental health diagnostic profile of the sample as captured by the DART.
Notes: Figure 3 represents the results of the DART clinical assessment for the sample. Orange bars represent participants who met criteria for a probable mental health disorder diagnosis, yellow bars represent participants who were subthreshold, and grey bars represent participants who did not meet criteria. Abbreviations: DART = Diagnostic Assessment Research Tool.

3.4.1 Quantitative Results

As a critical control, we tested for potential differences between the low vs. high PCL-5 groups with respect to age, biological sex assigned at birth, exposure to potentially traumatic events (LEC-5), and childhood trauma (CTQ). Here, our analyses revealed that the low PCL-5 and high PCL-5 groups did not differ significantly on any of these variables (uncorrected *p-value* = .05). Notably, the occurrence of trauma exposure did not differ between low and high PCL-5 groups when summing across all direct trauma (i.e., "happened to me" only) items (χ^2 (1, N =40) = 0.005, p = 0.942) and when looking at individual direct traumatic event categories separately on the LEC-5 (uncorrected *p-value* = .05).

Additionally, to better characterize our sample, we examined potential low vs. high PCL-5 group differences with respect to minority stress and trauma-related symptom scales. Mann-Whitney tests revealed that the high PCL-5 group demonstrated significantly higher scores as compared to the low PCL-5 group on the DHEQ-O (Mdn = 24 vs 18, U = 114, z = -2.32, p = .020), DHEQ-D (Mdn = 2.16 vs 1.76, U = 98.5, z = -2.737, p = .006), IHP-R (Mdn = 1.8 vs 1.6, U = 121, z = -2.156, p= .031), and DERS (Mdn = 105 vs 70, U= 75, z = -3.374, p < .001). No significant group differences were found for the IHNI, SASI-SAS, and SASI-DSA (uncorrected *p-value* = .05). In summary, the high PCL-5 group showed elevated levels of exposure and distress associated with daily heterosexist experiences, internalized homophobia, and emotion dysregulation. However, neither group showed a significant difference in internalized homonegativity or self-acceptance scores.

Spearman's rank correlations revealed a significant negative correlation between the IHNI and SASI-SAS [r_s (38) = -.518, p = <.001] and the SASI-DSA [r_s (38) = -.565, p = <.001] when correcting for multiple comparisons using the multistage Bonferroni procedure. Additionally, significant positive correlations between the PCL-5 and DHEQ-O [r_s (38) =.469, p =.002] and DHEQ-D [r_s (38) = .571, p = <.001] were found even when corrected for multiple comparisons. Significant positive correlations between DERS and IHP-R [r_s (38) = .392, p = .012] were found only at the uncorrected threshold.

3.4.2 Qualitative Themes

Data analysis yielded four core themes in the low PCL-5 group, which may suggest potential

protective factors against trauma-related symptoms in the context of minority stress. Specifically, these included positive coming-out experiences and supportive post-disclosure environments, positive SGM identity factors, and social safety, as well as positive representation and empowerment. Conversely, two core themes were found in the high PCL-5 group, including negative alterations to the sense of self and distress associated with the anticipation of minority stress and insufficient social safety, which may be suggestive of potential risk factors for developing trauma-related symptoms among SGMs.

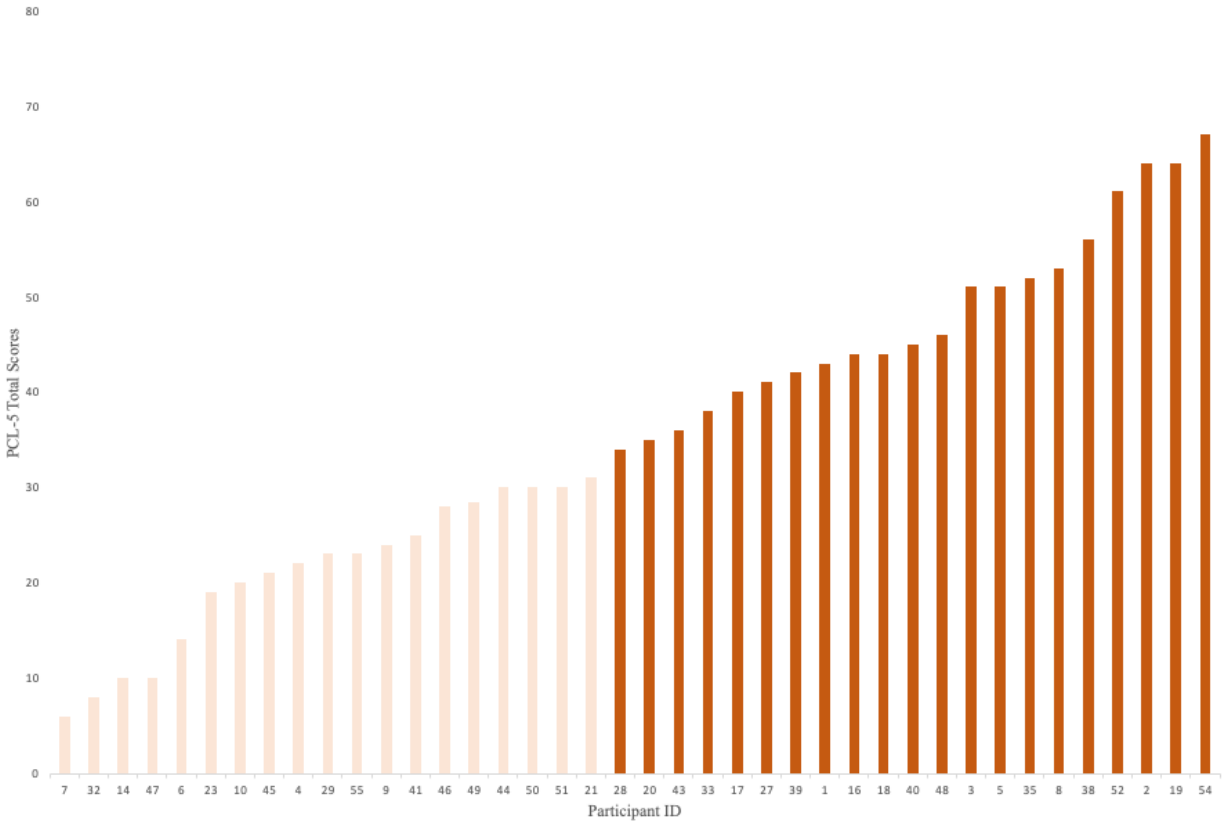

Figure 4. Participant PCL-5 scores

Note: This figure displays participants' PCL-5 scores, organized from low to high, based on a cut-point score of 33. Individuals in the low group are highlighted in peach, while those in the high group are highlighted in dark orange. Abbreviations: PCL-5 = Posttraumatic Stress Disorder Checklist for DSM-5.

3.4.2.1 Low PCL-5 group themes

Positive Coming Out Experiences and Supportive Post-disclosure Environments

Several participants in the low PCL-5 group described unexpected positive coming-out experiences. In the context of pervasive systemic stigma towards SGM individuals, these participants expressed receiving support and kindness and, in some cases, experienced relief when disclosing their identity to others. For instance, one participant reflected that their coming-out experience aligned closely with

what they had hoped for:

> *It was like a year later I came out to my dad, and when I came out to him, I was home for the holidays. He was watching the TV while reading a book. So I kind of like shut off the TV and said "You know there is something I gotta tell you, and being meaning to tell you for a while and that I am gay," and he said "Well, there is something I'm wanting to tell you as well: that I love you," so, you know, his response was like textbook, what you should do.* (Participant 10: Gay, Two-spirit, Indigenous North American, AMAB; PCL-5 score: 20)

Interestingly, some participants reported that they did not anticipate negative reactions when disclosing their SGM identity to others. Rather than approaching disclosure with fear or uncertainty, they described feeling a strong sense of confidence and emotional security, grounded in the belief that their loved ones would respond with acceptance and support. This sense of anticipated affirmation appeared to buffer against minority stress and may have contributed to more adaptive psychological outcomes. As one participant explained:

> *I would say everyone has a fear of telling people … on what would happen if real things change. All of that. I feel like that's definitely common for everyone. But I would say I knew there wasn't gonna be any harm associated with me coming out. I knew I wasn't gonna get kicked out. I knew everyone would just accept it… I would say that that's definitely unique compared to other people. …These things are getting more accepting especially where I'm from.* (Participant 45: Gay, Cis-woman, White-Europe, AFAB; PCL-5 score: 21)

Moreover, anticipation of rejection and internal conflict appeared to be significantly reduced when participants described receiving affirming support, particularly during key periods of identity development, such as adolescence or early adulthood. This support fostered a sense of psychological safety and validation, which not only eased the coming-out process but, in some cases, enabled individuals to believe that disclosing their SGM identity would not fundamentally disrupt their relationships or life circumstances. These findings underscore the protective role of affirming social environments in buffering against minority stress and facilitating more adaptive identity integration.

As one participant described:

> *As kind of like the oldest, and the only daughter and stuff, there was a part of me that's like, ah, is my mom going to be bummed out by this? And I really, I knew that they wouldn't stop loving me or anything, but I was like, there's going to be a part of her that'll probably be disappointed kind of thing, even if just very secretly, and she would never tell me….We didn't talk about it for ages and ages. Until towards the end of university... I was in a car ride with my mom. And she was like, "I've been waiting years to have a conversation with you". And she's like, "and all of the literature says not to force your kids to talk about it". But she's like, can we just end this level of anxiety? And I was kind of like, Oh, okay. Yeah, absolutely. If you want to have the conversation, we can have the conversation. And it was totally fine.* (Participant 47: Lesbian, Cis-woman, White-North American, AFAB; PCL-5 score: 10)

Taken together, positive coming-out experiences, alongside affirming post-disclosure environments where participants received consistent support and a sense of safety, appeared to contribute to more adaptive coping and identity integration. These supportive contexts may have helped buffer against the psychological impact of minority stress (e.g., rejection sensitivity) and reduced the likelihood of trauma-related distress. Participants who described such experiences often reported feeling safer and more secure in their SGM identities, suggesting that acceptance and affirmation can play a protective role during critical periods of identity development.

Social Safety

Another central theme highlighted within the low PCL-5 group was social safety, which refers to reliable social connection, belongingness, inclusion, recognition, and protection (Diamond & Alley, 2022). Here, participants described the profound influence of positive community interactions within and outside SGM communities. These experiences of social affirmation appeared to foster feelings of safety, visibility, and validation, potentially serving as a buffer against the negative effects of minority stress. As one participant explained:

> *I definitely feel like I belong to the LGBT+, or the queer community. I generally find it quite*

> *accepting …. I do find that they're generally very welcoming [the queer community] and excited to meet someone else who's from the queer community… The other communities I would say I'm a part of, like the outdoors community… I really enjoy that they just don't seem to give a shit about gender or sexuality. They just want to go outside and have fun… I find that I can relate really well to those people and they are very inclusive, and then also the rock climbing community tends to be very welcoming or queer friendly.* (Participant 46: Gay, Cis-man, White-North American, AMAB; PCL-5 score: 28)

Participants also frequently emphasized the importance of feeling socially safe and supported through experiences of authentic inclusion. For many, this sense of safety was strengthened by forming connections with others who shared similar identities or had faced comparable challenges, particularly regarding trauma and minority stress within the 2SLGBTQIA+ community. As one participant described:

> *I generally feel pretty comfortable with gay people, you know, being part of it. It's not a community that I don't feel comfortable in … There does also tend to be, at least in the groups I'm in, people tend to be very open about their history, and there does tend to be a lot of history of trauma in people's lives, violent, or sexual or emotional. So, I think that being able to share those things and know that it's shared among a lot of us, it's like a comfort level that is just nice and open and welcoming.* (Participant 14: Gay, Cis-woman, White-North America, AFAB; PCL-5 score: 10)

Collectively, these experiences provided not only emotional reassurance but also a sense of solidarity, helping participants feel safe, understood, and less alone. Such connections appeared to play a protective role, offering support and potentially buffering against the psychological effects of minority stress.

Positive SGM Identity Factors

Another prominent theme identified among participants in the low PCL-5 group was the presence of positive SGM identity factors, defined as aspects of one's sexual or gender minority identity that

contribute to a positive sense of self and psychological well-being (Katz, 2023; Riggle et al., 2014; Rostosky et al., 2018; Siegel, 2022). Participants in this group described experiences of identity pride, self-acceptance, strengthened self-worth, and, in some cases, the ability to overcome internalized shame. Notably, several individuals reported that cultivating these positive identity factors required a process of actively reconstructing their self-perception, particularly when navigating the effects of early stigma or negative socialization. For instance, one participant described moving from internalized shame shaped by a conservative religious background toward a sense of pride and authenticity in their SGM identity:

> *For me in my youth, I was raised in that Catholic church where, you know, having an understanding of sins, and being gay being a sin, sort of the point where I think I moved away from religion, saying well, if they were wrong about this, then they're wrong about other things. But kind of accepting that this is who I am inside, and I need to present openly as to who I am. I worked to the point where I began to accept who I was.* (Participant 10: Gay, Two-spirit, Indigenous North American, AMAB; PCL-5 score: 20)

In a similar vein, some participants reflected on how they actively rebuilt their sense of self and reconstructed their self-worth to feel deserving of love and acceptance. This process often involved challenging internalized stigma and re-evaluating early messages they had received about their identity. As one participant shared:

> *Of course I am loved! I think it's when you … When you go through being barraged with, "You're not worthy of respect," and such, you rebuild yourself, your sense of self-worth, after a while, whether it's through finding another job, finding your own circle of friends, finding a partner. When you start rebuilding, and then you realize, "Yeah, I am. I deserve this. I deserve the hugs. I deserve the accolades of being able to shovel the driveway or something." Yeah. You do, you rebuild.* (Participant 7: Lesbian, Unsure, White-North America, AFAB; PCL-5 score: 6)

Taken together, these accounts highlight that participants continued to encounter societal stigma and its lasting effects; importantly, however, the presence of positive SGM identity factors, such as identity pride, self-acceptance, strong self-worth, and the ability to overcome internalized shame, appeared to support individuals in navigating these challenges. These identity-related strengths may serve a protective function by promoting resilience and enabling individuals to explore and affirm their authentic identities. Ultimately, this may contribute to improved psychological well-being in the context of minority stress.

Positive Representation and Empowerment

The final theme identified in the low PCL-5 group focused on the importance of positive representation and empowerment. As reflected in earlier themes, social connection played a critical role in fostering a sense of belonging and support. Participants emphasized that seeing themselves reflected in affirming, empowered representations helped reinforce key aspects of positive SGM identity, such as self-worth, self-acceptance, and the ability to move beyond internalized shame. These forms of representation not only validated individual experiences but also strengthened identity development through a sense of shared resilience and visibility. For instance, one participant described intentionally seeking out racial/ethnic representation, which helped affirm their identity and enhance their self-worth:

> *I intentionally found a job that is run by brown women. And I love that, because that is directly challenging, you know, systemic issues in the medical system, and it's holistic, too... I intentionally sought that out. And I think that's been helpful to be around other racialized women in healthcare as leaders. That's helped me to be on the social medias and it's been also a journey for me to be more out. It's opening up all these cascading effects for me as part of that affirmation of my identity through the lens of race… they've been amazing and very encouraging and supportive.* (Participant 55: Queer, Cis-woman, South-Asian, AFAB; PCL-5 score: 23)

This example illustrates the importance of representation that aligns with one's intersectional minority

identity. Here, having positive and empowering representation that aligned with the participants' racial/ethnic identity encouraged them to feel more comfortable disclosing their sexual orientation and embracing their authentic self. Indeed, seeking out representation that reflects one's intersectional minority identities may provide support in navigating these complex social positions.

Moreover, participants also emphasized the value of working with mental health professionals who shared aspects of their SGM identity. Having a therapist with similar lived experiences was described as particularly meaningful, as it fostered a deeper sense of understanding, trust, and emotional safety. For some, shared identity factors helped reduce the burden of having to explain or justify their experiences, particularly those related to minority stress. Feeling seen and validated in the therapeutic relationship appeared to enhance participants' sense of empowerment and support. As one participant described:

> *My therapist... Trans specialized therapist. It wasn't just important to me that my therapist was specialized in trans, I didn't realize, but it was so much more important that they were trans too. [He] could speak on his own personal experience, that I, like, completely believe in.* (Participant 23: Pansexual, Trans-man/masculine, White-North America, AFAB; PCL-5 score: 19)

Taken together, seeking out positive representation and experiences of empowerment appeared to serve a meaningful role in affirming and validating participants' identities. These influences extended beyond simply being understood – they were deeply rooted in feeling genuinely connected to others. Whether peers, clinicians, or community members, through shared lived experiences, this sense of connection fostered trust, relatability, and a belief in the possibility of resilience. For many, seeing others who had navigated similar challenges provided not only validation but also a sense of hope and guidance (i.e., "If she can overcome the challenges I am now dealing with, then maybe I can too").

3.4.2.2 High PCL-5 Group Themes

Negative Alterations to the Sense of Self

Many participants in the high PCL-5 group described negative alterations to their sense of self that adversely affected their overall well-being and mental health. Several individuals specifically reported a persistent belief that they were not "good enough," reflecting a deeply negative self-concept. This maladaptive belief was often reinforced by internalized shame related to their SGM identity. As one participant described:

> *I think the bad person thing goes more to like the feeling of being a burden. Or just like being a disappointment, you know… Not only am I non-binary… I was my dad's only daughter and that meant a lot to him. And so, like changing that relationship was really hard … he doesn't really know what his role is supposed to be anymore.* (Participant 20: Queer, Non-binary/gender-queer, White-North America, AFAB; PCL-5 score: 35)

Some participants described a pervasive sense of being unlovable, often reinforced by internalized feelings of shame and guilt. This perception was closely tied to disruptions in attachment systems, which appeared to significantly impact interpersonal relationships. For many, these altered attachment dynamics influenced how they viewed themselves in relation to others, shaping expectations of intimacy, trust, and emotional safety within relationships. As one participant explained:

> *I feel a lot of shame and guilt with my partner because I think, I've expressed before, I feel that I'm unlovable, so I feel like I need to work extra hard to make sure that I am lovable. And it's not that my partner, obviously, doesn't make me feel that way. It's all in my own head, but I feel extra shame and guilt whenever I do something, if we get into a fight, or if I break his things. I feel that I have a lot of extra shame and guilt because I already feel unlovable, and I'm like "Well, he's going to break up with me now. I ruined it." Whereas in reality, maybe a healthy person would just think, "Oh, it was just a fight, but we'll get over it." But, whereas, in my head I'm like "It's over! I've ruined everything!* (Participant 40: Bisexual, Cis-woman, White-North America, AFAB; PCL-5 score: 45)

Similarly, a negatively valenced sense of self, which was characterized by feelings of being defective, was associated with difficulties in self-acceptance and fear of emotional intimacy in romantic

relationships. Some participants who identified as bisexual described difficulty being open with partners, particularly regarding their sexual experiences and preferences. This hesitation appeared to be linked, in part, to internalized stigma and difficulty with self-acceptance, which may have contributed to discomfort with vulnerability and hindered the development of emotionally authentic connections.

> *I think it will harm the relationship I have with (mentions husband's name). So, I don't think he would ever understand that void that I feel. So, I don't think he will ever be able to accept, you know? I can't even accept it. So, no, I can't accept myself. And I can't accept him to have that void that you want that sexual relationship with someone else…..So, I have to be guarded in that way.* (Participant 28: Bisexual, Unsure, South-Asian, AFAB; PCL-5 score: 34)

Here, the core belief of feeling defective (i.e., feeling flawed), strengthened by internalized stigma (shame and guilt) and difficulties with self-acceptance, may be closely linked to the anticipation and fear of rejection. In this particular example, the participant described being unable to be their true, authentic self around their romantic partner, due to negative self-perceptions (i.e., "I can't accept myself") and anticipating rejection from their partner (i.e., "he will never accept me").

Others described their negative sense of self as being intricately shaped by pervasive social norms and persistent feelings of inadequacy. Participants reflected on how chronic exposure to stigma and rejection led them to internalize messages of inferiority, fundamentally altering how they viewed themselves. For some, constructing a compromised version of the self, through identity suppression or minimization, served as a necessary strategy to avoid exclusion, violence, or other harms. However, over time, this form of self-protection became psychologically unsustainable, reinforcing a sense of failure and unworthiness. As one participant explained, no matter what they did, they felt they would never be accepted, because they could never embody what society wanted them to be.

> *There was this "You're never gonna be good enough." ….. And I realize now that who I was, was the compromise that was who I had to be to protect myself from consequences, from exclusion, from violence. I've been able to work but, again, I realize the compromise I was*

> *living was impossible. Because I was never going to be good enough at the thing they wanted me to be. I was always going to be a failure. It's just so often that the men considered me useless… because I don't do anything that men considered to be useful.* (Participant 19: Lesbian, Trans-woman/feminine, White-Europe, AMAB; PCL-5 score: 64)

Collectively, these accounts highlight the profound impact that a negatively valenced sense of self can have on mental health and overall well-being among SGM individuals. Participants described persistent negative self-perceptions, such as 'I am not good enough,' 'I am unlovable,' and 'Others will never accept me,' that were often deeply ingrained and shaped by earlier experiences of stigma, rejection, and invalidation. These beliefs not only influenced internal emotional states but also disrupted key areas of functioning, particularly in interpersonal relationships, by undermining trust and limiting emotional intimacy. Importantly, such cognitive-affective patterns may increase vulnerability to negative mental health outcomes, especially in the context of chronic minority stress and trauma exposure. For some individuals, these internalized beliefs appeared to perpetuate cycles of self-doubt, isolation, and shame, which are known to contribute to elevated risk for trauma-related symptoms within SGM populations (Livingston et al., 2020; Nicholson et al., 2025; Straub et al., 2018).

Distress Associated With the Anticipation of Minority Stress and Insufficient Social Safety

The final theme identified in the high PCL-5 group related to potential risk factors for trauma symptoms was heightened distress associated with the anticipation of minority stress and insufficient social safety. Here, SGM participants in the high PCL-5 group described heightened distress, namely fear and anxiety, during instances where they anticipated minority stress. For example, using a public restroom may evoke anxiety, fear, and panic in some SGM individuals, prompting them to anticipate potential challenges, be constantly on guard, and formulate a safety plan to escape. As one participant described:

> *Not just microaggressions but actual aggressions when it's bathrooms, in particular. People get very sensitive about me being in a bathroom that they think its the wrong one because I'm like "I don't know which one I'm supposed to go into." If I go into a guy's bathroom, they say*

> *I'm in the wrong one. If I'm in a girl's bathroom, I'm wrong. I mean, technically you're right, technically. You are right because I am non-binary and I'm not a woman or man, but I don't have other options, so I have to pick one. And both of them are going to be negative, but what I found is that the women's washroom is less scary because they would yell at you, or they would say something snide. But I don't have to worry about physical violence because that's not an issue. Whereas if I do the men's washroom, I'm more likely to experience physical issues where they would get up in my face or whatever. It's more physical, so I opt for the women's bathroom.* (Participant 38: Panromantic asexual, Non-binary/gender-queer, White-Europe, AFAB; PCL-5 score: 56)

From an intersectional perspective, this example illustrates how individuals with multiple stigmatized identities (e.g., identifying as both a sexual and gender minority) may face distinct forms of minority stress with limited access to social safety. Notably, in this case, the participant did not choose the women's washroom because it felt safe, but rather because they anticipated that the risk of physical abuse would be less severe—an experience that may not be shared by cisgender sexual minorities. In situations where no option feels truly safe, the goal becomes not achieving safety, but minimizing harm. This constrained sense of agency and persistent vulnerability can negatively shape one's sense of self, potentially leading to internalized beliefs of unworthiness (e.g., "I am not worthy of safety").

Several participants in this group also described a persistent sense of fear stemming from both the experience and anticipation of minority stress. For example, one participant reported being deeply afraid of her own identity because of how that identity is treated and perceived in the broader social environment. This fear was closely tied to proximal minority stressors and was associated with pervasive negative beliefs about oneself (e.g., "My identity is wrong"), others (e.g., "People will always reject me"), and the world (e.g., "The world is unsafe for people like me"). Such patterns of cognition and emotion reflect trauma-related processes that may reinforce psychological distress and contribute to the development or maintenance of post-traumatic stress symptoms (Nicholson et al., 2022).

> *I'm not embarrassed about who I am. I'm frightened. But I've come to terms with everything that can happen to me. And that has happened over five years.* (Participant 19: Lesbian, Trans-woman/feminine, White-Europe, AMAB; PCL-5 score: 64)

Furthermore, some participants who had encountered minority stress described a persistent need to remain on guard and hypervigilant to protect themselves from potential harm, a response commonly linked to trauma. This chronic hypervigilance can be maladaptive, contributing to mental fatigue and influencing one's perceptions of the world. As one participant explained:

> *[In reference to minority stressors they've experienced] I think they've definitely, like, made me more anxious as a human, more on guard or in fight-or-flight mode quite often. Like I said, it takes up a lot of my train of thought if I see somebody being discriminatory or experience that at my workplace as a micro-aggression or just an aggression, it's definitely negative on my health, like, on my mental health. I very much internalize it, and it feels not great. Obviously, with my past experiences of being, like, in not a safe space, that has definitely played a lot into ways that I see the world now.* (Participant 43: Queer, Two-spirit, Indigenous, AFAB; PCL-5 score: 36)

Overall, the distress associated with minority stress and insufficient social safety can elicit intense emotional and physiological responses, including fear, anxiety, panic, and heightened vigilance, especially in situations where threat is ambiguous or anticipated. While such reactions may serve an adaptive function by promoting self-protection in unsafe or invalidating environments, chronic activation of these responses can negatively influence perceptions of oneself, others, and the world, and can profoundly impact mental health and overall well-being. As illustrated above, the persistent anticipation of minority stress may contribute to emotional exhaustion, avoidance behaviours, and increased vulnerability to trauma-related symptoms.

3.5 Discussion

Exposure to minority stress and identity-based trauma increases the risk of developing mental health disorders, including PTSD, among SGM individuals (Flores et al., 2020; Hatzenbuehler &

Pachankis, 2016; Livingston et al., 2020; Meyer, 2003; Nicholson et al., 2022, 2025; Salomaa et al., 2023; Valentine et al., 2022). The purpose of the current study was to explore pathways of risk and resilience for trauma symptoms among SGM individuals in the context of co-occurring minority stress and trauma exposure, which, to our knowledge, has never before been conducted using a mixed-methods approach. Here, we identified four core themes within the low PCL-5 group, which may point towards potential protective factors for trauma-related symptoms; these themes included positive coming out experiences and supportive post-disclosure environments, social safety, positive SGM identity factors, and positive representation and empowerment. Conversely, we found two salient themes in the high PCL-5 group, which may reflect heightened vulnerability and risk for trauma-related symptoms; these themes included negative alterations to the sense of self, and distress associated with the anticipation of minority stress and insufficient social safety. Quantitative analyses revealed significant group differences, whereby participants in the high PCL-5 group reported higher scores on exposure and distress associated with daily heterosexist experiences (DHEQ-O and DHEQ-D), internalized homophobia (IHP-R), and emotion dysregulation (DERS). Importantly, as a control, significant group differences were not found for age, biological sex assigned at birth, potentially traumatic events (LEC-5), and childhood trauma (CTQ). To better characterize our sample, we examined potential low vs. high PCL-5 group differences with respect to minority stress and trauma-related symptom scales, which revealed no significant group differences for internalized homonegativity (IHNI) and self-acceptance (SASI-SAS and SASI-DSA). Additionally, further quantitative analyses revealed significant correlations when correcting for multiple comparisons, including negative correlations between internalized homonegativity (IHNI) and self-acceptance (SASI-SAS and SASI-DSA), as well as significant positive correlations between trauma symptom severity (PCL-5) and exposure and distress associated with daily heterosexist experiences (DHEQ-O and DHEQ-D). Collectively, our findings suggest possible mechanisms of risk and resilience among SGM individuals, which may aid the treatment and prevention of trauma-related symptomatology within these populations.

Low PCL-5 themes

3.5.1 Positive Coming Out Experiences and Supportive Post-disclosure Environments

A critical theme identified in the low PCL-5 group was positive coming-out experiences and supportive post-disclosure environments. These experiences were described as being closely tied to a sense of safety and security in expressing participants' SGM identities. Indeed, disclosure experiences represent a critical component of SGM identity development, as the nature of others' reactions can profoundly influence overall well-being (Meyer, 2003; Mousavi et al., 2025; Pachankis & Jackson, 2023). Critically, when an SGM individual experiences adversity after identity disclosure, they are more likely to withhold disclosing their SGM identity to others (e.g., anticipating rejection/stigma), engaging in persistent patterns that will keep their identity hidden (e.g., isolation, avoidance, and secret-keeping) (Pachankis & Jackson, 2023). As identity exploration is an important stage in SGM identity development and involves seeking out other SGM individuals and establishing social connections, receiving negative reactions after disclosure can hinder one's healthy identity development and may lead to adverse psychological outcomes (Pachankis & Jackson, 2023; Rosario et al., 2009). In contrast, positive post-disclosure environments and social support are hypothesized to reduce distress and encourage future disclosure, which, in turn, may lead to greater self-acceptance (Mohr & Fassinger, 2003; Pachankis & Jackson, 2023). Supporting our findings, previous studies have found associations between supportive disclosure environments and positive psychological outcomes, including stress-related growth, lower depression, and increased positive affect (Ryan et al., 2010; D. Solomon et al., 2015). Moreover, negative reactions from others after disclosure are associated with adverse mental health challenges, including suicide attempts, depression, and substance use (Pachankis & Jackson, 2023; Rosario et al., 2009, 2014; Ryan et al., 2009). Indeed, when considered alongside prior research, our findings suggest that the adverse effects of minority stress experiences and identity-based trauma among SGM individuals may be attenuated by affirming coming-out experiences and supportive post-disclosure environments. These positive contexts can play a critical role in fostering protective psychological factors, such as a stronger sense of safety, authenticity, and self-acceptance, which may, in turn, contribute to improved mental health outcomes.

While identity disclosure is a critical component of SGM identity development, it may also shape the formation of attachment systems, thereby influencing how individuals perceive and experience minority stress and relate to others. According to the Integrated Attachment and Sexual Minority Stress (IASMS) Model, the calibration of adult attachment systems is a dynamic process, shaped by both early experiences with attachment figures and ongoing minority stress exposure (Cook & Calebs, 2016). In line with this model, reactions to disclosure, whether affirming or rejecting, can shape or even alter an individual's attachment system (Cook et al., 2016; Cook & Calebs, 2016). Importantly, research on the intersection of attachment and SGM identity disclosure remains limited; however, it is hypothesized that rejection following disclosure may lead to shifts from secure to insecure or disorganized attachment patterns (Cook & Calebs, 2016; Nicholson et al., 2025; Skidmore et al., 2023). This change may, in turn, heighten vulnerability to proximal minority stressors, including internalized stigma, identity nondisclosure, and rejection sensitivity. In other words, the attachment systems of SGM individuals can greatly affect how they perceive and experience minority stress. Importantly, secure attachment can serve as a protective factor against adversity, where previous research has demonstrated associations between secure attachment style and reduced negative mental health outcomes (depression) and proximal minority stressors (e.g., internalized stigma and identity nondisclosure) (Skidmore et al., 2023). This is in direct contrast with maladaptive attachment styles, which were related to greater adverse health outcomes and minority stressors (Skidmore et al., 2023).

Furthermore, research on attachment and PTSD provides further insight. A history of supportive caregiving has been identified as a key predictor of resilience in the face of trauma (Sippel et al., 2015; Southwick & Charney, 2012). Specifically, core biological systems associated with stress regulation, such as the sympathetic nervous system and the hypothalamic-pituitary-adrenal (HPA) axis, are strongly influenced by early attachment experiences (Sippel et al., 2015). This connection is particularly relevant given that severe and chronic forms of PTSD, including complex PTSD and the dissociative subtype of PTSD, are often linked to early developmental trauma (e.g., sexual assault,

physical assault, emotional and physical neglect) (Hansen et al., 2017; Lanius et al., 2012; Wolf et al., 2012). Taken together, our findings, which highlight the protective effects of positive identity disclosure experiences, may reflect the broader role of attachment in shaping trauma-related outcomes among SGM individuals. Indeed, affirming disclosure experiences may not only buffer the impact of minority stress but may also reinforce attachment security, thereby promoting resilience in the face of trauma (Pachankis & Jackson, 2023; Sippel et al., 2015; Skidmore et al., 2023; D. Solomon et al., 2015).

3.5.2 Social Safety

Another core theme identified within the low PCL-5 group, which may be related to protective factors for trauma-related symptoms, was social safety. Social safety is a fundamental human need and refers to the perceived reliability of interpersonal relationships and social environments that provide connection, belonging, inclusion, recognition, and protection (Diamond & Alley, 2022; Slavich et al., 2023). In the current study, several participants in the low PCL-5 group described experiences of social safety that fostered comfort, security, and validation in expressing their authentic SGM identities. This finding also highlights the importance of social safety in contributing to positive identity development (Cook & Calebs, 2016), as it facilitates a safe and inclusive environment for SGM individuals to develop and explore authentic, meaningful connections. Moreover, our findings additionally reinforce the importance of integrating social safety theory when contextualizing trauma-related symptoms among SGMs. Diamond and Alley (2022) argued that minority stress theory alone does not fully account for the mental health disparities observed among SGM individuals. To address this limitation, they proposed integrating a social safety framework into existing minority stress models to more comprehensively capture the determinants of SGM health disparities. Critically, insufficient access to social safety presents unique challenges for SGM individuals, as the absence or unreliability of safety and protection can lead to harmful outcomes, such as chronic threat vigilance (Diamond & Alley, 2022). In this context, social safety is likely to function as a protective buffer against the psychological consequences of minority stress and trauma-

related symptoms. This is supported by research on sexual minority survivors of interpersonal trauma, whereby social neglect was identified as a central theme in how participants described and understood their Criterion A traumas (Berke et al., 2022). The importance of social safety is further demonstrated in the trauma literature, as insufficient social support post-trauma is a well-documented predictor of chronic PTSD (Berke et al., 2022; Janoff-Bulman, 1992; Ullman & Filipas, 2001). Considering the significance of social support in SGM identity development (Cook & Calebs, 2016; Diamond & Alley, 2022; Meyer, 2015), as well as the implications of social support in the development of PTSD (Berke et al., 2022; Janoff-Bulman, 1992; Ullman & Filipas, 2001; Wang et al., 2021; Yehuda et al., 2006), our results suggest that social safety is an important protective factor against trauma-related symptoms in the context of co-occurring minority stress and trauma exposure.

3.5.3 Positive SGM Identity Factors

Another key theme within the low PCL-5 group was the presence of positive SGM identity factors. These factors refer to aspects of one's sexual or gender minority identity that contribute to a positive sense of self and psychological well-being (Riggle et al., 2008, 2011, 2014; Rostosky et al., 2010, 2018). In the current study, participants described these factors (i.e., self-acceptance, identity pride, strengthened self-worth, and the resolution of internalized shame) as being integral in helping them overcome and cope with stress. This aligns with previous research, which shows significant associations between positive SGM identity factors and psychological well-being (Riggle et al., 2014; Rostosky et al., 2018), with one study identifying two positive SGM identity factors (e.g., authenticity and intimacy) that were significantly associated with all measured psychological well-being domains (e.g., positive relationships with others, personal growth, self-acceptance, purpose in life, autonomy, and environmental mastery) (Rostosky et al., 2018). Moreover, participants in the current study often reported rebuilding and transforming their prior negative self-perceptions (e.g., related to shame, internalized stigma, and low self-worth) to experience positive emotions, such as love and happiness. The process of addressing negative self-perceptions and internalized shame constitutes a fundamental component of self-acceptance and serves as a vital contributor to the development of a healthy SGM identity and psychological well-being (Camp et al., 2020). Importantly, poor self-acceptance is a

known risk factor for negative mental health outcomes, including depression and suicidality among SGMs (Camp et al., 2020). Conversely, higher self-acceptance has been shown to be associated with positive mental health outcomes and well-being (Camp et al., 2020; Rostosky et al., 2018). This is supported by our quantitative analysis, whereby self-acceptance of sexuality was found to be negatively associated with internalized homonegativity. On balance, findings from the current study suggest that positive SGM identity factors, particularly those related to self-acceptance, may be associated with reduced trauma-related symptoms in the context of minority stress and trauma. Notably, other positive SGM identity factors, including self-compassion (Neff, 2003), have also been linked to lower levels of psychological distress among SGM individuals, indicating that targeting self-perceptions may be a key pathway for promoting resilience (Helminen et al., 2022). Taken together, positive identity factors may enable SGM individuals to psychologically decouple their identity from adverse minority stress experiences and move forward without internalizing the associated harm, thereby serving as a protective mechanism against the development of trauma-related symptoms.

3.5.4 Positive Representation and Empowerment

The final core theme identified within the low PCL-5 group was positive representation and empowerment. Here, participants overwhelmingly described actively seeking out positive representation in their daily lives, including in workplace and health-care settings, which helped them feel empowered and socially safe. Finding appropriate and empowering SGM representation can be instrumental in helping SGM individuals challenge deeply-rooted societal stigma and may additionally facilitate and encourage identity disclosure and promote positive SGM identity factors (as described above) (Cottle et al., 2024; Pachankis & Jackson, 2023). Consistent with our findings, a recent systematic review identified empirical evidence supporting the beneficial impact of SGM representation—particularly through role models and mentors—on identity acceptance and affirmation. Here, the destigmatization of SGM identities emerged as a key mechanism underlying these outcomes (Cottle et al., 2024). By reducing internalized stigma and promoting self-acceptance, destigmatization is proposed to enhance psychological well-being and support SGM individuals in

coping with the effects of minority stress (Cottle et al., 2024). Further strengthening these results, some studies have also shown that limited access to role models is linked with psychological distress (e.g., depression and anxiety symptoms) among SGM individuals (Bird et al., 2012; Pachankis & Jackson, 2023). In the context of PTSD, evidence suggests that engagement with positive and resilient role models during periods of stress is a critical factor in the development of resilience (Haglund et al., 2007; Mealer et al., 2012). Taken together, the support and empowerment that SGM individuals receive through positive representation may have a profound impact on their overall psychological well-being and buffer against trauma-related symptoms.

High PCL-5 themes

3.5.5 Negative Alterations to the Sense of Self

In the high PCL-5 group, negative alterations to the sense of self was revealed as a salient theme among SGMs with elevated trauma-related symptoms. These findings directly contrast thematic presentations within the low PCL-5 group, whereby *positive SGM identity factors* (i.e., self-acceptance, identity pride, strengthened self-worth, and the resolution of internalized shame) may have enabled participants to overcome adversity. Here, participants in the high PCL-5 group described several experiences illustrating negative self-perceptions with the core belief that they are undeserving, defective, or unlovable, presenting alongside significant forms of rejection sensitivity. Critically, these negative self-beliefs are often deeply ingrained and reinforced by proximal and distal minority stressors, making them particularly difficult to challenge and reframe (Coyne et al., 2020; Dworkin et al., 2018; Hatzenbuehler, 2009; Meyer, 2003; Szymanski & Balsam, 2011). Consequently, these maladaptive self-beliefs and perceptions appeared to interfere with daily life (e.g., affecting interpersonal relationships), adversely contributing to participants' overall well-being. Consistent with these findings, frequent exposure to minority stressors is associated with distress and has been shown to negatively impact one's sense of self (Hughto et al., 2021; Mereish et al., 2022; Rood et al., 2017). In turn, these consequences may influence how one perceives and experiences minority stress, leading to further negative changes in cognition (e.g., persistent negative beliefs about oneself, others, or the world) (Chan et al., 2020; Hatzenbuehler, 2009; Hatzenbuehler & Pachankis,

2016; Ouellette et al., 2023; Pachankis et al., 2015). Interestingly, in the current study, negative beliefs relating to the self appeared to be more pronounced among participants than negative beliefs relating to others and the world. This may reflect the critical role of internalized stigma in compromising one's self-concept, which is in line with prior research (Chan et al., 2020; Hatzenbuehler, 2009; Hatzenbuehler & Pachankis, 2016; Mereish et al., 2022; Nicholson et al., 2025; D. Solomon et al., 2015; Straub et al., 2018). Further complementing these qualitative findings, our quantitative analyses revealed that internalized stigma was negatively associated with self-acceptance. Finally, although these negative perceptions were predominantly self-directed, they were often described in a relational context, particularly when discussing intimacy and romantic partners.

Importantly, PTSD is clinically characterized by symptoms of negative alterations in cognitions and mood, including negative self-concept (American Psychiatric Association, 2022; Ehlers & Clark, 2000; Foa et al., 1999; Frewen & Lanius, 2014; Lanius et al., 2020; Lloyd et al., 2020; Nazarov et al., 2016; Nicholson et al., 2025). Critically, the sense of self is profoundly impacted in the aftermath of trauma, where individuals with PTSD commonly exhibit alterations in brain networks that are fundamental to the self, including the default mode network (DMN) (Frewen et al., 2011; Lanius et al., 2020; Terpou et al., 2020). Indeed, these alterations may manifest as disruptions in self-referential processing, autobiographical memory, and social cognition, as well as persistent negative core beliefs (e.g., pronounced shame and guilt), and dissociative symptoms (Foa et al., 1999; Frewen et al., 2011; Lanius et al., 2020; Terpou et al., 2020). Consequently, individuals with PTSD are often afflicted by disrupted cognitive and somatic-based self-perceptions, whereby individuals commonly report feeling unrecognizable, including "I don't know who I am anymore", "I have permanently changed for the worse", and "I feel as though my body does not belong to me" (Cox et al., 2014; Foa et al., 1999; Lanius et al., 2020). Similarly, recent findings among trauma-exposed SGM individuals illustrate alterations to the sense of self (Nicholson et al., 2025). More specifically, SGMs described qualitative accounts of pronounced negative self-beliefs, including "I feel that I am undeserving of love" and "I hated myself for being gay….I needed to prove to myself that I was valued, because of the internalized hatred that I had" (Nicholson et al., 2025). Indeed, this points

toward the critical role of minority stress in the development and calibration of the self among SGM individuals. Taken together, our findings suggest that negative alterations to the sense of self may be a risk factor for the development of trauma-related symptoms among SGM individuals.

3.5.6 Distress Associated With the Anticipation of Minority Stress and Insufficient Social Safety

The final core theme found in the high PCL-5 group was distress associated with the anticipation of minority stress and insufficient social safety. In response to past experiences of minority stress, which appeared to exert a profound impact on participants in this group, several individuals described anticipating future stressors with intense physiological responses and hypervigilance. Persistent engagement in hypervigilant behaviours allowed them to monitor their surroundings and protect themselves from potential minority stress-related threats. Although this response may be adaptive in situations involving immediate danger, it can notably become maladaptive in the absence or uncertainty of threat, thereby contributing to mental fatigue and heightened experiences of fear, anxiety, and panic (Diamond & Alley, 2022; Hatzenbuehler, 2009; Hatzenbuehler & Link, 2014; Hatzenbuehler & Pachankis, 2016; Hollinsaid et al., 2023; Keating & Muller, 2020; Meyer, 2003; Riggle et al., 2023; Shaw et al., 2010). These findings are in line with previous research among SGM individuals, whereby increased hypervigilance symptoms have been well-documented in response to both minority stress and trauma exposure (Alessi et al., 2017; Hollinsaid et al., 2023; Keating & Muller, 2020; Rostosky et al., 2022).

In the context of having a socially stigmatized identity, SGM individuals may remain hypervigilant to potential threats, often unconsciously, until a sense of safety is established (Diamond & Alley, 2022; Hatzenbuehler & Pachankis, 2016; Hollinsaid et al., 2023; Pachankis, 2007; Riggle et al., 2023; Rostosky et al., 2022). These hypervigilant behaviours, which can develop from an early age among SGM individuals, result from both chronic exposure to distal minority stressors and the absence/lack of social safety (Diamond & Alley, 2022). This response to insufficient social safety can have profound and long-lasting negative psychological and physical impacts, contributing to the etiology of various mood and anxiety-related disorders, as well as PTSD (Bar-Haim et al., 2007; Diamond & Alley, 2022; Hollinsaid et al., 2023; Kimble et al., 2014). Indeed, it appears probable that

insufficient social safety may lead to increased risk for trauma-related symptoms among SGM individuals, whereby the theme outlined in this section is in direct contrast to *social safety* and *affirming post-disclosure environment* protective factors that were identified within the low PCL-5 group. Furthermore, our quantitative results also demonstrate a strong positive correlation between measures of both minority stress exposure and distress (DHEQ-O and DHEQ-D) and trauma-related symptoms. In summary, distress related to the ongoing anticipation of minority stress and lack of social safety may elicit intense emotional and physiological responses, including fear, anxiety, panic, and increased vigilance. While such reactions might serve an adaptive role by encouraging self-protection in unsafe or invalidating environments, prolonged activation of these responses can negatively affect perceptions of oneself, others, and the world, and can significantly impact mental health and overall well-being over time (Diamond & Alley, 2022; Hatzenbuehler & Pachankis, 2016; Hollinsaid et al., 2023; Pachankis, 2007; Riggle et al., 2023; Rostosky et al., 2022).

3.6 Limitations and Future Directions

Several limitations of the present study warrant consideration. Although multiple quantitative measures were employed to assess minority stress-related outcomes, a validated resilience measure applicable across the diverse SGM sample was not included. This limited our ability to quantitatively evaluate protective factors related to resilience. Notably, resilience remains a complex and multifaceted construct without a universally accepted definition, posing inherent challenges for reliable and consistent measurement. This underscores ongoing conceptual and methodological limitations in resilience research and highlights the need for further investigation to develop and validate inclusive resilience frameworks for SGM populations. Additionally, the sequential nature of the data analysis precluded full blinding in this mixed-methods study, potentially introducing interpretive bias. Furthermore, the study's sample was not representative of the broader SGM population, limiting the generalizability of our findings. Finally, the cross-sectional design limits conclusions about developmental trajectories or causal relationships; future longitudinal research is needed to explore the progression of trauma-related symptoms and resilience processes over time from a developmental perspective.

3.7 Conclusion

SGM individuals are severely impacted by minority stressors and identity-based trauma due to the deeply rooted societal stigma that persists today. These adverse experiences, which profoundly contribute to mental health disparities, should be carefully considered during the assessment and treatment of trauma-related symptoms among SGM individuals. Critically, however, it is equally important to take a strength-based (and not solely a deficit-based) approach to both treat and prevent trauma-related symptoms among SGM individuals effectively. In the current study, we found evidence to suggest that positive coming out experiences and supportive post-disclosure environments, positive SGM identity factors, social safety, and positive representation and empowerment may be critical factors for overcoming stress and trauma among those with low PTSD symptom severity. In contrast, negative alterations to the sense of self, as well as distress associated with the anticipation of minority stress and insufficient social safety, were prominent themes among individuals with high PTSD symptom severity, which may be suggestive of potential risk pathways. Our findings carry important implications for treatment interventions, suggesting that existing approaches may be strengthened by directly addressing the identified risk and resilience factors. Future research and clinical practice must prioritize both the reduction of risk and the amplification of resilience to more comprehensively address the mental health needs of SGM individuals impacted by trauma.

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Chapter 4 | Study Three

Overview

Trauma-related symptoms among SGM individuals may be better understood by utilizing frameworks that are not restricted by the prerequisite of Criterion A for PTSD. This is especially important considering the profound impact of minority stress on moral affect (i.e., shame, guilt, betrayal), whereby minority stressors may be perceived as potentially morally injurious events (PMIEs). Consequently, exposure to PMIEs may lead to moral injury, a trauma-related syndrome that is related, but distinct from PTSD. While moral injury has recently been expanded to consider populations outside of military contexts (e.g., healthcare workers and racial minorities), research on SGM individuals remains limited. As such, to better understand the intersections of moral injury and minority stress, and how this interplay may contribute to trauma-related symptoms, we investigated the morally injurious dimensions of minority stress using a mixed-methods approach. Findings from this study shed light on the potential benefits of using moral injury frameworks to contextualize trauma-related symptoms among SGM populations.

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Identity in turmoil: Investigating the morally injurious dimensions of minority stress

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ABSTRACT

Background: Sexual and gender minorities (SGMs) are at an increased risk for developing mental health disorders due to their socially stigmatized identities. Minority stress (i.e. discrimination, identity nondisclosure, internalized stigma) has been shown to impact mental health outcomes among SGMs. Both distal and proximal minority stressors may serve as potentially morally injurious events (PMIEs), which may lead to moral injury and trauma/stressor-related symptoms. Critically, minority stress-related moral injury among SGMs has never before been explored using a mixed-methods approach.

Methods: Thirty-seven SGM participants with diverse minority identities participated in the study. Using a convergent parallel mixed-methods design, we conducted semi-structured qualitative interviews, performed clinical assessments, and administered a comprehensive battery of quantitative measures. Here, we modified the Moral Injury Event Scale (MIES) for use with SGMs. Qualitative themes were extracted and then converged with MIES scores to investigate differential thematic presentations based on the quantitative intensity of SGM-related PMIEs.

Results: Data analysis indicated four core themes related to moral injury among SGMs: shame (internalizing stigma), guilt, betrayal/loss of trust, and attachment injuries (rejection, altered sense-of-self, and social cognition). The qualitative presentation of these themes differed depending on MIES severity. Attachment injuries emerged as a unique core feature of moral injury among SGMs, whereby the remaining core themes align with previous moral injury research. Furthermore, quantitative analyses revealed that the level of exposure to and intensity of minority stress-related PMIEs was positively associated with hazardous alcohol use and trauma-related symptoms.

Conclusions: This is the first mixed-methods study to investigate minority stressors as PMIEs, highlighting how these experiences may contribute to symptoms of moral injury among SGMs. Moral injury may serve as a valuable framework for better understanding trauma-related symptoms and mental health disparities among SGMs. These findings have the potential to inform novel treatment interventions aimed at addressing mental health burdens among SGMs.

Identidad en crisis: investigación de las dimensiones moralmente dañinas del estrés de las minorías

Antecedentes: Las minorías sexuales y de género (SGMs, por sus siglas en inglés) tienen un mayor riesgo de desarrollar trastornos de salud mental debido a sus identidades socialmente estigmatizadas. De hecho, se ha demostrado que el estrés de las minorías (es decir, la discriminación, la opresión, las microagresiones, la no divulgación de la identidad y el estigma internalizado) impacta directamente en los resultados de salud mental de las SGMs. Es importante destacar que tanto los factores de estrés de minoría distales como los proximales pueden actuar como eventos potenciales moralmente perjudiciales (PMIE, por sus siglas en inglés), lo que puede conducir a lesiones morales y síntomas relacionados con

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Minority stress; moral injury; sexual minorities; gender minorities; guilt; shame; betrayal; attachment injuries

PALABRAS CLAVE

Estrés de las minorías; daño moral; vergüenza; culpa; traición; lesiones en el apego; minorías sexuales; minorías de género

HIGHLIGHTS

- The study identified four core themes related to moral injury among sexual and gender minorities: shame, guilt, betrayal/loss of trust, and attachment injuries.
- The intensity of minority stress-related moral injury was positively associated with hazardous alcohol use and trauma-related symptoms.
- This is the first mixed-methods study to explore dimensions of moral injury related to minority stress among sexual and gender minorities.

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el trauma o el estrés. Sin embargo, hasta ahora, nunca se había explorado las características fundamentales del daño moral relacionado con el estrés de las minorías en las SGMs utilizando un enfoque de métodos mixtos.
Métodos: Treinta y siete participantes SGM con diversas identidades raciales y étnicas interseccionales participaron en el estudio. Usando un diseño de métodos mixtos paralelos convergentes, realizamos entrevistas cualitativas semiestructuradas para examinar experiencias interseccionales con factores de estrés de minoría. También administramos evaluaciones clínicas semiestructuradas y una batería de medidas cuantitativas para evaluar síntomas relacionados con la salud mental. Aquí, modificamos la Escala de Eventos de Daño Moral (MIES, por sus siglas en inglés) para su uso con SGMs. Se extrajeron temas cualitativos relacionados con el daño moral y luego se integraron con las puntuaciones de MIES para investigar diferencias en la presentación temática según la intensidad cuantitativa de los PMIE relacionados con las SGMs.
Resultados: Nuestro estudio reveló cuatro temas principales relacionados con el daño moral en las SGMs: vergüenza (internalización del estigma), culpa, traición/pérdida de confianza, lesiones en el apego (rechazo, alteración del sentido de sí mismo y cognición social). Cabe destacar que la presentación cualitativa de estos temas varió según la gravedad de MIES. Las lesiones en el apego surgieron como una característica distintiva del daño moral en las SGMs, mientras que los demás temas principales se alinean con estudios previos sobre daño moral en otras poblaciones. Además, los análisis cuantitativos revelaron que el nivel de exposición e intensidad de los PMIE relacionados con el estrés de minoría se asociaron positivamente con el consumo riesgoso de alcohol y los síntomas relacionados con el trauma.

4.1 Introduction

Sexual and gender minorities (SGMs) can often experience overwhelming shame, guilt, and betrayal (moral affect) as a result of the social stress they are subjected to based on their oppressed and stigmatized identities, particularly during critical developmental periods (Mereish & Poteat, 2015; Pachankis & Jackson, 2023; Tan et al., 2020). Despite considerable progress, SGMs across the globe continue to face significant social, cultural, legal, political, and economic barriers, which significantly impact mental and physical health outcomes (Amnesty International, 2022; Rice et al., 2021; Tan et al., 2020). Specifically, a robust body of evidence indicates that SGMs are disproportionately affected by mental health burdens, including comorbid posttraumatic stress disorder (PTSD), substance use disorders, mood and anxiety disorders (e.g. generalized anxiety disorder and major depressive disorder), body image disturbances, and suicide ideation and attempts, regardless of age (Akdeniz et al., 2014; Cochran et al., 2013; Dürrbaum & Sattler, 2020; Frost, 2017; Fulginiti et al., 2021; Hatzenbuehler & Pachankis, 2016; Lehavot & Simoni, 2011; Meyer, 2016; Pachankis, 2015; Pitoňák, 2017; Plöderl & Tremblay, 2015).

Historically, SGMs have been persecuted, and their identities invalidated, stigmatized, and discriminated against (Abbruzzese & Simon, 2018; Katz-Wise & Hyde, 2012). Gender minorities, including transgender and gender-diverse (TGD) individuals, also face unique stressors associated with their identity and experience disproportionately high rates of discrimination, stigma, rejection and violence, all of which have been associated with psychological distress (Lloyd et al., 2019; Singh et al., 2022; Sue & Sue, 2016; Tan et al., 2020). Racism can also occur within LGBTQ + communities, in addition to heterosexism/homo- or binegative discrimination within racial/ethnic minority communities, illustrating the complexity of intra-minority stress experiences and the importance of intersectionality-informed frameworks (Balsam et al., 2011; Pachankis et al., 2020; Carter et al., 2022; Collins, 2000; Crenshaw, 1991; Purdie-Greenaway & Eibach, 2008). Furthermore, research that builds upon current diagnostic frameworks and treatment interventions to more accurately reflect the experiences of SGMs is urgently needed to improve mental health outcomes and rectify exclusionary models of disease that reinforce health inequities (Harnett, 2020; Nicholson et al., 2022).

4.1.1. Minority stress, trauma, and moral affect

The *Minority Stress Model* (Brooks, 1981; Hendricks & Testa, 2012; Meyer, 2003) is a framework that aids in understanding the high rates of mental health burdens that disproportionately affect SGMs. This conceptual model proposes that the unique stressors experienced by SGMs (due to their socially stigmatized identities) act as catalysts for mental and physical health conditions (Frost & Meyer, 2023). Minority stressors have been broadly categorized into distal and proxi- mal stressors. Distal stressors originate from the exter- nal environment (e.g. discrimination, violence, hate crimes, microaggressions, non-affirming experiences, systemic/legislative oppression, and institutional betrayal) whereas proximal stressors are internal processes (e.g. internalized stigma, rejection sensitivity, negative expectations for the future, and identity nondisclosure) (Frost & Meyer, 2023). Importantly, negative coming-out experiences and SGM-based rejection and discrimination from attachment figures (i.e.

primary caregivers) during development and adulthood have been shown to have maladaptive effects on the calibration of attachment systems, thereby significantly impacting mental health, well-being, and future relationships (Cook & Calebs, 2016; Landolt et al., 2004; Mohr & Fassinger, 2003; Popa-Velea et al., 2019; Shenkman et al., 2021). Furthermore, structural stigma (including discriminatory laws, policies, and prejudicial societal attitudes) is also associated with adverse mental health outcomes among SGMs, where regional severity has been shown to influence how strongly these negative consequences manifest (Frost & Meyer, 2023; Hatzenbuehler et al., 2024; Pachankis & Bränström, 2018; Singh et al., 2022). In line with this, sexual minority youth raised in highly stigmatizing environments have been shown to display a blunted cortisol response following social stress, compared to those from less stigmatizing environments (Hatzenbuehler & McLaughlin, 2014). This indicates that the stress of growing up in environments that target sexual min- orities for social exclusion may exert biological effects that are similar to traumatic life experiences (Flentje et al., 2020; Hatzenbuehler & McLaughlin, 2014). Elsewhere, structural stigma has been found to interact with gay-related rejection sensitivity on the individual level, leading to negative mental health outcomes (i.e. substance use) (Pachankis et al., 2014). Indeed, minority stressors represent a 'fundamental ecological threat' that can force SGMs to choose between expressing their authentic selves or the iden- tities validated by society (Alessi & Martin, 2017).

A point of complexity is that while these minority stress experiences can be perceived as traumatic, only certain forms of minority stress fall within the Criterion A definition of trauma in the DSM-5-TR (APA, 2022), thereby imposing significant constraints on how we both research and address their impact on trauma-related symptoms (Minshew, 2022; Robinson & Rubin, 2016; Szymanski & Balsam, 2011). Among SGMs, minority stressors that do not meet Criterion A definitions have been associated with traumatic stress symptoms (Arnett III et al., 2019; Berlin et al., 2023; Holmes et al., 2016; Minshew, 2022; Robinson & Rubin, 2016; Szymanski & Balsam, 2011). For instance, homonegative microaggressions and traumatic stress symptoms are highly correlated, where heterosexist discrimination, victimization, and internalized heterosexism are positive predictors for PTSD symptoms (Robinson & Rubin, 2016; Straub et al., 2018; Szymanski & Balsam, 2011). In relation, a recent study examined the relationship between symptoms of psychiatric distress, minority stress exposure, and Criterion A traumas among TGD individuals (Salomaa et al., 2023). Here, researchers found that minority stress experiences (i.e. discrimination, social rejection, and structural barriers directly related to TGD identities) were perceived by both TGD participants and health-care providers as being more directly related to psychiatric symptoms (i.e. depression, avoidance, anxiety, stress, substance use, and shame) than Criterion A traumatic events. Importantly, while SGMs experience Criterion A traumas at much higher rates than the general population, being chronically shamed, humiliated, unaffirmed, and unloved can equally inflict profound harm (Minshew, 2022; Salomaa et al., 2023). Consequently, it has been hypothesized that minority stress experiences can lead to a variety of negative mental health outcomes through several overlapping neuropsychological mechanistic pathways of PTSD and trauma-related disorders, such as altered stress reactivity, hypervigilance, avoidance, interpersonal difficulties, emotion dysregulation, and alterations to the sense-of-self (Fenster et al., 2018; Hatzenbuehler, 2009; Marchi et al., 2023; Nicholson et al., 2022; Pachankis et al., 2015; Robinson & Rubin, 2016; Yehuda et al., 2015). Considering this evidence, it has been suggested that current frameworks for trauma-related disorders may benefit from more inclusive definitions of trauma to better represent the diverse experiences of marginalized communities (Berke et al., 2023; Holmes et al., 2016; Kira et al., 2021; Nadal et al., 2020; Shipherd et al., 2019; Williams et al., 2023).

Relatedly, Straub et al. (2018) found that associations between proximal minority stressors (internalized stigma related to sexual identity) and PTSD symptoms are mediated by moral affect, more specifically, shame. This is in line with Hatzenbuehler's (2009) Psychological Mediation Framework, where moral affective processes may be classified as psychological mediators that can further increase vulnerability to adverse psychiatric outcomes in the context of minority stress (Hatzenbuehler, 2009; Meyer, 2003; Nicholson et al., 2022). This seminal study by Straub and colleagues (2018) offers further insight into how minority stress-related moral affect (i.e. shame, guilt, betrayal, anger) may mediate the presen- tation of trauma symptoms among SGMs. Indeed, uti- lizing a moral injury framework, as we describe below, may help to better characterize minority stress-related trauma symptoms among SGMs without the prerequisite of contextualizing and grounding these symptoms in a specific Criterion A trauma (Nicholson et al., 2022).

4.1.2. Moral injury

SGMs often experience complex moral affect, including feelings of shame, guilt, and betrayal associated with their stigmatized identity, which can be a risk factor for negative mental health outcomes (Hequembourg & Dearing, 2013; Pachankis et al., 2023; Straub et al., 2018). Moral injury is defined as a

'**trauma syndrome** including psychological, existential, behavioral, and interpersonal issues that emerge following perceived violations of deep moral beliefs by oneself or trusted individuals' (Jinkerson, 2016; Litz et al., 2009). Core features of moral injury include shame, guilt, existential conflict (including subjective loss of meaning in life), betrayal, and a loss of trust in oneself, others, or higher beings (Jinkerson, 2016; Koenig & Al Zaben, 2021). Here, shame refers to a painful self-conscious emotion typically accompanied by self-deprecation, defensive avoidance, and a desire to hide or externalize blame, whereas guilt is more behaviour-focused, and is associated with remorse and worry about the consequences of one's actions (Tangney et al., 2007). Importantly, these core features of moral injury are associated with secondary symptoms pertaining to substance use, depression/anxiety, re-experiencing, interpersonal difficulties, and self-harm (Jinkerson, 2016). Indeed, individuals affected by moral injury have been shown to display higher rates of substance use disorders (SUD), particularly alcohol use disorder (AUD) (Battles et al., 2019; Hall et al., 2022; Kelley et al., 2019; Maguen et al., 2023). Notably, moral injury is also commonly associated with the presentation of PTSD symptoms (Barnes et al., 2019; Bryan et al., 2018; Fani et al., 2021; Koenig & Al Zaben, 2021; Lathan et al., 2023).

Unlike PTSD, moral injury is not currently classified as a mental health disorder in the DSM-5-TR (APA, 2022). Nevertheless, moral injury can be considered a distinct trauma syndrome from PTSD, though there is some definitional overlap between the two (Barnes et al., 2019; Koenig & Al Zaben, 2021). In particular, overlap with moral injury exists primarily in the PTSD symptom cluster of negative alterations in cognitions and mood (Cluster D; APA, 2022). In contrast to PTSD, moral injury does not require exposure to Criterion A traumas; instead, it develops when transgressions of moral beliefs or values are committed, observed, or learned about with consequent feelings (Koenig & Al Zaben, 2021). In this regard, while a potentially morally injurious event (PMIE) may qualify as a Criterion A trauma, it is not necessary for the development of moral injury. As such, the etiology of moral injury and PTSD are distinct (Barnes et al., 2019). Importantly, it has been postulated by our group that utilizing a moral injury framework in the context of minority stress may help to improve the contextualization, diagnosis, and treatment of trauma-related symptoms (which may or may not include Criterion A traumas) among SGMs (Nicholson et al., 2022).

Since its conception, moral injury has primarily been investigated in military, Veteran, and healthcare settings due to the disproportionately high exposure rates of PMIEs in these populations (Čartolovni et al., 2021; D'Alessandro et al., 2022; Richardson et al., 2020; Riedel et al., 2022; Xue et al., 2022). Critically, however, limited studies have investigated moral injury among minority populations (Elbasheir et al., 2024; Hosein, 2019; McEwen et al., 2022), with even fewer focusing on SGMs (Anderson et al., 2024; Jones et al., 2022; Kondrath et al., 2024). Chronic exposure to minority stress, key elements of which include anticipations of rejection, identity nondisclo- sure and lying to close ones, internalized stigma, feel- ings of institutional betrayal (e.g. from healthcare and religious institutions), structural oppression, discrimination, and violence, may represent PMIEs that could increase the risk for developing identity-based moral injury among SGMs. Specifically, SGMs may (a) perceive their own identity as a moral violation due to internalized stigma, and (b) perceive others' negative reactions to their minoritized identity as a moral transgression, together leaving them more vulnerable to developing moral injury and other adverse psychiatric outcomes (English et al., 2021; Jackson & Mohr, 2016; Jones et al., 2022; Mereish & Poteat, 2015; Meyer & Frost, 2013; Nicholson et al., 2022; Smith et al., 2016). In support of this, a qualitative study investigating religious trauma and moral injury as a result of religious-based LGBTQ + conversion practices found that SGMs experienced increased shame related to their identity as well as loss of trust (Jones et al., 2022). Importantly, evidence has demonstrated higher levels of explicit and implicit shame among SGM populations, which together help to explain the mental health disparities observed among SGMs (Pachankis et al., 2024). Among sexual minority adults, self-reported shame partially accounted for the association between distal SGM stressors and psychological distress (Mereish & Poteat, 2015) and suicidality (Mereish et al., 2019). Similarly, self-reported shame in sexual minority adolescents also partially accounted for the association between family rejection and depression (Mereish et al., 2021). Indeed, there remains a paucity of empirical evidence investigating the dimensions of minority stress-related moral injury among SGMs. Of importance, conceptual and diagnostic frameworks positioning minority stress experiences as PMIEs capable of resulting in moral injury, may facilitate a deeper understanding of the mental health disparities (particularly trauma-related symptomatology) that disproportionately affect SGMs and improve treatment outcomes (Nicholson et al., 2022).

4.1.3. The current study

This mixed-methods study was conducted to investigate dimensions of moral injury that are associated with minority stress exposure among SGMs. Here, both qualitative (semi-structured interviews) and quantitative (self-report questionnaire battery)

methods were utilized to provide a more comprehensive investigation of SGM lived experience from an intersectional perspective. Our research questions were as follows: (a) What core features of moral injury are SGMs qualitatively experiencing due to their stigmatized identities? (b) Do the core features of moral injury among SGMs converge/diverge from current conceptualizations of moral injury in previously investigated populations? (c) If present, how do these core features of moral injury relate to specific minority stress experiences? and (d) Do themes emerging from the qualitative data converge/diverge with quantitative measures of exposure to and perceived intensity of SGM-related PMIEs, and is this associated with mental health outcomes? We hypothesized that themes of moral injury would be present among SGMs, with unique contextual specifiers and associ- ations with minority stress (i.e. internalized stigma and rejection sensitivity). Additionally, we predicted that thematic presentations of moral injury (as ident- ified in the qualitative interviews) would converge with quantitative measures of exposure to and per- ceived intensity of SGM-related PMIEs, which would further be associated with negative mental health outcomes.

4.2 Methods

4.2.1.Study design overview

This mixed-methods analysis was part of a large multiphase medical neuroimaging project, called the *Minority Mosaic Study*, which aimed to investigate the neurobiological basis of minority stress and how this may lead to risk or resilience for mental health outcomes. For the current investigation, we employed a convergent parallel mixed-methods design following best-practice guidelines as outlined by Creswell and Clark (2017). Here, qualitative and quantitative data were collected concurrently in two separate databases with the same participant sample, analysed separately, and then merged to gain additional insight into the presentation of moral injury among SGMs and address our research questions.

Semi-structured qualitative interviews which explored the lived experiences of SGM individuals were used to investigate dimensions of moral injury. As a means of creating group comparisons in relation to qualitative themes, participants were assigned to 'low' and 'high' groups based on their quantitative scores on the modified Moral Injury Events Scale (MIES), denoting exposure to and perceived intensity of SGM-based PMIEs. Here, we examined how thematic presentations of moral injury and associations with minority stress qualitatively differed depending on one's MIES score using a joint display. Joint displays are visual tools used to integrate quantitative and qualitative data. Specifically, they aid researchers in utilizing quantitative data to delineate distinct groups, thereby facilitating the interpretation of quali- tative thematic analyses (McCrudden et al., 2021). Finally, associations between SGM-based PMIEs and mental health symptoms (i.e. substance use, depression, and trauma-related symptoms) were inves- tigated quantitatively.

Our mixed-methods study draws upon both pragmatic and constructivist epistemologies, to examine differences in the experiences of stress, identity development, and health among SGMs using an intersectionality-informed approach (Bowleg et al., 2023; Creswell & Clark, 2017, p. 34–37; Frost et al., 2020; Rivas-Koehl et al., 2023). The term intersectionality, rooted within Black feminist and critical race scholarship (e.g. Crenshaw, 1989), captures how different power relations such as oppression, racism, sexism, heterosexism, and classism, structure individual-level experiences, particularly for those with multidimensional minority identities (Bowleg et al., 2023; Crenshaw, 1989). Additionally, a critical-ideological approach was utilized to examine and challenge social inequalities, power dynamics, and structures of oppression within society (Ponterotto, 2005). Following guidelines proposed by Bowleg and colleagues (2023), our study aimed to accurately capture unique lived experiences by rooting the foundation of our research within intersectionality-informed minority stress frameworks (Rivas-Koehl et al., 2023). Here, we implemented targeted recruitment strategies to ensure diverse representation in our study. We also utilized identity mapping techniques during data col- lection (see below), which helped participants high- light and share experiences connected to their intersecting identities (Frost et al., 2020). Further- more, to enrich our study with perspectives beyond those represented within the research team, we employed participatory action research by collaborat- ing with LGBTQ2SAI + community organizations, such as the LGBT Purge Fund Canada. Collaborators provided valuable feedback on the research design, including the telephone screener, semi-structured qualitative interviews, and clinical assessments, as well as on recruitment strategies, and on interpreting and disseminating our research findings. Notably, sev- eral community collaborators provided valuable feed- back based on their unique lived experiences related to multiple axes of marginalization, which strengthened our intersectional perspective. Overall, incorporating participatory action research greatly enriched our study by providing essential insights and direction.

4.2.2 Participants

The sample for this study included $n = 40$ SGM participants with diverse sexual orientation, gender,

racial, and ethnic identities. During analysis, three participants were removed from the sample due to incomplete responses on the SGM-modified MIES, leaving a final sample of $n = 37$ (detailed demographic information is reported in Table 1). This study was approved by the University of Ottawa Institute of Mental Health Research Ethics Board (REB #2022028) and the Hamilton Integrated Research Ethics Board (REB #13564), and all participants provided written and verbal consent prior to the start of the study. Participants were recruited from across Canada through various online platforms (including social media sites such as Facebook, Instagram, etc.), clinics and agencies serving SGMs, as well as community partner organizations (which included national networks such as the LGBT Purge Fund and the Atlas Institute for Veterans and Families). All participants for the study were self-selected volunteers.

Table 1. Descriptive statistics of demographic and clinical variables.

Age, M (std)	*36.4 (14)*
Sex Assigned at Birth, % (*N*)	
Female	75.7% (28)
Male	21.6% (8)
Prefer not to answer	2.7% (1)
Gender Identity, % (*N*)	
Cis-man	13.5% (5)
Cis-woman	37.8% (14)
Trans-man	10.8% (4)
Trans-woman	5.4% (2)
Non-binary	16.2% (6)
Two-spirit	5.4% (2)
Unsure	5.4% (2)
Questioning	5.4% (2)
Sexual Orientation, % (*N*)	
Gay	16.2% (6)
Lesbian	18.9% (7)
Bisexual	10.8% (4)
Pansexual	8.1% (3)
Queer	37.8% (14)
Other	5.4% (2)
Prefer not to answer	2.7% (1)
Racial Identity, % (*N*)	
Indigenous	5.4% (2)
East Asian	5.4% (2)
South Asian	13.5% (5)
South American	2.7% (1)
White-North American	43.2% (16)
White-European	24.3% (9)
Mixed-race	5.4% (2)
Education (in years), *M (std)*	16.4 (*3.47*)
Household income, % (*N*)	
< $15,000	10.8% (4)
$15,000–$30,000	16.2% (6)
$30,000–$45,000	5.4% (2)
$45,000–$60,000	2.7% (1)
$60,000–$75,000	18.9% (7)
$75,000–$90,000	8.1% (3)
$105,000–$120,000	13.5% (5)
> $120,000	10.8% (4)
Prefer not to answer	13.5% (5)
Marital Status, % (*N*)	
Married/Common-law	29.7% (11)
Single	45.9% (17)
Long-term relationship	16.2% (6)
Divorced	2.7% (1)
Separated	2.7% (1)
Widowed	2.7% (1)
SGM-Modified MIES Total, *M (std)*	21.41 (*10.27*)
AUDIT Total, *M (std)*	5.47 (*5.14*)
PCL-5 Total, *M (std)*	34.78 (*16.08*)
BDI Total, *M (std)*	15.71 (*10.61*)
CTQ Total, *M (std)*	54.15 (*13.71*)
LEC-5, *M (std)*	
Total	13.67 (*6.88*)
Exp	4.24 (*2.41*)

Notes: Table 1 provides an overview of the demographic characteristics of the sample and total scores for clinical variables of interest. Age was only provided by 34 participants. Abbreviations: SGM-Modified MIES = Sexual and Gender Minority Modified Moral Injury Event Scale, AUDIT = Alcohol Use Disorder Identification Test, PCL-5 = Posttraumatic Stress Disorder Checklist for DSM-5, BDI = Beck Depression Inventory, CTQ = Childhood Trauma Questionnaire, LEC-5 = Life Events Checklist for DSM-5; Total = sum of all endorsed past trauma types ('Happened to me', 'Witnessed it', 'Learned about it', 'Part of my job'); Total score min/max = 0–68; range in sample for Total = 2–35; Exp = directly experienced traumatic events ('Happened to me' only); Exp score min/max = 0–17; range in sample for Exp = 0–12.

As this study was part of the larger *Minority Mosaic* neurobiological fMRI project investigating the parallels between minority stress exposure and trauma-related disorders, exclusion criteria that are standard in PTSD neuroimaging studies were used (Nicholson et al., 2022; Nicholson et al., 2024), which included a history of psychotic spectrum dis- orders, bipolar disorder, and dementia, as well as acute suicidality within the past 3 months. (see clini- cal assessment section below). The inclusion criteria consisted of current self-identification as a SGM (captured using our comprehensive demographics form), being between the ages of 18-65, fluent in English, and having access to an electronic device to complete online components of the study.

4.2.3. Data collection procedure & instruments

Data collection took place between 2021 and 2023. Individuals interested in the study first completed eligibility telephone screeners ($n = 74$). For those who were initially eligible, separate appointments were scheduled for clinical assessments to determine full eligibility and to screen for the presence of DSM-5 mental health disorders ($n = 45$). Prior to the start of the clinical assessment, participants were briefed on the study's objectives and scope, and both written and verbal consent were obtained. Fully eligible participants then completed a semi-structured minority stress-related qualitative interview ($n = 41$). The final step involved participants filling out a battery of questionnaires relating to minority stress experiences, moral injury, and mental health ($n = 40$). Participant attrition occurred for various reasons over the duration of the study. For instance, twenty-nine participants did not complete the clinical assessments after the telephone screener, primarily due to loss of contact. Moreover, four participants completed both the screener and the clinical assessment but did not proceed to the qualitative interview due to personal reasons or ineligibility. Lastly, one participant completed all components of the study except for the quantitative battery.

4.2.4. Qualitative interviews

The purpose of the qualitative portion of the current study was to better understand the lived experiences of SGMs in relation to morally injurious dimensions of minority stress via 1:1 semi-structured interviews. Participants were first provided with a short psychoeducation of minority stress, which included brief definitions of the various types of distal and proximal stressors (i.e. microaggressions, internalized stigma, discrimination, rejection sensitivity, etc.). Qualitative data collection was rooted within an intersectional- ity-informed framework and utilized an 'identity mapping activity', where participants were asked to choose words or phrases that describe different aspects of their identity related to their gender, race, ethnicity, sexuality, class, occupation, and any other socially salient aspects of their identity (Frost et al., 2020). The identity map was then discussed together with the interviewer and used as an anchor for the rest of the interview when referencing the participant's minority identities. The remainder of the interview was concerned with participants' experiences with minority stressors, intersectionality and communities, moral affect, disclosure of identity and coming out, authenticity, relationships and attachments, mental and physical health, and resiliency over their lifetime. Critically, personalized identity maps were referenced repeatedly throughout the interview to accurately reflect participants' multidimensional minority identities, focusing on how different aspects of their identity influence various minority stress experiences, as opposed to examining sexual orientation or gender in isolation. The interviews, lasting about 2–3 h each, were conducted virtually via Zoom by a trained researcher and were audio-recorded.

4.2.5. Quantitative instruments

For the current study, participants completed a battery of self-report questionnaires to assess for demographic features, as well as experiences with minority stressors, morally injurious events, and mental health symptoms. The questionnaire battery was administered via REDCap (Harris et al., 2009), a secure web-based software platform hosted at both McMaster University and the University of Ottawa, designed to support data capture for research studies. Although out of scope for the current analysis, as part of the larger *Minority Mosaic Study*, our battery of questionnaires additionally included scales which broadly examined iden- tity-based minority stress exposure and trauma- related symptoms, which will be further analysed else- where. The questionnaires analysed for the current study were *a priori* hypothesized to be related to the core features of moral injury among SGMs. This was based on previous syndromal conceptualizations of moral injury, and the secondary symptoms associated with the core features of moral injury as defined by Jinkerson (2016), which include substance use, depression/anxiety, re-experiencing symptoms, and interpersonal difficulties. Additionally, we further examined for potential associations with childhood trauma exposure.

The Moral Injury Events Scale (MIES; Nash et al., 2013) was modified for use with SGMs in order to capture exposure to minority stress-related potentially morally injurious events (PMIEs). The original MIES is a 9-item self-report scale with items inquiring about exposure to events that may have been per- ceived as transgressions or betrayals in relation to moral injury, and the subjective impact of these events. On our modified version of the MIES, partici- pants were specifically asked to respond to the ques- tions based on their experience as a sexual and/or gender minority. Participants responded on a scale ranging from 1 (strongly disagree) to 6 (strongly agree), with higher scores indicating greater exposure to and intensity of PMIEs. The original MIES has demonstrated a good preliminary factor structure and reliability ($\alpha = 0.82–0.89$) (Bryan et al., 2016). On our modified version, 2 of the original 9 questions were removed as they pertained only to military mem- bers (please see supplementary material for the SGM- modified version of the MIES, Cronbach's α within current sample = 0.802). In sum, the SGM-modified MIES was utilized to assess for both the presence of exposure and the perceived intensity of PMIEs related to one's sexual and/or gender identity.

The Alcohol Use Disorder Identification Test (AUDIT) was used to assess hazardous/harmful alcohol consumption over the past year (Saunders et al., 1993). The AUDIT is a 10-item self-report questionnaire, with items assessing amount and frequency of alcohol intake, alcohol dependence, and problems related to alcohol consumption. Scores range from 0 to 40, whereby scores above 8 suggest hazardous/ harmful alcohol consumption. The Beck Depression Inventory (BDI) was utilized to capture symptoms of depression (Beck et al., 1961; Beck et al., 1997). The BDI is a self-report 21-item measure that assesses symptoms within the past 2 weeks. Total scores range from 0 to 63, with scores between 21- 63 indicat- ing moderate to severe levels of depression. The Post-traumatic Stress Disorder Checklist for DSM-5 (PCL-5) was used in this study to assess the presence and severity of trauma-related symptoms among participants. This 20-item self-report measure evaluates the key symptom clusters of PTSD as outlined in the DSM-5: intrusions (e.g. unwanted traumatic memories), avoidance, negative alterations in cognition and mood (e.g. distorted blame of self or others), and alterations in arousal and reactivity. When completing the PCL-5, respondents were instructed to indicate how bothered they were by 20 trauma-related symptoms in the past month, with total scores ranging

from 0 to 80. Research suggests that a PCL-5 cut-off score between 31 and 33 is indicative of probable PTSD (Weathers et al., 2013). The PCL-5 was chosen for its comprehensive coverage of PTSD symptoms and its applicability to various types of traumatic experiences, including those stemming from chronic minority stress. The PCL-5 was analysed in the current study given evidence which suggests that outcomes associated with exposure to PMIEs are distinct from, but associated with PTSD (see Griffin et al., 2019 for review). Indeed, moral injury is considered a separate syndrome from PTSD albeit with definitional overlap (as reviewed previously in detail). Notably, associations between PTSD symptoms and exposure to PMIEs have been shown previously to range from small to moderate (Currier, Holland, & Malott, 2015; Currier, Holland, Drescher, et al., 2015; Nash et al., 2013).

The Childhood Trauma Questionnaire (CTQ) is a self-report measure that consists of 28 items which assess childhood abuse and neglect, including physical, emotional, and sexual abuse, as well as physical and emotional neglect (total score 25–36 = none or minimal childhood trauma, 41–51 = low to moderate trauma, 56–68 = moderate to severe trauma, > 72 = severe to extreme trauma) (Bernstein et al., 2003). The Life Events Checklist for DSM-5 (LEC-5) is a self-report measure that screens for lifetime exposure to potentially traumatic events across 16 categories, including but not limited to natural disasters, various forms of assault, and severe accidents. Respondents indicate whether they have directly experienced, witnessed, or learned about these events in their lifetime, providing a nuanced picture of their trauma exposure. The LEC-5 is adept at identifying exposures to DSM-5 Criterion A events like direct or indirect exposure to actual or threatened death, serious injury, or sexual violence (Weathers et al., 2013). Incorporating the LEC-5 in this research allows for a detailed understanding of the types of traumatic events that participants have encountered over their lifetimes. Critically, it has been repeatedly documented that SGMs disproportionately experi- ence such events when compared to the broader population (Meyer et al., 2021; Minshew, 2022; Tan et al., 2020). By quantifying the extent and nature of traumatic event exposure, the LEC-5 aids in con- textualizing the study results and exploring how trauma and minority stress intersect, shaping the psychological experiences of this population.

4.2.6. Clinical assessment

Participants underwent an online clinical interview to screen for the presence of mental health disorders, which lasted approx. 1–3 h and was conducted over Zoom platforms with a clinically trained researcher. The Diagnostic Assessment Research Tool (DART), a semi-structured interview to facilitate the assessment of mental health disorders based on the criteria outlined in the Diagnostic and Statistical Manual of Mental Disorders Fifth Edition (DSM-5), was utilized for this purpose (APA 2022; Schneider et al., 2022). Psychometric validation of this tool has yielded good construct, convergent, and discriminant validity for a wide range of disorders and has been applied successfully in a variety of studies (Krause et al., 2022; Ouellette et al., 2022; Puccinelli et al., 2023; Schneider et al., 2022). The DART enabled for the systematic evaluation of mental health disorders within our sample, providing essential contextual and diagnostic information that contributes to a com- prehensive understanding of the mental health bur- dens affecting SGMs in our study (McCabe et al., 2021). Participant eligibility for the study was only fully confirmed after completion of the DART clinical assessment.

4.2.7 Data analysis

Qualitative analysis

The recordings of the qualitative interviews were transcribed to text format by a third-party company, with which confidentiality agreements were in place before transcription. The interviews were transcribed verbatim and de-identified, transcriptions were then checked thoroughly for accuracy. Data from the inter- views were analysed using thematic analysis (Braun & Clarke, 2012). A thematic analysis approach was chosen for its capacity to uncover and interpret patterns and themes within qualitative data, facilitating a more nuanced exploration of the experiences of SGMs (Braun & Clarke, 2012). Due to the wide range of topics assessed in the qualitative interviews, thematic analysis was determined as the best analysis method for this study, allowing for a high level of flexi- bility in categorizing and analysing the data (Braun & Clarke, 2012). The definition of a ‘theme’ in this study was guided by Braun and Clarke (2006), who conceptualize a theme as capturing something important about the data in relation to the research question and demonstrating a degree of patterned response or meaning within the dataset. Thematic analyses were conducted at the latent level, going beyond what was explicitly stated and instead aiming to uncover implicit aspects of the data and deeper layers of mean- ing (Braun & Clarke, 2006).

Three researchers (SN, JW, MP) well-versed in the minority stress literature, coded the interviews using MAXQDA software (VERBI Software, 2021). Following Braun & Clarke’s (2006 & 2012) guidelines, the researchers began by immersing themselves in the data through repeated readings, actively searching for meanings and patterns. This process involved critically examining how participants made sense of their

experiences, articulated their beliefs about the world, and constructed their perceptions of it. In this study, complete coding was used, ensuring that anything of interest or relevance to answering our research questions was identified. Both deductive and inductive coding approaches were employed. In this iterative process, the researchers began with several deductive codes, including relationship with identity labels, minority stressors (e.g. internalized stigma, microaggressions, discrimination, rejection-related experiences, identity non-disclosure), fear/anxiety related to identity, coming out experiences, safety concerns, and moral affect (e.g. shame, guilt, betrayal, loss of trust, existential conflict). Deductive coding leveraged existing theoretical frameworks related to minority stress (Meyer, 2003) and moral injury (Jinkerson, 2016) to provide a structured foundation for analysis that was aligned with existing research. Critically, an inductive approach complemented the analysis, as researchers identified new codes such as attachment injuries, mental guard/hypervigilance, overcompensation, conservative religious upbringing, and importance of representation. This approach facilitated the identification of new themes in the data, building on previous research while still remaining open to unexpected findings in the exploration of new phenomena (Braun & Clarke, 2006). As open coding continued, axial coding (Lune & Berg, 2017) was simultaneously applied to account for higher-level themes being generated from the data. This allowed for the organization of lower-level codes into hierarchical categorical structures and themes.

To ensure the validity, reliability, and rigour of our qualitative data analysis, we employed a comprehensive and collaborative coding process guided by the principles of Guba and Lincoln's criteria for trustworthiness (Lincoln & Guba, 1985). Initially, to establish a consistent coding framework, multiple researchers independently coded single interviews, collaboratively developing a common coding tree. This process of investigator triangulation not only enhanced the dependability of our findings but also ensured a robust framework for the analysis of our qualitative data. Once a consensus on the coding tree was reached, the remaining interviews were divided among the researchers, with regular team meetings held to discuss and potentially revise the coding tree, ensuring continued cohesiveness and alignment in our analytical approach. The rigour of our analysis was further reinforced by employing audit trials, wherein each researcher independently reviewed and coded the same qualitative interview according to the agreed-upon coding framework. This procedure allowed for a critical examination of interpretations, potential biases, and positionality in the research process, thereby fostering a culture of reflexivity on our team.

4.2.8 Mixed methods analysis

In our mixed methods analysis, we employed a median split method (Creswell & Clark, 2018) to cat- egorize participants into two groups based on their SGM-modified MIES scores [low group (MIES score = 6–19) vs. high group (MIES score = 20–41)]. This categorization allowed us to examine and compare qualitative themes pertaining to minority stress- related moral injury, as a function of varying levels of exposure to SGM-based PMIEs and the perceived intensity of these events (i.e. SGM-modified MIES). Importantly, this median split method was a data-driven approach that allowed for group comparisons of the extracted qualitative themes in the absence of established cut-off scores on the MIES (Creswell & Clark, 2017). Here, there were 18 participants in the low MIES group (MIES score $M = 12.89$, $std = 4.42$), and 19 participants in the high MIES group (MIES score $M = 29.47$, $std = 7.16$). Data on the MIES across all participants, and for the low and high MIES groups separately, were normally distributed. An independent samples t-test confirmed significantly higher MIES scores in the high vs. the low group ($p < .001$).

After we completed the blind qualitative thematic analysis and allocation of participants into the low vs. high MIES groups, we merged the qualitative and quantitative data using a joint display method to explore whether the identified qualitative themes were differentially expressed in the high vs. low MIES groups (see Figure 1 for a visualization of the mixed method analysis). Notably, all qualitative inter- views were coded blindly without prior knowledge of the participants' quantitative data to eliminate any potential bias in theme identification.

In summary, this mixed-methods analysis allowed us to investigate whether core dimensions of minority stress-related moral injury qualitatively differed as a function of varying levels of exposure to SGM-based PMIEs and the perceived intensity of these events (as measured quantitatively using the SGM-modified MIES). These mixed-methods results are presented using a joint display, which visually stratifies participants based on MIES scores to explore contrasting thematic presentations of minority stress-related moral injury (McCrudden et al., 2021).

4.2.9.Correlation analysis with the SGM-modified MIES

Lastly, a correlation analysis was conducted to investigate whether there were any associations between scores on the SGM-modified MIES and mental health outcomes using R statistical package version 4.3.2. In the current study, correlational analyses were guided by the syndromal definition of moral injury (Jinkerson, 2016), which postulates that the core symptoms of moral injury are associated with secondary symp- toms including substance use, depression/anxiety,

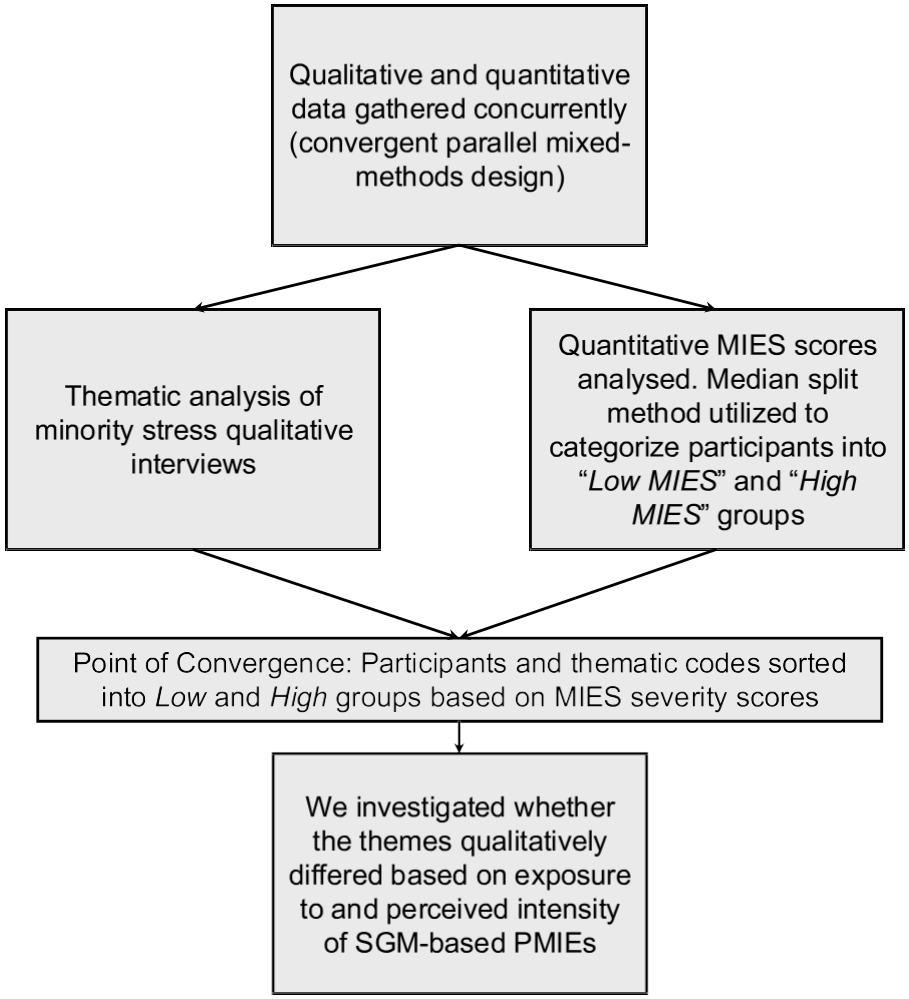

Figure 1. Summary of convergent parallel mixed-methods design. Abbreviations: MIES = moral injury event scale, PMIEs = potentially morally injurious events, SGM = sexual and gender minority.

and re-experiencing symptoms. As such, we conducted Spearman's rank correlations to examine associations between scores on the SGM-modified MIES and alcohol use (AUDIT), symptoms of depression (BDI), and trauma-related symptoms (PCL-5). We further probed for potential associations between scores on the SGM-modified MIES and the severity of childhood abuse and neglect (CTQ). Non-parametric Spearman's rank correlations were utilized as data from the AUDIT and CTQ violated assumptions of normality; among the scales no outliers were detected. In some instances, individuals chose to select the 'prefer not to answer' response for items on various scales (AUDIT $n = 1$, PCL-5 $n = 1$, BDI $n = 2$, CTQ $n = 4$), as such, we conducted pairwise deletions for these participants during bivariate analyses. To control Type 1 error when analysing multiple dependent correlations, we applied the multistage Bonferroni correction (Larzelere & Mulaik, 1977). This procedure adjusts the significance threshold at each step based on the number of remaining hypotheses, often allowing more rejections than a standard Bonferroni correction applied uniformly across all tests. By adjusting the significance threshold as fewer hypotheses remain, the multistage Bonferroni method achieves a better balance between Type 1 error control and statistical power. Initially, the significance level was divided by the total number of comparisons ($p < .05/4 = .0125$). If any hypothesis was found significant, the threshold was iteratively recalculated by dividing the significance level by the difference between the initial number of tests and the number of significant results already identified (Larzelere & Mulaik, 1977). This iterative process was only conducted once ($p < .05/3 = .0167$) until no further significant results were detected. This method enhances the robustness and reliability of results by reducing the likelihood of false positives while maintaining statistical power, providing a balanced approach to multiple comparison correction (Larzelere & Mulaik, 1977; Brophy, 1988).

4.3. Results

The current study qualitatively identified four core components of moral injury related to minority stress exposure among SGMs, which included: shame, guilt, betrayal/loss of trust, and attachment

injuries. Here, strong converging evidence between qualitative and quantitative data was found, whereby the qualitative intensity and presentation of moral injury themes was found to differ based on quantitative scores on the SGM-modified MIES (corresponding to exposure to and perceived intensity of SGM-based PMIEs). The analysis revealed a variety of minority stressors (i.e. identity nondisclosure, internalized stigma, discrimination, invalidation, experiences with rejection and rejection sensitivity, etc.) that were qualitatively associated with each of the core components of moral injury. Our findings suggest that attachment injuries may represent a unique core feature of moral injury among SGMs, in contrast to shame, guilt, and betrayal/loss of trust, which have been previously established as moral injury features in other populations (Griffin et al., 2019; Jinkerson, 2016). Finally, exposure and perceived intensity of SGM-based PMIEs (as measured on the modified MIES) were found to be strongly correlated with alcohol use and trauma- related symptoms in our sample.

The LEC-5 facilitated a deeper understanding of the various types of traumatic events that were experienced by participants. Here, exposure frequencies to various types of traumatic events are presented in a heat map in Figure 2. Notably, all participants in this sample had either directly or indirectly experienced at least one traumatic event as defined by the LEC-5, with direct exposure to unwanted or uncomfortable sexual experiences (84%) and physical assault (60%) being the most common. Of importance, these results are in line with previous studies demonstrating that SGMs, particularly those with intersecting racial and ethnic minority identities, experience disproportionately high rates of trauma exposure (Berger & Sarnyai, 2015; Katz-Wise & Hyde, 2012; Rothman et al., 2011; Tan et al., 2020). Further strengthening the ecological validity of our study, findings from the DART clinical assessment are in line with previous studies demonstrating higher rates of comorbid substance use, trauma and stressor-related disorders (including PTSD), generalized anxiety disorder, and major depressive disorder among SGMs (see Figure 3) (Akdeniz et al., 2014; Cochran et al., 2013; Dürrbaum & Sattler, 2020; Frost, 2017; Fulginiti et al., 2021; Hatzenbuehler & Pachankis, 2016; Lehavot & Simoni, 2011; Meyer, 2016; Pachankis, 2015; Pitoňák, 2017; Plöderl & Tremblay, 2015). Together, these results aid in the contextualization of the current findings, and are in keeping with previous studies demonstrating a high degree of complexity in relation to co-occurring mental health conditions and exposure to trauma among SGMs populations.

Event	Happened Directly	Witnessed	Learned about it	Part of job	Not sure
Other unwanted or uncomfortable sexual experience	84%	16%	35%	5%	0%
Physical assault	60%	32%	38%	8%	8%
Other very stressful event or experience	51%	27%	24%	8%	19%
Transportation accident	35%	27%	49%	3%	0%
Sexual assault	35%	3%	51%	5%	11%
Serious accident at work, home, or during recreational activity	32%	19%	24%	3%	5%
Natural disaster	30%	19%	27%	8%	3%
Exposure to toxic substance	14%	3%	14%	11%	5%
Severe human suffering	14%	30%	24%	8%	19%
Assault with a weapon	11%	5%	32%	8%	8%
Life-threatening illness or injury	8%	49%	38%	0%	0%
Fire or explosion	8%	19%	32%	3%	3%
Serious injury, harm, or death you caused to someone else	8%	0%	5%	3%	3%
Captivity	5%	0%	8%	3%	5%
Sudden violent death	5%	8%	51%	5%	11%
Combat or exposure to a war-zone	3%	3%	14%	5%	3%
Sudden accidental death	3%	8%	38%	8%	5%

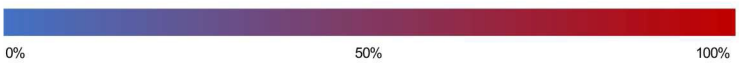

Figure 2. Life Events Checklist for DSM-5.

Notes: Each row corresponds to an event type, each column corresponds to the way in which a participant experienced the event (e.g. happened directly to them, witnessed it, learned about it happening to a close family member or close friend etc.), and each cell represents the percentage of respondents for the given category. The color intensity represents the percentage value, with red indicating higher percentages. Results were rounded to zero decimal places. All participants had either directly or indirectly experienced one of the events mentioned in the LEC-5.

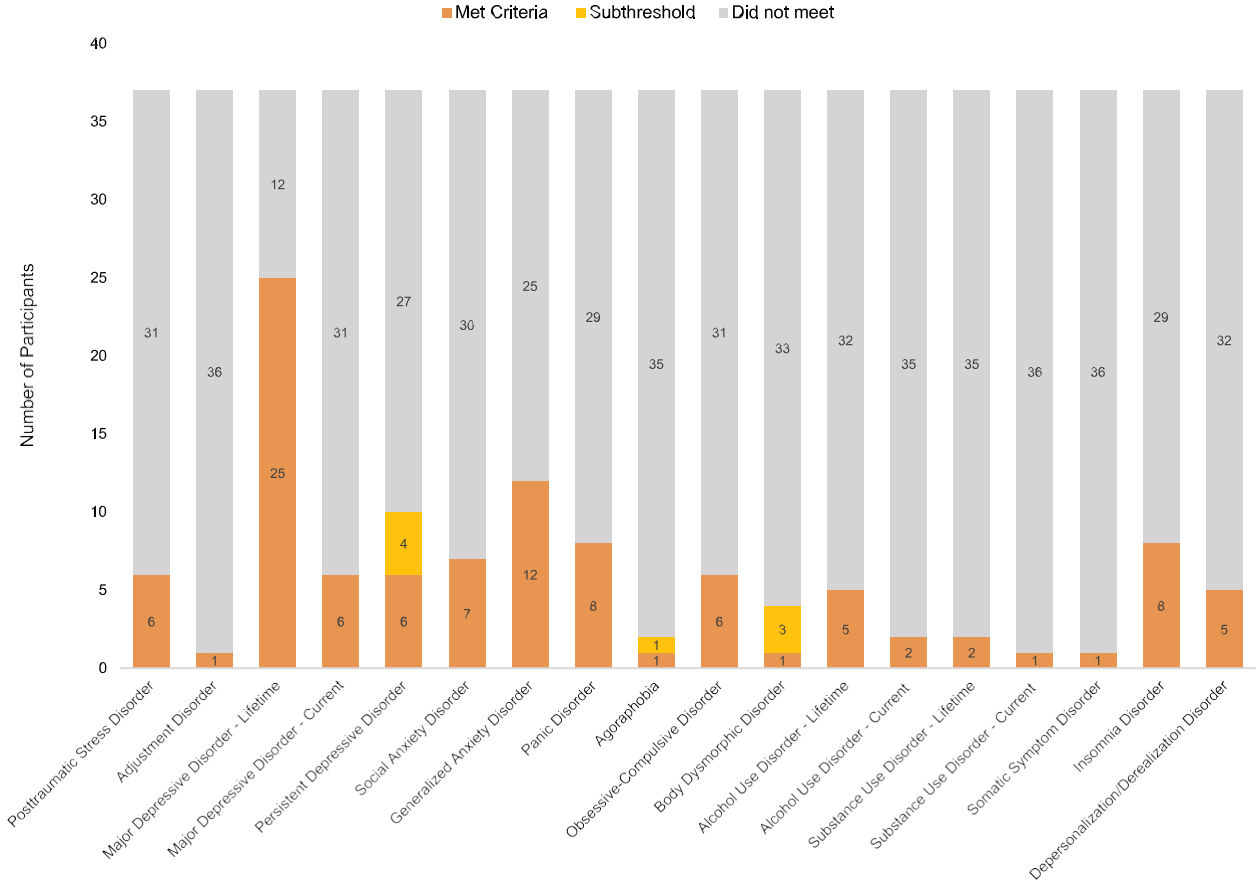

Figure 3. Mental health diagnostic profile of the sample as captured by the DART.

Notes: Figure 3 represents the results of the DART clinical assessment for the sample. Orange bars represent participants who met criteria for a probable mental health disorder diagnosis, yellow bars represent participants who were subthreshold, and grey bars represent participants who did not meet criteria. Abbreviations: DART = Diagnostic Assessment Research Tool.

4.3.1. Theme 1: shame

One of the most prominent themes that participants discussed during the qualitative interviews was the concept of shame. Interestingly, one aspect that accompanied feelings of shame among participants was the internalization of negative attitudes about their stigmatized identities (i.e. internalized stigma). Bearing witness to not only speech but also acts of discrimination and violence that portrayed their identities as morally wrong and harmful, both in youth and adulthood, was associated with internalized stigma and the development of self-hatred. Addition- ally, higher levels of shame were associated with feel- ings of worthlessness and identity nondisclosure, as well as suppression of authenticity related to discrimi- nation and/or fear of discovery. While the theme of shame was evident across the entire sample, the inten- sity of reports differed as a function of participants' scores on the modified MIES, denoting exposure to and perceived intensity of SGM-based PMIEs.

Low MIES scores

Individuals within the low range of MIES scores (Figure 4) qualitatively reported shame as being associated with the internalization of negative attitudes about their SGM identity. Participants in the lower MIES range also noted that feelings of shame were more prominent during their youth/adolescence and were much less tied to their current identity. Nevertheless, participants acknowledged that they felt pressured to meticulously adjust and selectively manage how they presented themselves. These behaviours emerged as a consequence of the stigma associated with their identities, precipitating feelings of shame and a perception of inherent inadequacy.

> I mean, sometimes I thought there was something wrong with myself. When I was young… Like, why am I not conforming? Why am I not following the rules and ways of living and all that? And yeah, I had that internal shame for quite some time. Why am I going through this struggle? Just because who I am? It was a bit difficult for me to sort of accept. (Participant 27; Lesbian, Cis-woman, South Asian, Assigned female at birth (AFAB); MIES score: 13)

Participants described adaptively modifying the extent to which they revealed their authentic selves, particularly within environments characterized by hetero- or cisnormativity, instead of actively concealing their identity. This was simultaneously associated with

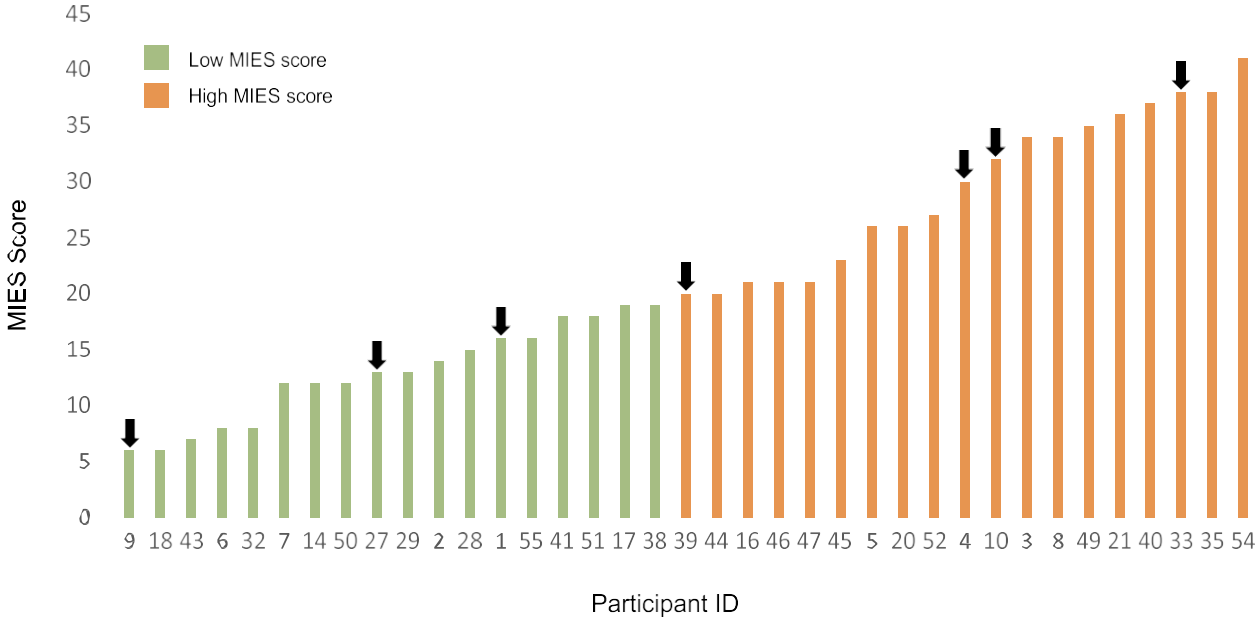

Figure 4. MIES severity & shame.

Note: This figure displays participants' scores on the SGM-modified MIES, organized from *low* to *high* scores (measuring exposure to and perceived inten- sity of SGM-based PMIEs). Individuals belonging to the *low* group are highlighted in green and those in the *high* group are denoted in orange. Participants whose quotes are highlighted in the results section below to illustrate themes of shame are indicated with arrows in the graph above. Abbreviations: MIES = Moral Injury Event Scale, PMIEs = Potentially Morally Injurious Events.

feelings of guilt related to suppressing their identity and disappointing members of their community.

> I think maybe being raised with a bit of like it's okay to be gay, but people shouldn't be so loud about it, kind of thing. Feeling like, for straight people, you don't want to be too loud about it, but then also like in gay circles "Oh, am I hiding? Am I hiding who I am?" (Participant 9; Queer, Cis-woman, White-European, AFAB; MIES score: 6)

Several participants also described how they felt as though they were 'misfits in society' due to their stigmatized identities and how these feelings developed into self-hatred, worthlessness, and fear. Illustratively, participant 1 reported that they perceived these feelings of worthlessness related to their sexual identity as being associated with symptoms of anxiety and depression. This showcases how individuals may attribute minority stress experiences and moral injury as being closely associated with negative psychological outcomes.

> Then I attributed it all to I hated the fact that I was gay, you know? I don't want to be like this dyke. Who the hell wants to be this misfit in society, you know? … So that's how I handled it. It was interna- lized. I hated myself. I didn't want to be this way. I wasn't worthy. You know, like, pick it all, throw it all in a basket, and that's what you are. And then from the anxiety, then it develops into depression, right? And then you just feel like you're not worthy to be on this Earth, you know? (Participant 1; Lesbian, Cis-woman, White-North American, AFAB; MIES score: 16)

Overall, participants within the low range of exposure to SGM-based PMIEs exhibited clear indicators of shame and internalized stigma, particularly during youth/adolescence, which was commonly linked with feelings of worthlessness, self-hatred, fear of rejection, and suppression of authenticity.

High MIES scores

While participants within the high range of MIES scores similarly reported SGM-based shame and internalized stigma, associated emotions and cognitions appeared to have more pronounced consequences as compared to the low MIES group (Figure 4). Within this group specifically, shame-related coping mechanisms included substance use, overcompensation/perfectionism, and pervasive identity concealment. For example, participant 4 explained how the feelings of shame she felt related to her identity ran so deep that the only way she could be intimate with a partner was by numbing these emotions through alcohol use. Due to severe intimacy and emotional constriction tied to this shame, as well as learned threat hypervigilance, alcohol use served as a negative coping mechanism to temporarily rid herself of anguish and allow herself to be emotionally vulnerable.

> Well, the first time I would sleep with somebody, I'd have to be drunk. I was never sober. I just—it was the only way I could drop my guard. (Participant 4; Lesbian, Cis-woman, White-North American, AFAB; MIES score: 30)

Within the high MIES range, other participants also noted how feelings of shame related to their stigmatized identities created pressure for them to overcompensate for seemingly negative aspects of themselves.

For example, participant 10 noted how they hated themselves for being gay and consequently tried to prove to themselves they were valued by becoming an over-achiever and adopting perfectionist traits, thereby compensating for the aspects of their identi- ties deemed morally wrong by society.

> You know, I hated myself for it, basically, for being gay … I needed to prove to myself, that I was valued, because of that internalized hatred that I had … I was the stereotypical over-achiever … I was always trying harder. I don't know if that was more to prove to myself or to others, sort of, my value. I think that might have been more of a competition that I was putting on myself, for my own self-worth. (Participant 10; Gay, Two-spirit, Indigenous, Assigned male at birth (AMAB); MIES score: 32)

Individuals in this group were also inclined to change their appearance and behaviours as a result of deeply rooted feelings of shame, some completely suppressing parts of themselves in an attempt to act and present in ways that were more fitting with societal norms. In these instances, individuals frequently perceived themselves as the perpetrator of a moral transgression due to pervasive identity invalidation. For example, participant 33 described how they were taught that their queerness was a bad thing, which ulti- mately caused them to suppress/conceal that part of their identity to act and present in ways that were more fitting with society's expectations.

> I was trying to push my queerness down because I was taught it's bad for me, for everyone else, for my girlfriend, for everyone. I tried to push it down. We broke up and everything. I tried to be more feminine, very cis and all that. I grew my hair out. But it didn't work. (Participant 33; Queer, Trans-masculine, South Asian, AFAB; MIES score: 38)

Additionally, in comparison to the low MIES group, participants in the high MIES range described experiences of shame and identity concealment that persisted long into adulthood.

> I was closeted until mid-university. And really ashamed of gender and different things like that until even after university. With the shame and stigma … I didn't want people to know that I was queer or trans or mentally ill and all these things, so I just kept quiet. I didn't share these parts of me because I was afraid of how other people would react. (Participant 39; Queer, Non-binary, White- North American; MIES score: 20)

Overall, shame was identified as a core feature of moral injury in SGMs and was strongly linked to internalized SGM stigma. Depending on the severity of scores on the SGM-modified MIES, these outcomes manifested in varying levels of intensity, presenting alongside feelings of self-hatred and fear of rejection, with increased pressure to not only conceal but also attempt to alter sexual and gender identities. Increased shame and moral injury were also qualitatively associated with additional negative coping mechanisms (i.e. alcohol use). Here, we found converging evidence between participants' quantitative self-reports of exposure to and perceived intensity of SGM-based PMIEs and qualitative thematic data from the semi-structured interviews.

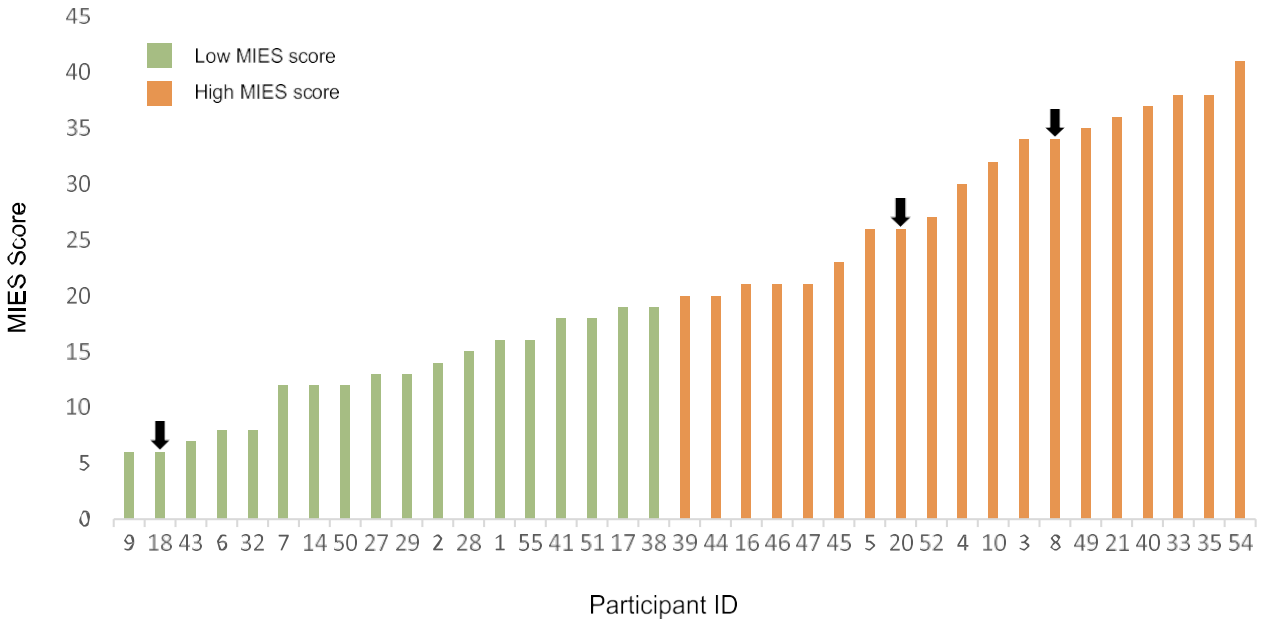

Figure 5. MIES severity & guilt.

Notes: This figure displays participants' scores on the SGM-modified MIES, organized from *low* to *high* scores (measuring exposure to and perceived inten- sity of SGM-based PMIEs). Individuals belonging to the *low* group are highlighted in green and those in the *high* group are denoted in orange. Participants whose quotes are highlighted in the results section below to illustrate themes of guilt are indicated with arrows in the graph above. Abbreviations: MIES = Moral Injury Event Scale, PMIEs = Potentially Morally Injurious Events.

4.3.2. Theme 2: guilt

Another core theme identified from the qualitative analysis was guilt related to one's stigmatized identity, which upon convergence with the quantitative data, presented in unique ways depending on exposure to SGM-based PMIEs and their perceived intensity, as measured on the modified MIES.

Low MIES scores

Participants within the low range of MIES scores described feelings of guilt in qualitatively different ways as compared to participants in the high range (Figure 5). In the low group, many individuals described complex feelings of guilt surrounding aspects of identity disclosure during youth/adolescence. For example, participant 18 noted feelings of guilt surrounding their coming out experience, detailing a sense of alienation due to their sexual identity and detrimental impacts on parental relationships. These complicated feelings never fully subsided, further highlighting the insidious effects of SGM-based PMIEs.

> I don't feel those things now (guilt). But I definitely felt them growing up. There's obviously still some reminiscence from that … there's some internalized homophobia that probably still exists from me … Definitely the guilt was stronger when I was younger about just not being able to be normal … It's more of a sadness now versus a guilt. (Participant 18; Gay, Cisman, White-North American, AMAB; MIES score: 6)

Several individuals further described how guilt and moral injury-related thoughts, emotions and behaviours stemmed from their religious upbringing, whereby socialization and involvement within religious communities led them to believe their SGM identity was innately wrong. Critically, however, the encoding of moral principles through religious doctrines throughout development was also apparent in the high MIES group. These experiences led to varying levels of guilt and shame in relation to one's SGM identity, whereby the emergence of associated moral affect often occurred long before disclosing their identity to others.

High MIES scores

Among participants within the high range of MIES scores (Figure 5), guilt was associated with manifestations of psychosomatic symptoms, fear, distress, and anticipatory rejection, which ultimately affected relationships in a more severe way and created barriers with respect to living authentically. For example, participant 20 described how they were raised to believe that being gay was morally wrong and emphasized the enduring effects this had on their psychological well-being. They described how being physically inti- mate with individuals of the same gender caused them intense physical distress and psychosomatic symptoms, as they felt as though they were violating moral standards.

> The first time I kissed a girl, I had a full-blown panic attack because I felt, like, I had been raised as a girl and I'd been raised that being gay is wrong and now I'm kissing a girl and I'm like, breaking all of these moral rules, you know? It took several dates and several different partners I guess to stop having that like literal physical, shaking reaction. (Participant 20; Queer, Non-binary, White-North American, AFAB; MIES score: 26)

This example showcases how moral injury-based emotions such as guilt and shame, can manifest as psychosomatic reactions within the body. Furthermore, several other participants discussed anticipations of rejection from their families and how this led to identity nondisclosure and suppression of authenticity in adulthood, which was associated with strong feelings of guilt, remorse, and worry about the consequences of their actions. Participants also noted that these feelings of guilt caused strain on their current relationships with family members and friends, and were intricately associated with pronounced fear, hypervigilance, and avoidance behaviours. These examples highlight the lasting effects of developmental minority stress exposure on mental health and well-being in adulthood among SGMs.

Furthermore, participants articulated a sense of guilt and remorse pertaining to the falsification of their identity, emphasizing conflicts with moral principles and values.

> I felt very guilty about lying (…) in order to survive, you've got to lie. And yeah, because you're taught not to lie, right? So it's one of your core values. And you had to break a core value. And I found that difficult to reconcile. And I also turned—a friend came to me in a time of need and out of self-preser- vation and fear, I wasn't available for that person. And I've always felt guilty about that. (Participant 8; Lesbian, Cis-woman, White-North American, AFAB; MIES score: 34)

Overall, participants with higher MIES scores seemed to experience guilt more profoundly, reporting psychosomatic manifestations, as well as high levels of fear, worry about consequences, and hypervigilance. Collectively, this further reinforced the internalization of negative attitudes as well as identity nondisclosure and associated avoidance behaviours out of fear of rejection. Again, the severity of participants' MIES scores converged with the qualitative data and the intensity by which themes emerged, indicating that higher levels of exposure to and perceived intensity of SGM-based PMIEs were associated with more pronounced presentations of guilt.

4.3.3. Theme 3: betrayal & loss of trust

Another core feature of moral injury that we found in the current study was betrayal and loss of trust in

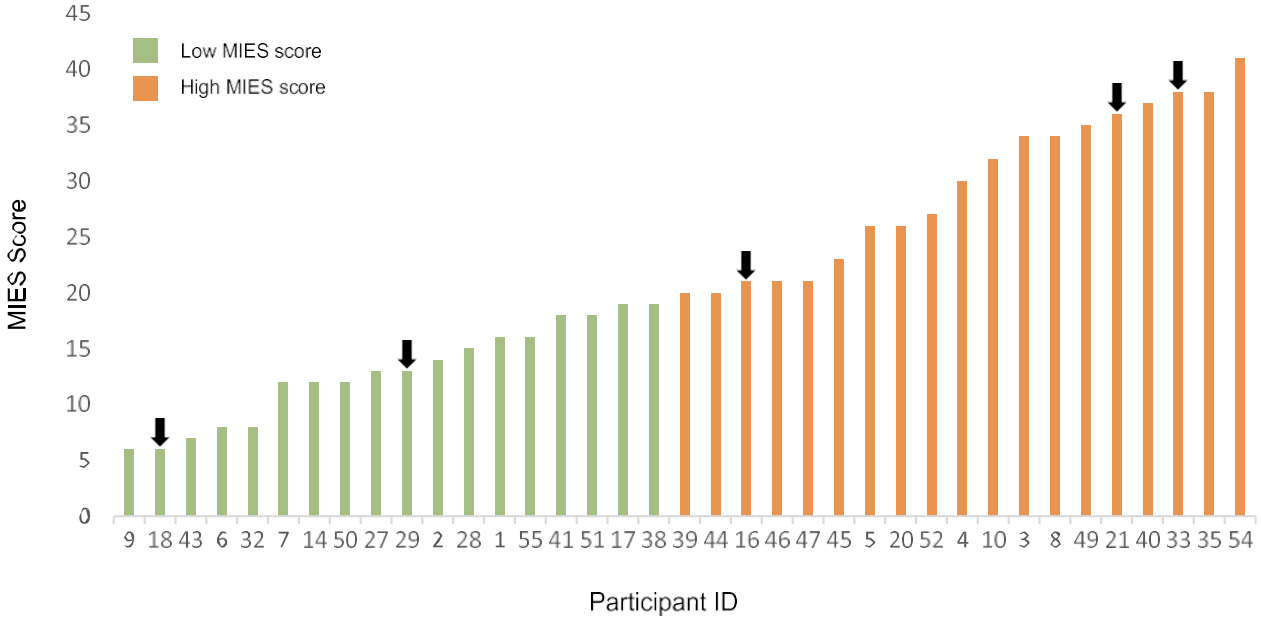

Figure 6. MIES severity & betrayal/loss of trust.

Notes: This figure displays participants' scores on the SGM-modified MIES, organized from *low* to *high* scores (measuring exposure to and perceived inten- sity of SGM-based PMIEs). Individuals belonging to the *low* group are highlighted in green and those in the *high* group are denoted in orange. Participants whose quotes are highlighted in the results section below to illustrate themes of betrayal/loss of trust are indicated with arrows in the graph above. Abbreviations: MIES = Moral Injury Event Scale, PMIEs = Potentially Morally Injurious Events.

others, which also appeared to present in unique ways depending on exposure to and perceived intensity of SGM-based PMIEs on the modified MIES.

Low MIES scores

Participants within the low range of MIES scores (Figure 6) described interpersonal experiences where they felt betrayed and lost trust in others. Illustratively, participant 18 noted how he experienced situations where he was actively discriminated against by peers and even authority figures (e.g. teachers). He articulated his desire for family and friends to courageously speak out and intervene more assertively when confronted with instances of hateful speech directed at him or others within the LGBTQ community. Partici- pants reported that not receiving this kind of support led them to experience feelings of betrayal and consequently lose trust in those closest to them.

> When people didn't come for my safety … or when that friend told those guys to leave me alone, I didn't feel like it was enough. I didn't feel much better from it. And I just wanted more help, or that teacher that didn't support me in that scenario. I wish other people, whether they were friends or family, would speak up more when they would hear gay slurs or something like that. (Participant 18; Gay, Cis-man, White-North American, AMAB; MIES score: 6)

Similarly, participant 29 recounted instances when family members consistently disregarded her correct pronouns, while also encouraging her to conceal her SGM identity at school due to apprehensions about potential adverse outcomes.

> They don't call me by my name, they don't use my pronouns. I'm still their brother. My older brother, at the time I came out in high school … told me to repress it, and to not let other people know because of what other people would think. (Participant 29; Pansexual, Trans-woman, Mixed-race, AMAB; MIES score: 13)

These experiences of rejection, prejudice, and micro-aggressions, from close family members and friends, were collectively perceived as acts of betrayal, leaving individuals feeling unsupported, unsafe, and invalidated. In turn, these instances of betrayal became intricately linked with the erosion of trust.

High MIES scores

Within the range of high MIES scores (Figure 6), participants additionally noted experiences of intra-community betrayal and loss of trust. Specifically, numerous participants articulated the challenges they faced in identifying as gender diverse or transgen- der, recounting instances of rejection within the LGBTQ2SAI + community, notably from cisgender gay men and lesbian women.

> I think there are a lot of people in the community … mostly some gay men, but also some lesbians as well, who are not accepting of trans people generally, who wouldn't be accepting of me as part of the LGBTQ community … I would say that's what makes it a slightly more difficult sort of belonging. (Participant 16; Pansexual, Trans-woman, White-European, AMAB; MIES score: 21)

Additionally, several TGD participants reported experiences of intra-community betrayal wherein

members of the LGBTQ2SAI + community invalidated their identities if they did not conform to binary conceptualizations of gender or if they were not undergoing medical transitions.

> I've also actually had micro-aggressions from people who, in the LGBT community, didn't think I was trans enough. I wasn't a valid transgender person because I wasn't transitioning to a male identity. So, you know, I thought "Wow, really? And this is some- one that should know better." (Participant 21; Non- binary, White-European, AFAB; MIES Score: 36)

In a similar vein, other participants highlighted challenges in obtaining appropriate healthcare, specifically narrating instances where their SGM identities were dismissed by healthcare providers resulting in feelings of institutional betrayal and invalidation. Relatedly, other participants faced considerable obstacles in accessing healthcare, as they refrained from disclosing their identities to healthcare providers due to feelings of guilt and shame. This was accompanied by participants perceiving themselves as the perpetrator of a moral transgression based on their SGM identity.

Among individuals falling within the high MIES score range, experiences of betrayal and loss of trust often resulted in heightened emotions of anger and hopelessness, rooted in the perceived inability to implement meaningful change. Here, anger was associated with pronounced presentations of negative cognitions about the world and self, wherein individuals reported that they felt powerless to change how they were treated, leading them to internalize these negative thoughts and emotions. Furthermore, individuals with elevated MIES scores detailed the necessity to distance themselves from those whom they perceived as having betrayed them, citing a lack of support for their identities and an erosion of trust as the primary catalysts for their decision to isolate. Illustratively, participant 33 conveyed the necessity of terminating relationships with friends who persistently invalidated their identity and failed to respect their pronouns.

> I had to cut off close friends, who were like, "No, this is just a phase, this is not something I can accept." And they continued to keep talking to me with my dead name or the wrong pronouns. It was very pain- ful. I didn't want to deal with that. I just stopped talk- ing to them. (Participant 33; Queer, Trans-masculine, South Asian, AFAB; MIES score: 38)

This participant additionally conveyed the profound disappointment and sense of betrayal they experienced when their intimate partner rationalized and attributed discriminatory encounters to the expression of their gender identity. This was further compounded by confusion and loss of trust, as their partner concurrently appeared supportive of their identity in other settings.

In summary, while individuals with low MIES scores seemed to report events of interpersonal betrayal/loss of trust with close family and friends, those with high scores additionally reported accounts of intra-community minority stress (i.e. from the LGBTQ2SAI + community), and institutional betrayal (i.e. from healthcare institutions), as well as isolation, emotional shutdown, and feelings of anger associated with these experiences. Furthermore, those with high MIES scores reported intense feelings of hopelessness as a result of betrayals, along with accompanying negative cognitions about the world and self. Additionally, those with high MIES scores also recounted instances of interpersonal betrayal within their romantic relationships. In these instances, it appeared that intimate partners had internalized negative attitudes and beliefs towards SGMs, and subsequently projected these perspectives onto participants (i.e. through microaggressions/discrimination, withdrawing support, and rejection) thereby contributing to additional stress.

4.3.4. Theme 4: attachment injuries

The final core feature of moral injury that individuals were describing in relation to experiences with minority stress were themes surrounding attachment injuries. Here, *minority stress-related attachment injuries* are operationally defined as minority stress experiences among SGMs during development or adulthood (including, but not limited to, interpersonal experiences of rejection, abandonment, invalidation or discrimination from parents/caregivers based on one's identity), which result in maladaptive attachment systems that markedly impact relationship dynamics (Cook & Calebs, 2016).

Low MIES scores

Individuals within the low range of MIES scores (Figure 7) delineated attachment injuries linked to experiences with SGM-based PMIEs, which created challenges in establishing and sustaining relationships with intimate partners. For example, partici- pant 29 articulated how they were somehow always attracted to partners that were 'damaged like them' (i.e. individuals who had endured minority stress- related trauma and mental health burdens). This was viewed by the participant as an obstacle, hinder- ing the potential longevity of any relationship they sought to form. They elaborated on this recurrent theme in their romantic relationships, noting a con- sistent pattern of attracting partners who shared similar burdens related to minority stress due to their stigmatized identities. This example under- scores the profound impact of minority stress experiences on attachment systems and patterns of seeking in relationships.

> I feel like I can be loved but just other circumstances and the people I attract have made it hard for things

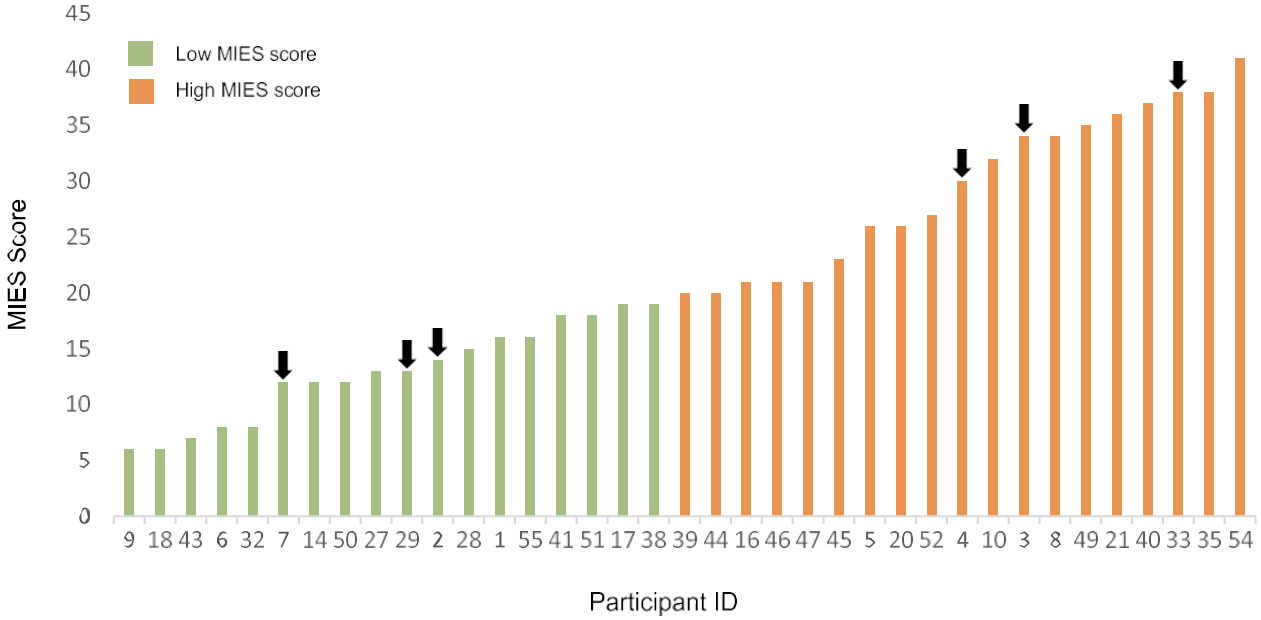

Figure 7. MIES severity & attachment injuries.

Note: This figure displays participants' scores on the SGM-modified MIES, organized from *low* to *high* scores (measuring exposure to and perceived inten- sity of SGM-based PMIEs). Individuals belonging to the *low* group are highlighted in green and those in the *high* group are denoted in orange. Participants whose quotes are highlighted in the results section below to illustrate themes of attachment injuries are indicated with arrows in the graph above. Abbreviations: MIES = Moral Injury Event Scale, PMIEs = Potentially Morally Injurious Events.

> to work … The people I attract are people like me who are queer people who also deal with lot of mental health and trauma and stuff like that, and when, like this baggage comes with them … That can make it really hard for relationships to happen and continue on long term. (Participant 29; Pansexual, Trans- woman, Mixed-race, AMAB; MIES score: 13)

Participants further described how they were hypervigilant towards anticipations of rejection from potential partners due to low self-worth, which resulted in both avoidant and highly anxious behaviours in terms of approaching and handling conflict within intimate relationships. Negative alterations to the sense-of-self coupled with prevailing anticipations of rejection (due to perceptions that one's SGM identity was morally wrong), ultimately resulted in challenges in forming secure relationships with intimate partners.

> Unfortunately, I think it cut me off from some people. All that stress of wondering what people are going to think. "Are they still going to love you?" … As a young girl, this is what you think, "And nobody is going to love me. There's something wrong with me." (Participant 7; Lesbian, White-North American, AFAB; MIES score: 12)

> You never get to be your real self. It goes right down to the very core of everything. We can't really share everything. Because you'll risk losing it … If you tell even the person you love the whole truth of the person you are, you lose them. (Participant 2; Trans- man, White-North American, AFAB; MIES score: 14)

High MIES scores

Participants who reported higher levels of exposure to and perceived intensity of SGM-based PMIEs (Figure 7), had more severe accounts of attachment injuries and negative alterations to their sense-of-self, leading them to feel undeserving of experiencing a secure and fulfilling relationship. When discussing intimate relationships, participants often expressed a sense of 'unworthiness of love' and an inability to feel loved, which was intrinsically tied to their SGM identity.

> I really started to question my deservingness of love. You know, because here was this person telling me that they loved me but not giving me what I needed, and I started questioning, like, am I asking for too much, am I just not capable of feeling loved? (Participant 3; Bisexual, Questioning, White-North American, AFAB; MIES score: 34)

These accounts delve into the intricate ways in which attachment injuries can manifest as negative shifts in one's sense-of-self and social cognitive processes, profoundly impacting emotional well-being and resulting in an overarching belief that one is unlovable.

> No matter how much love I can give, or how much I can care about somebody, because I'm trans or because of all the dark technicalities connected with me being trans … The love I can give or the care I can give is never enough. It won't be enough to keep them in a relationship with me. (Participant 33; Queer, Transmasculine, South Asian, AFAB; MIES score: 38)

Participants recounted their struggles with embracing emotional vulnerability in relationships, often leading them to prematurely terminate connections with potential partners and friends due to a persistent fear of rejection and a deficit in trust.

> I found it difficult to let anyone get close to me, whether as a friend or as a potential partner. You

> know, I might meet somebody, and I'd like them, and I always found a reason to end the relationship. I'd let them get close, we'd be intimate, but I couldn't be emotionally intimate with them, as much as I wanted to. I just, I couldn't open the door and let them in. It was very difficult for me. (Participant 4; Lesbian, Cis-woman, White-North American, AFAB; MIES score: 30)

Even within enduring relationships, individuals frequently described grappling with feelings associated with being unlovable. This led to heightened anxiety and a tendency to overcompensate within the relationship, often accompanied by persistent anticipation of the relationship ending. These intense feelings of rejection and sensitivity towards perceptions of abandonment showcase how minority stress-related PMIEs may be associated with attachment injuries and difficulties in maintaining future relationships.

Taken together, those with higher MIES scores seemed to have more severe barriers regarding forming attachments in adulthood, with more profound negative shifts to the sense-of-self and altered social cognition, which was associated with individuals feeling undeserving of both giving and receiving love. Overall, participants felt as though their SGM identity stood in the way of them experiencing healthy/secure connections, and often reported high levels of distress associated with being emotionally vulnerable.

4.3.5. Intersectional SGM experiences with race and ethnicity

Our qualitative analysis additionally identified important nuances regarding the presentation of moral injury themes among individuals with multidimen- sional minority identities. Here, we identified unique contextual factors – related to cultural, societal, and structural stigma, intergenerational shame, and acculturation – that were associated with the experiences of SGMs with intersecting racial and ethnic minority identities.

More specifically, participants from Indigenous communities, who have historically faced oppression and colonization, and continue to face systemic marginalization within Canada, shared unique experiences of shame. For example, one participant highlighted the profound intergenerational impact of shame, describing how it has been passed down through families as a result of colonial violence, cultural erasure, and ongoing stigmatization. This account of shame was not only tied to personal identity but was described as being deeply embedded in the collective trauma experienced by Indigenous communities in Canada, thereby reflecting the long-term effects of historical injustices.

> Growing up, I had kind of like that duality. My grandparents were very shameful of being Indigenous and didn't want to talk about it ever. So I think that initially, I already felt that kind of shame piece of my identity and wanting a better life. My whole family has wanted a better life for myself and my brother and have sacrificed a lot for that, because being Indigen- ous hasn't necessarily been a positive in our society because of the barriers. (Participant 43; Queer, Two-spirit, Indigenous, AFAB; MIES score: 7)

Additionally, one participant shared how their experience of identity-based shame and institutional betrayal was closely tied to the complexities of navigating membership within various LGBTQ2SAI+, racial/ethnic, and religious communities. They described experiencing unique forms of discrimination from each of the communities they belonged to, with each community rejecting different aspects of their identity. This multifaceted stigmatization heightened their sense of shame, as they continuously contended with conflicting expectations and discriminatory attitudes from various social and cultural groups.

> I've definitely felt ashamed of, for example, the way that the Muslim community treats the 2SLGBT community, or the way that South Asian communities treat women. (Participant 51; Queer, Cis-woman, South Asian, AFAB; MIES score: 18)

Similarly, several ethnic and racial SGM participants recalled experiences of guilt that were more relational in nature – focusing on others, such as families and collective communities, rather than on the self at the individual level. Specifically, one participant who immigrated to Canada described guilt in relation to prioritizing their own needs over their family, which arose from being torn between values instilled by two cultures. Here, the process of acculturation (i.e. the psychological and cultural adjustment due to interaction with multiple cultures) (Berry, 1997; Berry, 2005; Morela et al., 2016) led to the emergence of conflicting values between the participant and their family.

> Because when you're in Sri Lanka, you are part of your, like, you belong to your family. You are an extension of your family. So, you basically dedicate your whole life to the well-being of the family and everything, which is great but being me is the most important thing and I come first, which is sort of a selfish statement that I had so much guilt over. (Participant 27; Lesbian, Cis-woman, South Asian, AFAB; MIES score: 13)

The experience of guilt among second-generation immigrant ethnic and racial SGM participants was also linked to the process of acculturation and the ten- sion between conflicting cultural values. For example, one participant described feeling guilt over not fulfill- ing the cultural expectations associated with being a traditional eldest daughter.

> Sometimes, I think when I was first grappling with me being the outspoken queer woman, I think I felt guilty that my parents were burdened with an eldest

> daughter who was not going to conform to their expectations. But I mean, even now, in boundary setting with them and being like, I actually need space, I need some time off, or I'm doing something on my own, there is a bit of guilt, but that's more the guilt of me pushing back on their cultural expectations. (Participant 51; Queer, Cis-woman, South Asian, AFAB; MIES score: 18)

Finally, some racial/ethnic SGM participants reported unique experiences of attachment injuries, which were linked to growing up in structurally stigmatizing societies with culturally oppressive norms regarding SGM identities. These participants described their attachment injuries as complex and multifaceted, with the societal context adding an additional layer of difficulty. For instance, after coming out and leaving their home country, where laws and policies criminalize same-sex relationships, one participant described challenges in maintaining a secure relationship with their father. The participant also mentions hopes of bringing their partner to their country of origin and being acknowledged, welcomed, and accepted by their family.

> Tough. Especially with my father, it's really tough because we are very close. He always treated me as a son that he never had. So, we are very, like buddies, we do a lot of things together, used to at least, and it's so difficult. He had his 67th birthday or something, in February and I sent him a card saying that we have to talk about the elephant in the room. He has read the card, but he never spoke about it with me. So, I'm like, whatever. I mean, I need to talk to him face to face. Because me and my partner need to go to Sri Lanka together. And you know I want to show her my home country and he needs to acknowledge her. (Participant 27; Lesbian, Cis-woman, South Asian, AFAB; MIES score: 13)

Overall, we identified unique contextual specifiers related to qualitative themes of shame, guilt, betrayal, and attachment injuries among SGM participants with intersecting racial and ethnic minority identities. Although unique contextual factors and nuances were identified in the current study in association with intersecting racial and ethnic minority identities, differential thematic presentations in relation to quantitative measures of exposure and perceived intensity of SGM-based PMIEs (i.e. unique intersectional thematic presentations among participants in the low vs. high MIES groups) did not emerge in the mixed-methods analysis.

4.3.6. Correlation analysis with the SGM-modified MIES

Spearman's rank analyses revealed a significant positive correlation between the SGM-modified MIES and the AUDIT [$r_s(34) = .45$, $p = .006$] and the PCL- 5 [$r_s(34) = .41$, $p = .014$] when correcting for multiple comparisons using the multistage Bonferroni procedure. Follow-up tests on individual PCL-5 subscales evidenced positive correlations between the MIES and trauma-related symptoms of avoidance [PCL-C, $r_s(34) = .35$, $p = .034$], negative alterations in cognition and mood [PCL-D, $r_s(34) = .46$, $p = .005$] and hyperarousal [PCL-E, $r_s(34) = .45$, $p = .006$]. We did not detect significant correlations between MIES scores and the BDI [$r_s(33) = .30$, $p = .078$], nor the CTQ [$r_s(31) = .05$, $p = .799$] at both corrected and uncorrected thresholds. In summary, increased reports of exposure to and perceived intensity of SGM-based PMIEs, were associated with increased alcohol use and trauma-related symptoms.

4.4. Discussion

SGMs are at an increased risk for developing mental health burdens as a result of their socially stigmatized identities (Dürrbaum & Sattler, 2020; Hatzenbuehler & Pachankis, 2016; Mereish & Poteat, 2015; Tan et al., 2020). Indeed, research has consistently shown that exposure to minority stress directly influences the mental health outcomes of both SGM adolescents and adults (Mereish et al., 2021; Pachankis & Jackson, 2023). This mixed-methods study is among the first to integrate qualitative and quantitative data to examine minority stressors as PMIEs that may contribute to the development of moral injury symptoms among SGMs. In the current study, we uncovered novel insights into the unique presentation of minority stress-related moral injury among SGMs (see Figure 8 for summary illustration). Our analyses revealed the presence of three core features previously associated with moral injury in other populations (Jinkerson, 2016), namely, shame, guilt, and betrayal/loss of trust, which were linked with a variety of minority stressors. Moreover, the theme of attachment injuries surfaced as a novel core feature of moral injury in the current study. Here, the identification of attachment injuries offers a unique lens through which to understand the development of minority stress-related moral injury among SGMs. Strong converging evidence between qualitative and quantitative data was found, whereby the qualitative presentation of moral injury themes differed depending on quantitative scores on the SGM-modified MIES (corresponding to exposure and perceived intensity of SGM-based PMIEs). Taken together, we propose that a minority stress- informed moral injury framework may offer a deeper understanding of the mental health disparities—particularly trauma-related symptoms—that disproportionately affect SGMs, and inform more effective treatment approaches (Nicholson et al., 2022).

4.4.1. Shame

The theme of shame in the current study was qualitatively associated with internalized stigma, in addition

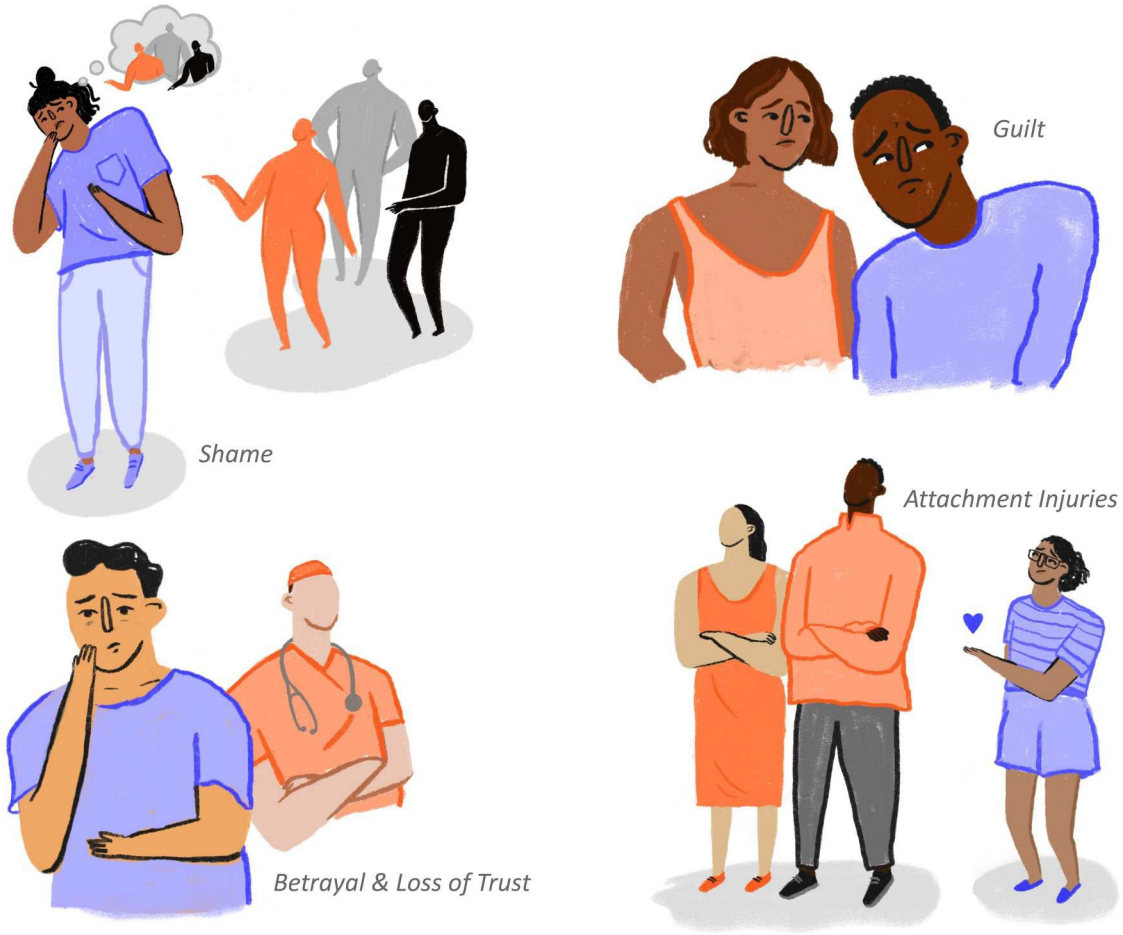

Figure 8. Morally injurious dimensions of minority stress.

Note: Summary illustration of the four core components of moral injury that were identified in the current study as being related to minority stress among SGMs. Illustration designed by *Hey Chels Studio Inc*.

to feelings of self-hatred, fear of rejection, identity concealment/nondisclosure, and negative coping mechanisms (i.e. alcohol use). Consistent with the current findings, past research has shown that shame among sexual minorities is not only related to internalized stigma, but also other negative mental health outcomes, such as substance use (Hequembourg & Dearing, 2013). Blais and colleagues (2014) also found that the relationship between minority stress exposure (i.e. victimization/bullying) and self-esteem was partially mediated by internalized homophobia (Blais et al., 2014). Additionally, it has been shown that internalized SGM stigma positively predicts trauma-related symptoms, which has been found to be indirectly mediated by shame (Straub et al., 2018); these findings offer further insight into how minority stress-related moral affect (i.e. shame) may be associated with the presentation of trauma-related symptomatology. Indeed, we postulate that drawing upon moral injury frameworks may help to improve the characterization and contextualization of minority stress-related trauma symptoms among SGMs without the prerequisite of grounding these symptoms in a specific Criterion A trauma (Nicholson et al., 2022).

Relatedly, shame has been shown to be a mediator between both distal and proximal minority stressors and a myriad of negative mental and physical health outcomes among sexual minorities (Mereish, 2019; Mereish et al., 2021; Mereish & Poteat, 2015). Indeed, several research studies have found higher levels of shame among SGMs, which together, help to explain the disparities observed among these populations in relation to psychological distress, depression, social anxiety, and suicidality (Mereish, 2019; Mereish & Poteat, 2015; Pachankis et al., 2024). Research among SGM adolescents and young adults has also found that the resolution of shame is a central goal of healthy identity development and of SGM-affirma- tive psychotherapy (Burger & Pachankis, 2024; Greene & Britton, 2012; McDermott et al., 2008). Further- more, demoralization has been shown to be negatively associated with psychological well-being and TGD-community connectedness (Woodrum et al., 2024). As such, it is becoming evident that addressing min- ority stress-related moral affect (i.e. shame) represents an essential target for the treatment of transdiagnostic symptoms that disproportionately affect SGM communities. Notably, in relation to moral injury studies

among non-SGM populations, both shame and guilt have repeatedly been shown to be two of the most central components of moral injury (Jinkerson, 2016).

4.4.2. Guilt

In the current study, more severe qualitative presentations of guilt were associated with psychosomatic symptoms in response to perceived violations of moral norms, as well as fear, distress, internalized stigma, and anticipations of rejection that resulted in identity nondisclosure and/or suppression of authen- ticity. In line with these findings, a recent study revealed a positive correlation between perceived levels of minority stress and somatic symptoms among SGMs (Gubán et al., 2025). Furthermore, research has shown that guilt and shame are associated with both family rejection and depressive symptoms among sexual min- ority adolescents (Mereish et al., 2021). Here, parental affirmation was found to be a protective factor and associated with lower feelings of guilt, shame, and depression, whereby negative indirect effects of parental affirmation on depressive symptoms were found to be significant through guilt and shame pathways (Mereish et al., 2021). In other words, parental affirmation may lessen depressive symptoms by ameliorating feelings of guilt and shame among sexual minority adolescents. Research has also demonstrated that guilt plays an important role among SGMs who largely conceal their identities from others, acting as a mediator between stigma and self-esteem; interestingly, this is not the case for those who largely disclose their SGM identity to others (Srivastava & Singh, 2023). Furthermore, within the theme of guilt in the current study, the influence of a religious upbringing was under- scored, shedding light on how SGM stigmatization rooted within religious institutions can profoundly impact identity-based moral injury. Consistent with prior qualitative investigations into moral injury among SGMs (Jones et al., 2022), these experiences may lead to internalized negative attitudes and insti- tutional betrayal. In the current study, experiences with religion were discussed predominately in relation to themes surrounding guilt and betrayal/loss of trust, and not in the context of existential/spiritual conflict. Interestingly, existential/spiritual conflict was the only core symptomatic feature outlined by Jinkerson (2016) that was not identified as a prominent theme in our data; given the preliminary nature of our study, further research is needed to confirm whether existential/spiritual conflict represents a core feature of moral injury development among SGMs.

4.4.3. Betrayal and loss of trust

Another core feature of minority stress-related moral injury that was highlighted in the current study was the theme surrounding betrayal and loss of trust in others. Here, participants emphasized the detrimental impacts of interpersonal betrayal from friends and family in relation to their SGM identity, linking these experiences with emotions of anger and hopelessness, alongside significant negative repercussions on their mental health. More severe qualitative presentations were associated with institutional betrayal stemming from negative experiences with healthcare providers/systems of care, whereby individuals collectively expressed feelings of shame and invalidation in a setting where they anticipated safety and support. Previously, it has been shown that various experiences of betrayal – such as institutional betrayal – have been linked to greater negative psychological and physical health outcomes among sexual minorities (Smith et al., 2016). Institutional betrayal from healthcare systems has also been shown to be particularly harmful and prevalent among TGD individuals (Bindman et al., 2022; Lightfoot et al., 2021; Morris et al., 2020; Pulice-Farrow et al., 2022). In the current study, more severe accounts of betrayal were also reported in the context of perceived LGBTQ2SAI + safe spaces. These experiences were largely understood by SGMs in our study as representing a form of 'sanctuary trauma', which refers to circumstances wherein an individual who has suffered severe stressors encoun- ters additional stress instead of the supportive and protective environment that was expected (Esaki et al., 2013; Nicholson 2022; Robins et al., 2005; Silver, 1985; Silver, 1986). Regarding these experiences with betrayal, participants felt unsafe, rejected, or harmed from within LGBTQ2SAI + communities. Sanctuary trauma is particularly harmful because it is inflicted by institutions, communities, or individuals who are expected to offer support and care. As such, these experiences can amplify existing stressors or traumas, thereby intensifying feelings of betrayal, isolation, powerlessness, and hopelessness (Esaki et al., 2013; Robins et al., 2005, Silver, 1985; Silver, 1986). Our results suggest that further exploration of sanctuary trauma/harm is warranted within minority stress frameworks. Indeed, it has been shown recently that intra-minority stress from the gay community predicts mental health over and above a comprehensive battery of traditional minority stressors (Pachankis et al., 2020). From an intersectionality perspective, individuals identifying as TGD in the current study described more severe forms of sanctuary harm related to intra-community minority stress, in addition to betrayal/ loss of trust from within healthcare systems. Contin- ued research is needed to elucidate further differential presentations of moral injury among SGMs with diverse intersecting identities in larger/representative samples. Further investigations into sanctuary trauma, intra-minority stress and betrayal may shed light on how stressors experienced by SGMs within their

own communities or within systems of care may heighten the risk for adverse mental health outcomes, particularly in relation to moral injury (Nicholson et al., 2022).

4.4.4. Attachment injuries

Lastly, attachment injuries were identified in the current study as a novel and central moral injury theme among SGMs. Previously, secondary symptomatic features pertaining to interpersonal difficulties and social problems have been proposed to be related to moral injury in other populations (e.g. among military personnel and healthcare workers; Griffin et al., 2019; Jinkerson, 2016; Richardson et al., 2020). In our research, participants described experiencing challenges in both forming and maintaining relationships in adulthood, stemming from notable disruptions to attachment systems as a result of exposure to minority stressors. Additionally, participants noted profound negative alterations to their sense-of-self, ultimately resulting in them feeling incapable or undeserving of both giv- ing and receiving love. Overall, participants with higher MIES scores felt as though their identity stood in the way of experiencing healthy relationships and often reported high levels of distress associated with being emotionally vulnerable. The finding of attachment injuries as a unique theme related to moral injury among SGMs may be related to the potential occurrence of rejection and abandonment (i.e. SGM-based PMIEs) from close relational figures during developmentally sensitive periods that coincide with the calibration of attachment systems (Popa- Velea et al., 2019; Shenkman et al., 2021). Indeed, it has been suggested that the hardships experienced by many SGMs, such as parental/peer rejection and negative coming out experiences, may alter working models of attachment, thus affecting relationships through greater avoidance of intimacy and interde- pendence (Landolt et al., 2004; Mohr & Fassinger, 2003; Shenkman et al., 2021). Critically, attachment patterns have been shown to be related to mental health outcomes among SGMs (Popa-Velea et al., 2019; Shenkman et al., 2021; Skidmore et al., 2023). Specifically, insecure attachment style has been shown to be a predictor of depression among LGB young adults and attachment avoidance has been shown to have a mediating effect on the association between being a sexual minority and depressive symp- toms, anxiety symptoms, and life satisfaction (Popa- Velea et al., 2019; Shenkman et al., 2021). Moreover, among sexual minority youth, attachment style has also been shown to mediate the relationship between sexual orientation and substance use (Rosario et al., 2014).

In line with the current results, the Integrated Attachment and Sexual Minority Stress (IASMS) Model outlines the bidirectional association between minority stress and adult attachment among sexual minorities, describing how attachment systems can be both shaped by minority stressors while simultaneously influencing the perception of minority stress experiences (Cook & Calebs, 2016). More specifically, this model suggests that proximal and distal minority stressors can overburden the attachment system, whereby an individual with a secure attachment style, for instance, may transition to a more insecure or *disorganized* attachment style. Typically associated with experiences of trauma, disorganized attachment styles develop in response to deeply contradictory internal working models surrounding attachment figures and their behaviours (e.g. my father loves and protects me but is simultaneously ashamed by me and causes me extreme pain) (Brand, 2024; Hesse & Main, 2000). The IASMS model also postu- lates that an individual with attachment injuries may experience minority stressors as more severe and be more likely to adopt maladaptive emotion regulation strategies (Cook & Calebs, 2016). Additionally, the model emphasizes that in the sexual identity development process, experiences of rejection are critical for understanding transitions from a secure to insecure attachment style between childhood and adulthood (Cook & Calebs, 2016).

Importantly, in the current study, participants' accounts indicate how rejection-related cognitions, emotions, and behaviours were intricately linked with SGM-based morally injurious events. Individuals described how they were hypervigilant towards anticipations of rejection due to low self-worth, which resulted in both avoidant and highly anxious behaviours in terms of approaching and handling conflict within intimate relationships (i.e. altered social cognition). The Rejection Sensitivity Model put forward by Feinstein (2020) emphasizes the role of past minority stress experiences, cognitive biases, and emotion regulation strategies in shaping responses to perceived rejection. This model postulates that those who develop high rejection sensitivity tend to anticipate rejection in various social situations, leading to maladaptive behaviours such as anxious or avoidant responses. Landolt et al. (2004) found that gender nonconformity in childhood was associated with greater parental and peer rejection, and that this rejection was associated with increased attachment insecurity. Past research also suggests that sexual minorities with attachment anxiety may be more vulnerable to depression due to an increased desire for validation from others and difficulties with self-validation, making them particularly sensitive to discrimination and rejection (Wei, et al., 2005; Zakalik & Wei, 2006). Importantly, rejection sensitivity among SGMs has been linked to negative mental health outcomes, including substance use, PTSD, depression,

social anxiety, and generalized anxiety, and has also been shown to mediate associations between discrimination and mental health burdens (Cohen et al., 2016; Dyar et al., 2018; Feinstein, 2020; Feinstein et al., 2012; Sattler et al., 2017).

4.4.5. Associations between moral injury, substance use and trauma-related symptoms

Through quantitative analyses in the current study, we found that scores on the SGM-modified MIES (denoting exposure to and perceived intensity of SGM-based PMIEs) were positively correlated with alcohol use and trauma-related symptoms. Indeed, past research has shown that SGMs are at an increased risk for developing substance use and trauma-related disorders (Fish & Pasley, 2015; Goldberg et al., 2013; Tan et al., 2020). To our knowledge, this is the first study to report an association between minority stress-related moral injury and both hazardous alcohol use and trauma-related symptoms among SGMs. Interestingly, these quantitative findings parallel qualitative themes that emerged in the current study surrounding alcohol use as a means by which to cope with minority stress-related shame, which was found to be closely associated with emotional constriction as well as hypervigilance. These results are also in line with syndromal definitions of moral injury (Jin- kerson, 2016), which postulate that the core symptoms of moral injury are associated with secondary sympto- matic features including substance use, re-experien- cing, and interpersonal difficulties. Interestingly, in the current study, we also found that scores on the SGM-modified MIES correlated with PCL-5 subscales pertaining to trauma symptoms of avoidance, negative alterations in cognition and mood, and hyperarousal, but not re-experiencing. Critically, moral injury is considered a separate syndrome from PTSD with distinct etiology, albeit with some definitional overlap (Barnes et al., 2019; Koenig & Al Zaben, 2021); in support of our correlation analysis, this overlap has largely been found to be within the affective domain of negative alterations in cognition and mood (Cluster D; APA, 2022). Additionally, previous research has revealed avoidance as a coping strategy in response to minority stress experiences among sexual minority adolescents (Goldbach & Gibbs, 2015). Hyperarousal, hypervigilance, and avoidance symptoms are also hypothesized to transdiagnostically mediate associations between experiences of minority stress and negative mental health outcomes (Pachankis, 2015). Taken together, these results support our hypothesis that utilizing a moral injury framework within the scope of minority stress may help to improve the characterization, contextualization, and treatment of trauma-related symptoms and substance use disorders among SGMs (Nicholson et al., 2022).

4.4.6. Future directions and limitations

These emerging findings highlight the need for additional research to further elucidate the core features and secondary symptomatic profiles associated with minority stress-related moral injury among SGMs. Our results suggest that the SGM-modified MIES may be a useful tool by which to measure exposure to minority stress-related PMIEs and the perceived intensity of these events. Notably, in the absence of any currently available scale that has been validated to capture minority stress-related moral injury among SGMs, we modified the MIES. The original MIES has three questions that capture betrayal, two of which are specific to military experiences and were ultimately removed from our study as they would not be relevant to civilian populations. Conse- quently, our modified MIES consisted of seven moral injury items including questions pertaining to transgressions by the self (four questions), transgres- sions by others (two questions), and betrayal (one question). Given that there were more questions on transgressions by the self than there were transgres- sions by others/betrayal, the cumulative MIES scores utilized in our mixed-methods analysis primarily reflect moral injury related to transgressions by the self. Indeed, this is an inherent limitation of the MIES version that was available during data collection, whereby additional studies are needed to further develop moral injury scales in the context of minority stress. This has motivated our research group to develop a moral injury scale specifically tailored for SGM individuals, enabling a more accurate assessment of exposure to minority stress-related PMIEs.

With respect to our mixed-methods analysis that utilized a median split, we employed a data-driven approach in our study that balances scientific rigour with the practical limitations of our sample size and of the quantitative scales available to measure min- ority stress-based moral injury. Notably, the goal of our mixed-methods analysis was to compare the presentation of group-level qualitative themes among individuals with low vs. high exposure to SGM-based PMIEs. While we did not use this categorization for an explicit quantitative analysis, our use of the median split (in the absence of established cut-off scores on the MIES) is worth noting as a limitation due to its arbitrary threshold. Indeed, this points towards the need for further research to develop and validate improved scales to measure minority stress-related moral injury, and to establish cut-off scores for moral injury.

Furthermore, we detected elevated trauma-related symptoms among SGMs on the PCL-5 corresponding to 21 participants scoring above the threshold for probable PTSD; this is in comparison to 6 participants meeting criteria for PTSD on the clinician-administered DART. Discrepancies between PTSD diagnoses

established via clinician-administered assessments vs. self-report questionnaires, such as the PCL-5, have been reported elsewhere (Bovin et al., 2016; Krüger-Gottschalk et al., 2022; Resick et al., 2023). Previous research has shown that participants typically score higher on self-report measures in comparison to clinician-administered semi-structured assessments (Bovin et al., 2016; Krüger-Gottschalk et al., 2022; Resick et al., 2023). Critically, however, in relation to the SGM sample in the current study, this also highlights an important limitation of how we currently conceptualize and measure trauma-related symptoms in the context of minority stress. Indeed, the DSM-5 has faced criticism for failing to adequately account for the persistent and chronic effects of minority stress exposure (Holmes et al., 2016; Kira et al., 2021; Williams et al., 2023). On balance, previous research has demonstrated the importance of considering the impact of minority stress experiences in order to accu- rately measure trauma-related symptoms (Holmes et al., 2016; Kira et al., 2021; Williams et al., 2023), whereby trauma symptoms have also been shown to be associated with minority stress events that do not meet Criterion A definitions among SGMs (Arnett III et al., 2019; Berlin et al., 2023; Holmes et al., 2016; Minshew, 2022; Robinson & Rubin, 2016; Szymanski & Balsam, 2011). During the DART clinical assessment, participants were asked if they had ever experienced a traumatic event and were provided with DSM-5 definitions of trauma. After giving a brief summary of their trauma exposure, participants were asked to answer symptom questions in reference to their most distressing index trauma. Given the known co-occurrence of Criterion A traumas, insi- dious identity-based trauma, and chronic minority stress exposure among SGMs (Arnett III et al., 2019; Berlin et al., 2023; Cook & Calebs, 2016; Minshew, 2022; Szymanski & Balsam, 2011), in order to extract an ecologically valid measure of trauma symptom severity, we did not restrict participants when completing the PCL-5 to anchor all of their responses to a single most distressing traumatic event. Critically, however, we captured detailed information about Criterion A trauma exposure during the DART assessment and using the LEC-5, allowing us to comprehensively contextualize trauma symptoms in this SGM population. Notably, all participants in the sample had experienced at least one Criterion A trauma. As a future research direction, we are currently conducting a dedicated analysis to examine this complex interplay in more detail.

Although the presentation of themes surrounding betrayal and loss of trust appeared to be more severe for participants identifying as TGD, continued research is needed to explore further the intersection- ality of these experiences. Indeed, it is critical to understand how moral injury features may be differentially expressed among diverse minority identities, particularly among SGM individuals with intersecting racial and ethnic minority identities. Additionally, although saturation was reached for the qualitative analysis, our quantitative analyses were restricted given our preliminary sample size. Finally, future research is needed to explore minority stress-related moral injury longitudinally in order to better understand its developmental impact.

4.5. Conclusion

This pioneering mixed-methods study provides novel insights into the intersection of minority stress and moral injury among SGMs. Our study revealed four qualitative themes related to moral injury presentation among SGMs: shame (internalizing stigma), guilt, betrayal/loss of trust, and attachment injuries (rejection, altered sense-of-self, and social cognition). Here, attachment injuries emerged as a unique feature, underscoring the complexity of SGM experiences in relation to the presentation of moral injury. Interestingly, the qualitative presentation of these themes was found to differ depending on quantitative measures of exposure to and perceived intensity of SGM-related PMIEs. Furthermore, our findings revealed that exposure to and intensity of SGM-related PMIEs was positively associated with hazardous alcohol use and trauma-related symptoms. Taken together, we propose that a minority stress-informed moral injury framework may facilitate a deeper understanding of the mental health disparities (particularly trauma- related symptoms) that disproportionately affect SGMs. Moving forward, the conceptual framework of moral injury offers promising avenues for further research and the development of targeted interventions aimed at mitigating mental health burdens among SGMs. Ultimately, by recognizing and addressing the unique challenges faced by SGM individuals, we can work towards creating more inclusive models of care and treatment for all members of society.

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Data availability statement

The data that support the findings of this study are available from the corresponding author, Andrew A. Nicholson, upon reasonable request.

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Chapter 5 | Global Discussion

5.1 Summary of dissertation research

Experiences of trauma and minority stress can shape the development and expression of trauma-related symptoms, affecting various aspects of functioning among those impacted (Frewen et al., 2011; Frewen & Lanius, 2014, 2015; Harricharan et al., 2017, 2021; Hatzenbuehler, 2009; Kearney & Lanius, 2022; Lanius, 2015; Lanius et al., 2012, 2020; Livingston et al., 2019, 2020; Marchi et al., 2023; Meyer, 2003; Pachankis, 2015; Rabellino et al., 2018, 2020; Salomaa et al., 2023; Terpou et al., 2020; Van Der Kolk, 2014; Yehuda et al., 2015). Due to the wide range of symptoms, the challenges associated with trauma-related disorders can be complex, affecting the individual at multiple levels (e.g., physical, behavioural, emotional, and social). As described throughout this dissertation, trauma can profoundly impact one's sense of self, including bodily self-consciousness. However, there remains a gap in understanding how symptoms of altered bodily self-consciousness in PTSD and its dissociative subtype uniquely manifest on the neurobiological level. Further adding to the complexity of understanding trauma-related symptoms are identity-based non-Criterion A traumatic events (e.g., minority stress-related discrimination, harassment, rejection), which can lead to trauma-related symptoms (Dworkin et al., 2018; Keating & Muller, 2020; Straub et al., 2018; Szymanski & Balsam, 2011), and in some cases, are perceived as more harmful and severe than Criterion A events (e.g., violence) (Salomaa et al., 2023). This remains a critical gap in comprehensively understanding trauma-related symptoms among equity-deserving groups, including sexual and gender minorities (SGMs), who are disproportionately exposed to harm due to their heavily stigmatized social identities (Flores et al., 2020; Hatzenbuehler & Pachankis, 2016; Keating & Muller, 2020; Livingston et al., 2019, 2020; Marchi et al., 2023; Meyer, 2003; Minshew, 2022; Nicholson et al., 2022; Pachankis, 2015; Roberts et al., 2012; Salomaa et al., 2023; Straub et al., 2018; Szymanski & Balsam, 2011; Valentine et al., 2022).

Consequently, the following dissertation underscores the importance of comprehensively understanding how trauma and marginalization influence the development and expression of trauma-

related symptoms. Critically, study one demonstrates how the temporoparietal junction (TPJ), a central region involved in bodily self-consciousness, is affected by trauma, revealing unique disruptions in TPJ neural circuitry in PTSD and its dissociative subtype at rest. Study two expands further on our understanding of trauma and PTSD by illustrating potential risk and protective factors among trauma-exposed SGM individuals. Lastly, in study three, we identified qualitative features of moral injury in the context of minority stress among SGMs, providing support for novel frameworks that may aid in the contextualization and treatment of trauma-related symptoms among this population. Further details, limitations, and clinical implications are described below.

Study One

The first study aimed to uncover potential alterations in the functional connectivity of the TPJ among individuals with PTSD and its dissociative subtype. Specifically, we investigated fMRI functional connectivity of the bilateral anterior and posterior TPJ at rest among individuals with PTSD and its dissociative subtype, as compared to healthy controls. Among those with the dissociative subtype, reduced right anterior TPJ functional connectivity was found with important anterior frontal lobe nodes (i.e., left ventrolateral and dorsomedial prefrontal cortices). Considering the involvement of these frontal regions in ventral attention and social cognition networks, which are known to function in tandem with the TPJ (Alves et al., 2022; Bukowski & Lamm, 2017; Cabeza et al., 2012; Corbetta et al., 2008; Decety & Lamm, 2007; Dunbar, 2012; Ghosh et al., 2021; Harricharan et al., 2017; Kang et al., 2013; Langner & Eickhoff, 2013; Le Petit et al., 2022; Northoff & Bermpohl, 2004; Quesque & Brass, 2019; Samson et al., 2004; Van Overwalle, 2009), these findings may suggest limited embodied awareness of oneself and a weakened capacity to contextualize social interactions and incoming sensory information among those with the dissociative subtype (Briere, 2006; Ellickson-Larew et al., 2020; Kearney & Lanius, 2022; Lanius, 2015; Nazarov et al., 2014; von Schröder et al., 2025). Additionally, post-hoc graph theoretical analysis revealed that individuals with the dissociative subtype, as compared to healthy controls, showed more efficient neural

communication between occipital and frontal lobe structures, and limited right anterior TPJ involvement. This may be indicative of a compensatory network when the TPJ is sub-optimally engaged, as individuals with the dissociative subtype may have to rely on visual processing of information from the occipital lobe, and may have limited access to social contextual information (from the TPJ) necessary for embodied awareness of their surroundings. Further corroborating the necessity of investigating the TPJ in the context of trauma, functional connectivity of the left anterior TPJ with the left superior parietal lobe (a region heavily involved in mediating top-down attention and emotion regulation) correlated negatively with childhood traumatization among all participants. These findings suggest that severe childhood trauma may intensify disruptions in embodied attention, which could be related to impaired emotion regulation.

A growing body of evidence suggests the TPJ plays a critical role in allocating attentional information necessary for the conscious experience of one's own body and understanding contextual information in social situations (Geng & Vossel, 2013; Krall et al., 2015; Wilterson et al., 2021). As these processes are significantly influenced by symptoms observed in PTSD (i.e., hyperarousal, hypervigilance, avoidance) and its dissociative subtype (i.e., depersonalization, derealization), these findings highlight the need to broaden our understanding of the TPJ in the context of trauma, especially concerning attentional functions, bodily self-consciousness, emotion regulation, and social processes. This is particularly important given that the TPJ remains underexplored in the existing literature on PTSD and its dissociative subtype. Taken together, findings from this study point toward the TPJ's role in the relationship between bodily self-consciousness and attention, as well as its cascading effects on emotion regulation and social cognition among individuals impacted by trauma.

Study Two

The second study aimed to extend the literature on the intersection of trauma and minority stress among SGMs. This was achieved by investigating potential risk and protective factors in the context of co-occurring trauma and minority stress among SGM individuals using a mixed-methods

approach, which, to our knowledge, has never before been conducted. Importantly, among participants endorsing low PTSD symptoms (i.e., "low PCL-5 group"), four themes were identified, which may be indicative of potential protective factors in the context of minority stress and trauma. This included positive coming out experiences and post-disclosure environments, positive SGM identity factors, social safety, and positive representation and empowerment. In contrast, participants endorsing high PTSD symptoms (i.e., "high PCL-5 group") commonly described two themes: negative alterations to the sense of self and distress associated with social threat and insufficient social safety, which may point towards potential risk factors for trauma-related symptoms among SGMs. Additionally, we identified significant positive correlations between trauma symptoms and minority stress occurrence and distress, as well as significant negative correlations between internalized stigma and self-acceptance.

Importantly, all participants, regardless of trauma-related symptom severity, reported exposure to at least one Criterion A traumatic event, and exposure to these events did not differ significantly between groups. However, the impact of minority stress appeared to be profound, where psychological distress (i.e., increased trauma-related symptoms) was significantly associated with greater minority stress exposure and distress. That is, all participants reported exposure to a Criterion A event; however, participants reporting more severe trauma symptoms reported higher levels of minority stress exposure and distress. This is consistent with prior findings, demonstrating that disproportionately high rates of mental health burdens and trauma-related symptoms are associated with minority stress exposure among SGM populations (Hatzenbuehler, 2009; Hatzenbuehler & Pachankis, 2016; Hollinsaid et al., 2023; Keating & Muller, 2020; Livingston et al., 2020; Marchi et al., 2023; Meyer, 1995, 2003; Minshew, 2022; Nicholson et al., 2022, 2025; Salomaa et al., 2023; Valentine et al., 2022; White Hughto et al., 2015).

Our findings reinforce the significant influence of minority stress on the sense of self among SGMs and how they perceive others and the world, which may lead to the development of trauma-related symptoms. These stressors, which are motivated by one's SGM identity, can target individuals

at their core (Berke et al., 2022; Jastrzębska & Błażek, 2022; Meyer, 2003; Szymanski & Balsam, 2011). Accordingly, the consequences and experiences of minority stress may be perceived to be more challenging, deeply ingrained, and distressing than those of Criterion A (potentially those that are not identity-based). This supported by previous findings which illustrate that minority stress experiences, when internalized, can lead to or reinforce maladaptive beliefs about one's identity (e.g., feeling unlovable, worthless, defective), thereby influencing how one perceives and experiences stressors (e.g., "this happened to me because I am bad") (Chan et al., 2020; Hatzenbuehler, 2009; Hatzenbuehler & Pachankis, 2016; Ouellette et al., 2023). However, our findings suggest that these consequences may be ameliorated by sufficient support through positive coming-out experiences and post-disclosure environments, social safety, and positive representation. It may also be the case that the level of impact of these experiences varies depending on certain identity characteristics one holds (i.e., positive SGM aspects). Taken together, trauma-related symptoms among SGM individuals are likely exacerbated by a combination of individual and social factors—particularly when minority stressors are perceived as direct threats to one's core identity and when support or social safety is lacking or inaccessible. Future research should explore psychopathology differences between identity-based and non-identity-based traumas among SGM populations and examine risk and protective factors in these contexts.

Study Three

As chronic exposure to minority stress can significantly impact moral affect (e.g., shame, guilt, and betrayal), the final study explored the dimensions of moral injury using a mixed-methods approach. Specifically, we aimed to expand current understandings of trauma-related symptoms among SGM individuals beyond frameworks requiring Criterion A exposure. Our analyses revealed differential thematic presentations of moral injury that varied in intensity depending on exposure to minority stress-related potentially morally injurious events (PMIEs) (as captured by the SGM-modified MIES). Consistent with current conceptualizations of moral injury, our thematic findings identified guilt, shame, and betrayal/loss of trust as salient features of minority stress-related moral

injury. Importantly, attachment injuries presented as a unique feature of moral injury among this population, illustrating the influence of minority stress experiences on attachment systems. Furthermore, the level of exposure to and intensity of minority stress-related PMIEs positively correlated with hazardous alcohol use and trauma-related symptoms, which are in line with our qualitative findings and previous minority stress and moral injury literature (Fish & Pasley, 2015; Goldberg et al., 2013; Jinkerson, 2016; Tan et al., 2020).

While a growing body of evidence suggests strong associations between PTSD and minority stress, trauma-related symptoms among SGM individuals may also be explained (or, in some cases, better characterized) by moral injury. As described extensively throughout this dissertation, distal (e.g., discrimination, microaggressions) and proximal minority stressors (e.g., internalized stigma, identity nondisclosure, rejection sensitivity) can be perceived as PMIEs, contributing to adverse psychological outcomes (Jackson & Mohr, 2016; Nicholson et al., 2022). The findings from this study have relevance for expanding current conceptualizations of both minority stress and trauma-related symptoms among equity-deserving groups, whereby developing further moral injury frameworks may help contextualize and treat trauma-related symptoms observed among SGMs.

Limitations and Future Directions

Although study limitations have been previously discussed within each chapter, there are important limitations worth discussing further in this section. The first study, which was collected at a single, cross-sectional point in time, limits inferences on the causality of our findings. As a result, we cannot conclude that the differences in TPJ neurocircuitry are a direct result of PTSD. Additionally, while exclusion of certain psychiatric disorders (i.e., alcohol/substance use not in sustained full remission, and bipolar disorder or any psychotic disorder) was applied for individuals with PTSD and the dissociative subtype, we did not exclude for comorbidity with other psychiatric disorders. Therefore, our findings may be influenced by other psychological challenges, which is critical to consider as PTSD is highly comorbid with several disorders, including major depressive

disorder and anxiety-related disorders (e.g., panic disorder and generalized anxiety disorder). Lastly, while we had a relatively large sample size, demographic data on social and identity-based categorizations (e.g., race, ethnicity, gender, sexual orientation, etc.) were not collected, limiting us from investigating (and controlling for) the effects of these variables.

As part of the same *Minority Mosaic* research program, the second and third studies share some limitations. Importantly, as our study samples do not reflect a representative sample, the generalizability of our findings is limited. For instance, the majority of our sample consists of SGM individuals who identify as cisgender, AFAB, and White-North American/European. This is an important limitation of our studies, as it is well-documented that minority stress experiences are unique among individuals with multidimensional minority identities, including TGD and ethnic/racial SGM individuals (Akdeniz et al., 2014; Frost & Meyer, 2023; Hatzenbuehler & Pachankis, 2016; Minshew, 2022; Nicholson et al., 2022; Rivas-Koehl et al., 2023; White Hughto et al., 2015). Accordingly, it is critical to expand the current understandings of this phenomenon in underrepresented samples with diverse intersections of identity.

The use of intersectionality-informed frameworks during qualitative analysis enabled us to consider different aspects of one's multidimensional minority identity. This helped us identify unique qualitative presentations of trauma-related symptoms associated with participants' multidimensional identities, highlighting how different intersections of one's identity can contribute to unique experiences. However, this approach was limited in our quantitative analyses, as we did not incorporate quantitative intersectional analyses. In the context of mixed-methods research, implementing intersectional analyses in both qualitative and quantitative data analyses can enable the investigation of whether unique presentations of outcomes (e.g., trauma-related symptoms) converge or diverge among specific intersections of identity. Future research should address these limitations by incorporating intersectional quantitative analyses.

Lastly, the cross-sectional design of these studies limits our interpretation of how risk and resilience (study two) and moral injury (study three) dynamically change and develop over time. For

instance, it is hypothesized that attachment systems of SGMs may shift over time (e.g., insecure to secure and vice versa) depending on the nature of their external environment (e.g., positive reactions vs negative reactions surrounding disclosure), which, in turn, can influence psychological well-being (Cook et al., 2016; Cook & Calebs, 2016). In other words, the impact of minority stress can vary throughout one's life, as critical aspects such as attachment and environment (e.g., social support) are dynamic. As such, longitudinal studies are required to capture the influence of these dynamic changes among SGM individuals, which could elucidate important clinical considerations for minority stress-based interventions. Taking this into account, we have modified several of our minority stress-based questionnaires within our current quantitative battery to more accurately capture changes over time. Future analyses of this dataset will aim to critically examine these changes, which we hope will inform future research.

5.2 Clinical Implications

The findings from this dissertation have the potential to advance existing treatment interventions and trauma-related frameworks for various populations. For example, findings from the first study, which reveal unique disruptions in TPJ neural circuitry among individuals with PTSD and its dissociative subtype, highlight the necessity of developing psychotherapeutic treatment interventions targeting disembodiment and trauma-related alterations in bodily self-consciousness. Critically, individuals experiencing symptoms of PTSD involving disembodiment may struggle to fully engage with the present moment unless they can integrate information related to both their internal state (e.g., interoception, bodily awareness) and their external environment (e.g., contextual cues in social interactions, visuospatial information). This has significant implications for psychotherapy engagement and effective trauma processing. As such, disruptions in the neurobiology of bodily self-consciousness, which were found to differ significantly between PTSD and its dissociative subtype, should be considered key treatment targets (Harricharan et al., 2021; Kearney et al., 2023; Kearney & Lanius, 2022; Rabellino et al., 2020). Approaches that focus on enhancing

embodiment, awareness, reflection, and regulation of the self in time and place (such as therapies targeting dysregulated brain regions in patients with dissociative PTSD) may prove beneficial (Frewen & Lanius, 2015; McGreevy & Boland, 2020; Warneret al., 2014, 2020). Specifically, targeting dissociation through alternative bottom-up treatment approaches that are sensory-based (e.g., Sensory Motor Arousal Regulation Therapy) may complement traditional top-down cognitive-based interventions and more effectively reduce trauma symptoms related to alterations in bodily self-consciousness (Kearney et al., 2023; Kuhfuß et al., 2021; Park et al., 2023; Warner et al., 2014). Importantly, findings from the first study suggest the value of evolving current psychotherapeutic treatment guidelines—which often rely on non-individualized approaches and categorical diagnoses—toward a personalized medicine framework that can better account for heterogeneity in symptom presentation (Cloitre et al., 2012; Park et al., 2023).

Additionally, findings from studies two and three illustrate that minority stress exposure may be associated with trauma-related symptoms, disrupting the self at multiple levels. As demonstrated in study two, manifestation of these disruptions can include negative alterations to one's sense of self, as well as social interaction disturbances (e.g., fear, rejection sensitivity, and avoidance due to chronic anticipation of minority stress). These findings may represent necessary targets to overcome and cope with these adverse experiences (Diamond & Alley, 2022; Hatchard et al., 2024; Hatzenbuehler & Pachankis, 2016; Livingston et al., 2020; Minshew, 2022; Nicholson et al., 2022; Pachankis, 2015; Pachankis et al., 2023). Furthermore, potential protective factors identified in study two, including supportive post-disclosure environments, social safety, positive SGM identity factors, and positive representation and empowerment, align with previous findings, suggesting that these factors could be strengthened and incorporated within psychotherapeutic interventions to improve SGM psychological health and overall well-being (Hall, 2018; Hatzenbuehler & Pachankis, 2016; Henderson et al., 2022; Riggle et al., 2008, 2011, 2014; Rostosky et al., 2010, 2018; Tankersley et al., 2021). In this vein, minority stress-based psychotherapeutic interventions have been recently developed, aimed at addressing some of the aforementioned risk factors and strengthening protective factors (Austin et

al., 2017; Coyne et al., 2020; Flentje, 2020; Hatchard et al., 2024; Ouellette et al., 2023; Pachankis, 2015; Pachankis et al., 2015, 2023). Although these adapted interventions hold promise for helping SGM individuals, they are not without limitations. In particular, most adapted interventions, given their focus on applying minority stress frameworks more generally to SGM populations, may be unable to address unique concerns related to different intersecting levels of privilege and oppression (e.g., racism) (Bowleg et al., 2023; Coyne et al., 2020). This warrants further development of minority stress-based interventions that consider the unique nuances in symptom presentation, as well as minority stress and trauma experiences associated with multidimensional minority identities. Taken together, results from study two, which demonstrate the insidious nature of minority stress experiences, support the use of trauma-focused minority stress-based interventions among SGM populations that target both risk and protective factors in order to promote resilience and well-being (Hatchard et al., 2024; Livingston et al., 2020; Nicholson et al., 2022, 2025; Ouellette et al., 2023; Shipherd et al., 2019).

Study Three highlights the value of conceptualizing minority stress experiences as PMIEs, offering a novel lens for understanding trauma-related symptoms among SGM individuals. This perspective is supported by emerging evidence demonstrating the profound impact of chronic minority stress on moral emotions such as shame, guilt, and betrayal (Anderson et al., 2024; Jones et al., 2022; Kondrath et al., 2024; Nicholson et al., 2022). Applying a moral injury framework allows for a more nuanced understanding of how identity-based trauma and systemic discrimination can give rise to trauma-related symptoms—even in the absence of traditional Criterion A events. Accordingly, the findings from Study Three support expanding existing trauma models to account for non-Criterion A experiences that are morally or existentially injurious. Broadening trauma-related frameworks in this way may better equip clinicians to recognize and address the complex interplay between moral distress, identity-based trauma, and minority stress in SGM populations. Such an approach can help reduce psychological distress while also promoting empowerment, resilience, and re-engagement with environments or experiences that may have previously been feared or avoided (Hatchard et al.,

2024).

5.3 Conclusion

Healing the impact of trauma on the self requires attention to several aspects that remain overlooked and understudied. This is evidenced by the findings herein, which illustrate the importance of addressing symptoms of disembodiment among individuals with PTSD and its dissociative subtype. Additionally, findings from studies two and three examine the intersection of minority stress, identity-based trauma, PTSD, and moral injury, whereby the consequences of these adverse experiences appear to profoundly impact the self at the multiple levels. This highlights the need to understand how trauma and minority stress intersect and co-occur when analyzing trauma-related symptoms in SGM populations. Further understanding of factors that create resilience remains necessary to reduce and buffer the pervasive impact of stigma among equity-deserving groups.

Introduction and Discussion References

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