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Neuroscientific account of Guilt- and Shame-Driven PTSD phenotypes

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ABSTRACT

Background: Guilt and Shame, two core self-related emotions, often emerge following trauma and play an important role in the development and maintenance of post-traumatic stress disorder (PTSD). Importantly, Guilt and Shame exhibit specific focal and non-specific global impacts of trauma on self-perception, respectively.

Objective and Methods: Integrating psychological theories with neuroscientific knowledge, we suggest a scheme of two diverging clinical phenotypes of PTSD, associated with distinct self-related processes and differential functionality of relevant neural networks.

Proposal: The Guilt-driven phenotype is characterized by preoccupation with negative self-attributes of one's actions in the traumatic event. It involves altered functionality of both the salience network (SN) and the default-mode network (DMN), associated with heightened interoceptive signalling and ruminative introspection which may lead to hyperarousal and intrusive symptoms, respectively. On the contrary, the Shame-driven phenotype is characterized by global, identity-related negative self-attributions. It involves altered functionality of both the SN and the DMN, associated with blunted interoceptive signalling and diminished introspection which may result in withdrawal and anhedonia symptoms together with dissociative experiences, respectively.

Conclusion: The proposed PTSD phenotypes may inform neuropsychological therapeutic interventions (e.g. self-focused psychotherapy and neuromodulation) aiming to restore the function of large-scale self-related neural processing.

Explicación neurocientífica de los fenotipos de TEPT impulsados por la culpa y la vergüenza

Antecedentes: La culpa y la vergüenza, dos emociones relacionadas con el yo, a menudo surgen después de un trauma y desempeñan un papel importante en el desarrollo y mantenimiento del trastorno de estrés postraumático (TEPT). Es importante destacar que la culpa y la vergüenza, exhiben impactos focales específicos y globales no específicos del trauma en la autopercepción, respectivamente.

Objetivo y métodos: Al integrar las teorías psicológicas con el conocimiento neurocientífico, sugerimos un esquema de dos fenotipos clínicos divergentes del TEPT, asociados con distintos procesos relacionados con el yo y una funcionalidad diferencial de las redes neuronales relevantes.

Resultados: El fenotipo impulsado por la culpa, se caracteriza por la preocupación por las auto atribuciones negativas de las propias acciones en el evento traumático. Implica una funcionalidad alterada tanto de la red de saliencia (RS) como de la red de modo predeterminado (RMP), asociadas con una señalización interoceptiva elevada y una introspección rumiante que pueden conducir a hiperactivación y síntomas intrusivos, respectivamente. Por el contrario, el fenotipo impulsado por la vergüenza se caracteriza por auto atribuciones negativas globales relacionadas con la identidad. Implica una funcionalidad alterada tanto de la RS como de la RMP, asociadas con una señalización interoceptiva disminuida y una introspección disminuida que pueden resultar en síntomas de retirada y anhedonia junto con experiencias disociativas, respectivamente.

Conclusión: Los fenotipos de TEPT propuestos, pueden servir de base para tratamientos neuropsicológicos (por ejemplo, la psicoterapia centrada en el yo y la neuromodulación) destinados a restaurar la función de las redes neuronales a gran escala relacionadas con uno mismo.

HIGHLIGHTS
- Guilt and Shame are two self-related emotions that often emerge following traumatic events and may contribute to the clinical profile of post-traumatic stress disorder (PTSD).
- Our framework suggests Guilt and Sham driven phenotypes of post-traumatic psychopathology, associated with two self-processing deficiencies related to specific action or global identity, respectively.
- The proposed phenotypes may inform neuropsychological treatments aiming to restore dysfunctional neural networks, later to be evident in alleviating Guilt and Shame and improving clinical outcomes.

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内疚和羞耻驱动的 PTSD 表型的神经科学解释

背景：内疚和羞耻是两种与自我相关的核心情绪，经常在创伤后出现，并在创伤后应激障碍（PTSD）的发展和维持中发挥重要作用。 重要的是，内疚和羞耻分别表现出创伤对自我认知的特定焦点和非特定全局影响。

目的和方法：将心理学理论与神经科学知识相结合，我们提出了 PTSD 两种不同临床表型的方案，与不同的自我相关过程和相关神经网络的不同功能相关。

结果：内疚驱动表型的特点是专注于一个人在创伤事件中行为的负面自我属性。 它涉及突显网络（SN）和默认模式网络（DMN）的功能改变，与增强的内感受信号和反刍内省相关，可能分别导致高唤起和闯入症状。 相反，羞耻驱动表型的特点是全局的、与认同相关的负面自我归因。 它涉及 SN 和 DMN 的功能改变，与减弱的内感受信号和减少的内省相关，可能分别导致退缩和快感缺乏症状以及解离体验。

结论：所提出的 PTSD 表型可能为旨在恢复大规模自我相关神经网络功能的神经心理治疗（例如，自我聚焦心理治疗和神经调节）提供信息。

Post-traumatic stress disorder (PTSD) is the only mental disorder triggered by an external event that is perceived as a threat to oneself survival. As such, survivors of traumatic events often endure negative self-related emotions by attributing the event's negative outcomes to their actions and/or character. Indeed, dating back to the first observations of 'shell shock' and until today's definition of PTSD, *Guilt* and *Shame*, two core self-related emotions, surfaced as central mental manifestations in response to a traumatic event (Blumgart & Rivers, 1921; Haley, 1974; Ludwig, 1947) Yet, as the Diagnostic and Statistical Manual of Mental Disorders (DSM) based diagnosis of PTSD (Diagnostic and Statistical Manual of Mental Disorders (DSM-5®)) was the focus of clinical categorization, the account of underlying psychological-self mechanisms in the disorder's mental manifestations received limited attention, both in diagnosis and treatment. However, constant discussions have been advocating the centrality of Guilt and Shame in the development and persistence of PTSD (Hartmann & Loewenstein, 1962; Lee et al., 2001; Seligowski et al., 2015; Tangney & Dearing, 2002; Tull & Kimbrel, 2020) Both self-related emotions were further included in the DSM-5 diagnosis of PTSD (Diagnostic and Statistical Manual of Mental Disorders (DSM-5®)), under a new symptom cluster of 'negative alternations in mood and cognition'. Nevertheless, Guilt and Shame were not differentiated from other negative emotions such as horror, fear, anger, and blame. Moreover, the current diagnostic framework does not rely on any associations between psychological and neurobiological mechanisms of disorders. For example, although accumulating evidence in PTSD point to the central role of the amygdala, hippocampus, and ventromedial prefrontal cortex (vmPFC) in the disorder's neural mechanism, their relation to a specific psychological construct such as Guilt or Shame has little scientific assurance (Fenster et al., 2018).

Inspired by current and past psychological and psychoanalytic perspectives, as well as the accumulating evidence for the involvement of large-scale neural networks in PTSD, the present work suggests a neuroscientific account of two diverging PTSD phenotypes. To this end, we will review the fundamental psychological roots of Guilt and Shame and their strong relevance to trauma responses, alongside evidence for neural correlates of these emotions and PTSD. Finally, we will suggest a scheme of Guilt- and Shame-driven PTSD phenotypes, associated with distinct self-related processes and differential functionality of relevant neural networks.

1. Psychological accounts of Guilt and Shame

Guilt and Shame are nearly as old as time itself, born in the garden of eden when Adam and Eve first rebelled against the offspring of forbidden actions. Other than being foundational in biblical missiology, Guilt and Shame began to gain focus in early seminal works in anthropology and psychology (DJ, 1983). These emotions do not only differ in their meaning, but also in one's reaction, which is echoed etymologically: 'Guilt' (from the German word 'Geld') expresses a striving to repair or recompense, while 'Shame' (traced back to the Indo–European root 'Kam') refers to hiding, concealing, or covering up (Karlsson & Sjöberg, 2009).

Guilt and Shame were addressed in the psychoanalytic literature since its early days (Breuer & Freud, 1955; Freud, 1894; Lansky & Morrison, 2014; Spero, 1984) with many formulations based on Freud's later structural model (Freud, 1923). According to this model, Guilt represents clashes between the realistic sense of self (i.e. the ego) and moral prohibitions (i.e. the super-ego), resulting in a feeling of misconduct. Shame, on the other hand, signifies the conflict between the ego and the 'ideal self' (i.e. the ego-ideal), resulting in a feeling of *self*-failure (Hartmann & Loewenstein, 1962; Lewis, 1971; Piers & Singer, 1953). Accordingly, 'Scham', the original

psychoanalytic term used by Freud for Shame is related to the genitalia, the hidden and private parts, reflecting the urge to hide following the devastating sense of self-defectiveness (Piers & Singer, 1953). With the emergence of self-psychology, Guilt feelings were associated with a more mature superego, which internalized the parent's moral demands, and was related to a transgression of these prohibitions. Shame, in contrast, was considered to manifest a shatter in the individual's illusion of grandiosity and entitlement, triggering feelings of inadequacy and vulnerability (Kohut, 2013). This psychological view is in line with Freuds' psychosexual developmental stages, placing Guilt at a higher developmental stage than Shame ('urethral and phallic' versus 'oral and anal' respectfully), and within the hierarchy of developmental anxieties ('loss of object' versus 'castration anxiety') (Erikson, 1994; Piers & Singer, 1953; Spero, 1984).

In her landmark report 'Shame and Guilt in Neurosis', Lewis (1971) presented an integrative view of these emotions based on ego-analytic, self-psychology, and cognitive perspectives. It is suggested that Guilt originates from specific behaviour or action-related attribution, while Shame stems from identity-related attributions, evoking the painful feeling of negative self-worth and overall inadequacy (Lewis, 2008; Tangney & Dearing, 2004). In her words, 'Shame is about the self … Guilt involves activity of the self' (Lewis, 1971). While Guilt is generated by an external outlook on the self, regarding an act for which one is responsible, Shame is experienced as a danger 'from within', shadowing a threat to one's entire self-perception. Importantly, Lewis' formulation leads to specific propositions regarding self-related reparation; Guilt that originates from specific behaviour or action-related attribution has the potential of being modified and alleviated, while Shame is less malleable, originating from identity-related attributions, and therefore harder to attenuate. As a consequence, Guilt is believed to promote a desire for change and maintain a relationship with the surroundings (Lewis, 2008; Tangney & Dearing, 2002), while Shame is associated with a generalized feeling of low worthiness, thus hopelessness to retreat and escape the inevitable pain of self-wound (Lewis, 1971; Lewis, 2008; Tangney & Dearing, 2002).

2. Guilt and Shame rooted in Trauma

We suggest that a better depiction of Guilt and Shame may contribute to a more precise clinical characterization of PTSD (Ben-Zion et al., 2020a; Bremner, 1999; Lanius et al., 2010b), and is necessary due to their common occurrence in those with this chronic disorder. Specifically, individuals with PTSD report high levels of Guilt and Shame across traumatic

experiences, including combat trauma (Crocker et al., 2016), sexual assault (Vidal & Petrak, 2007), intimate partner violence (Beck et al., 2011), child abuse (Feiring et al., 2002), and even non-interpersonal traumas (e.g. natural disasters (Carmassi et al., 2017)). However, current measures struggle to clearly differentiate these emotions, thus challenging the ability to quantify their occurrence (both together and separately) (Tangney, 1996). Recently, more specific tools for measuring trauma-related Guilt and Shame have been developed (e.g. Trauma-Related Shame Scale (Øktedalen et al., 2014), Shame and Guilt After Trauma Scale (Aakvaag et al., 2016)). These tools hold potential for more in-depth research on the frequency and co-existence of trauma-related Guilt and Shame and their underlying neural mechanisms.

In the aftermath of trauma, one seeks to form a sense of logic and coherence with both the event and one's self (Ehlers & Clark, 2000). Trauma-related Guilt is the outcome of a retroactive evaluation of one's actions, thoughts, and feelings during the traumatic event as inappropriate and immoral (Barrett, 2017a, 2017b). Trauma-related Shame, on the other hand, is the discrepancy between self-perception during the traumatic event and its usual sense of self, culminating in a threat to one's identity (Cunningham et al., 2018). As Guilt feelings are associated with a particular event-related behaviour ('I *did* bad') and remain external and apart from the whole self-experience, they provoke a sense of tension, remorse, and intrusive preoccupation with the transgression as means of possible compensation or reparation. Shame, instead, induces a global self-attribute of devaluation and insufficiency ('*I am* bad') and lingers within the wholeness of self-perception, thus leading to a desire to disappear or escape, often evident in detachment or dissociation from reality.

Accordingly, we suggest that Guilt-driven processes correspond to intrusive and hyperarousal PTSD symptom clusters (e.g. startle response), as well as to externalized emotion dysregulation (e.g. anger and irritability). From a 'self-needs' perspective, these could be presumed as ways to settle the tension within oneself in face of the misconduct. The Guilt-driven individual has not 'given up', thus maintaining a relationship with oneself and with the external environment through symptoms that negotiate the traumatic wound. Shame, conversely, is linked with the wish to disappear and detach from oneself, to avoid the painful feeling of negative and low self-worth, often manifested in symptoms that 'seize' the self while inhibiting interactions with the environment. This process emerges in post-traumatic stress symptoms of avoidance, withdrawal, isolation, derealization, and depersonalization (Dorahy et al., 2013; Kouri et al., 2023; Platt & Freyd, 2015; Talbot et al., 2004), thus enabling the individual to secure shelter

from the exposed and injured self. The shame-driven individual's wound is perceived as unamendable; The self has no option but to surrender, and dissociative symptoms reflect this (See Table 1). Finally, both self-emotions are associated with high levels of arousal (Eisenberg, 2000; Tull & Kimbrel, 2020). However, while the Guilt-driven individual tends to express this reactivity (e.g. hypervigilance), the Shame-driven individual shows a more aversive state due to the degree of internalizing extremely high and unpleasant levels of emotional arousal (Freed & D'Andrea, 2015).

3. Neuroscientific account of Guilt and Shame

The rapid growth of neuroimaging techniques over the last decades reinforced the notion that understanding the human brain (Hendler et al., 2018) requires not only an investigation of segregated brain regions, but rather large-scale brain networks and the interplay between them (see review Menon, 2011)). The natural neural candidates for self-related emotions are the Default-Mode Network (DMN) and the Salience Network (SN) (Bastin et al., 2016), shown to exhibit abnormal alterations in PTSD patients (Sripada et al., 2012). The brain's DMN consists of bilateral cortical areas in the medial and lateral parietal, medial prefrontal, and medial and lateral temporal cortices (Hugdahl et al., 2015). Here, we extend the DMN to the hippocampus, a region that is sometimes associated with this network (Kim, 2015) and plays a central role in PTSD pathogenesis (Ben-Zion et al., 2020b; Ben-Zion et al., 2022; Shin et al., 2006). While the DMN was first associated with a passive 'resting state' brain activity (hence its name), it is now thought to play a role in self-referential introspective mental processes, such as autobiographical memory and thinking about the future (Greicius et al., 2003). The the DMN has been related

to personal reflection and self-evaluation (including reference to specific personal experiences), as well as to social rules and moral expectations from the self and others (Bastin et al., 2016). Indeed, previous neuroimaging studies suggest alternations within the DMN in PTSD, mainly in the form of decreased activity and connectivity within key components of this network (Bluhm et al., 2009; DiGangi et al., 2016; Frewen et al., 2010; Lanius et al., 2010a; Sheynin et al., 2020).

The SN typically includes the ventrolateral PFC, bilateral anterior insula, and pre-supplementary motor area/anterior cingulate cortex (Seeley et al., 2007). The amygdala, another core region implicated in PTSD pathophysiology (Hayes et al., 2012), is also sometimes considered to be a part of this network (Menon, 2015). The SN is involved in detecting and orienting to salient external stimuli and internal events, through somatic signal processing known as 'interoception' (Hendler et al., 2018; Menon, 2011). Interoception is a core self-related process of body homeostasis (Chen et al., 2021; Chong et al., 2017), which might be related to impaired self-identity as manifested in feelings of Guilt and Shame. Several studies demonstrated that PTSD is associated with increased connectivity within the SN (Akiki et al., 2017; Sripada et al., 2012; Thome et al., 2014). This finding could reflect the heightened vigilance and enhanced sensitivity to traumatic cues in PTSD, but might also indicate emotional dysregulation and abnormal processing of somatic signals (Akiki et al., 2017; Sripada et al., 2012; Thome et al., 2014).

To date, only a handful of neuroimaging studies investigated Guilt and Shame in clinical populations (e.g. remitted depression disorder (Green et al., 2012; Pulcu et al., 2014), autism spectrum disorder (Morita et al., 2012), obsessive-compulsive disorder (Basile et al., 2014), and borderline personality disorder (Göttlich et al., 2020)), and did not yield converging findings. To the best of our knowledge, only two studies examined neural correlates of Shame (but not Guilt) in PTSD (Lloyd et al., 2020; Terpou et al., 2022). Both studies focused on PTSD which was caused by a 'moral injury' (i.e. when individuals either do something that goes against their beliefs or fail to do something in line with their beliefs). Lloyd and colleagues (2020) reported within a group of PTSD individuals, measures of state and trait Shame were negatively correlated with activity in DMN regions (e.g. dorsomedial prefrontal cortex) and SN regions (e.g. insula), respectively. The authors suggested that this anti-correlation pattern may speak to a diminished capacity for self-reflection in PTSD. Closely after, Terpou and colleagues (2022) suggested that in PTSD, the DMN might be biased toward lower-level midbrain systems, which may drive toxic Shame and related moral emotions that are common in this disorder. Thus, it

Table 1. Guilt- and Shame-Driven psychological characteristics and PTSD symptoms.

	Guilt	Shame
Psychological Characteristics	Externalizing arousal Focus on self-behavior Action self-attributions (I did) Self-negotiation Tension Feeling of agency Attempt to regain control Desire to make amends	Internalizing arousal Focus on self-identity perception Existential self-attributions (I am) Self-surrender Unworthiness Lack of control Helplessness and despair Desire to escape and disappear
PTSD Symptoms	Intrusive experiences Specific avoidance Emotional dysregulation Irritability Hypervigilance, Anger	Dissociation Global avoidance, withdrawal Mutism Anhedonia

is sensible to assume that the DMN plays a role in the emotional experience of Guilt and Shame. To the best of our knowledge, no neuroimaging study to date has compared Guilt and Shame in the context of post-traumatic psychopathology, and neither of these emotions was tested in PTSD populations that were not associated with moral injuries.

4. Neuroscientific View of Guilt- and Shame-Driven PTSD Phenotypes

Considering the above-mentioned evidence and theories, we propose a neuroscientific account of self-related emotions in post-traumatic psychopathology. Specifically, we outline two diverging clinical phenotypes of PTSD, rooted in the dominance of Guilt and Shame, mediated through different involvement of psychological processing of the self and associated neural networks (i.e. DMN and SN) functionality (see Figure 1).

The *Guilt-driven* phenotype is characterized by preoccupation with negative self-attributes related to specific actions (e.g. I *did* bad), associated with altered (possibly increased) function of the DMN (Davey et al., 2016; Denny et al., 2012; Northoff et al., 2006) This, in turn, leads to an inability to accurately reflect on the self's behaviour after traumatic event ('what is my part in the event?'), resulting in excessive ruminative introspection on negative self attributes, possibly leading to intrusive experiences in PTSD. In addition, heightened saliency and interoception, associated with altered (possibly increased) function

of the SN (Chen et al., 2021), impact the overall emotional reactivity and dysregulation (including during intrusive thoughts). Possible high integration between the SN and DMN (Shine, 2019; van Oort et al., 2017) could further perpetuate this condition, resulting in lower tolerance to even weak trauma reminders, which at its worst transform into actual perceptual vivid experiences (i.e. flashbacks). However, this excessive alertness, often reflected in symptoms of hyperarousal, emotional reactivity and dysregulation (e.g. anger outbursts), is valuable means of negotiating the tension within one's self (Akiki et al., 2017). From a self-theory perspective, a weak state of the self (i.e. heightened interoception and salience together with diminished regulation) might exacerbate penetration of intrusive experiences (Akiki et al., 2017; Sheynin et al., 2020), but nevertheless remain 'in touch' with reality. This neuroscientific conceptualization reverberates echoes with Freudian formulations of Guilt, suggesting internalization of negative attitudes culminating in self-reproach (Freud, 1917). It is also in line with more modern analytic formulations, according to which deficits in the 'self' enable the infiltration of traumatic intrusions onto it (Roussillon, 2011).

The *Shame-driven* phenotype is characterized by global, whole identity-related negative self-attributions (e.g. I *am* bad), associated with altered (possibly reduced) function of the DMN (Hamilton et al., 2015). This, in turn, might result in diminished introspection, along with distressful memories and sensitivities to trauma reminders, which could encourage an attempt
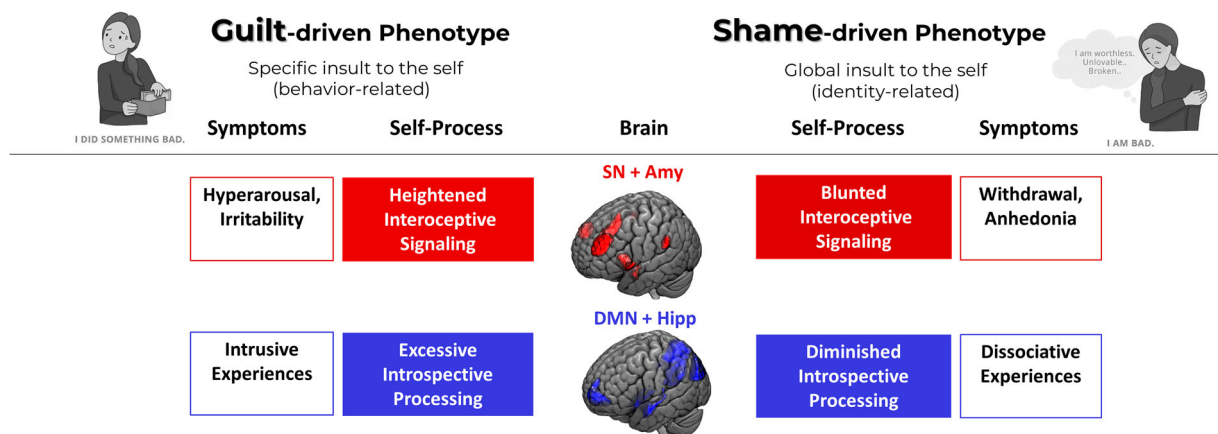

Figure 1. Proposed Neuroscientific Account of Guilt- and Shame-driven PTSD Phenotypes. Each phenotype is described on three different levels: the suggested neural networks underlying both phenotypes, the self-related mental processes and specific presented symptoms and behaviors. The colours correspond to the relevant neural systems: The salience network (SN) and the amygdala (Amy) in red, the default-mode network (DMN) and the hippocampus (Hipp) in blue. The Guilt-driven phenotype (on the left side) is more common in PTSD, related to specific insult to the self, associated with heightened interoceptive signalling and ruminative introspective, resulting in hyperarousal (e.g. hypervigilance, startle response, anger, irritability) and intrusion symptoms (e.g. flashbacks, intrusive memories, nightmares), respectively. The Shame-driven phenotype (on the right side) is less commonly presented in PTSD, associated with a global insult to self-identity, associated with blunted interoceptive signalling and diminished introspection, resulting in withdrawal and avoidance symptoms together with dissociative experiences (e.g. mutism, derealization, depersonalization, delusions), respectively. Both phenotypes are associated with alternations in the SN (including the amygdala) and the DMN (including the hippocampus). ©National Institute for the Clinical Application of Behavioral Medicine https://www.nicabm.com/shame-guilt-client-handout/

to escape the mental pain through dissociative states that provide a 'shelter from reality' (e.g. depersonalization and derealization) (Lebois et al., 2022). This phenotype is also associated with blunted interoceptive signalling, mediated through altered (possibly reduced) function of the SN. In turn, it compromises the individual's ability to identify, integrate and regulate externally- and internally-driven feelings, possibly perpetuating the dissociative state. This difficulty might also mirror as symptoms of emotional numbing, alexithymia, and social isolation that further aid in harbouring the agonized and exposed self. Possible high segregation between SN and DMN could further perpetuate this disintegrated self-condition resulting in its worst case in a catatonic-like behaviour (Moskowitz, 2004). Interestingly, these ideas resonant with a psychoanalytic formulation of Shame, describing it as an implosion of the self (Lewis, 1971) and as an endogenously activated mental act (Piers & Singer, 1953).

The proposed neuroscientific framework supports the idea that altered functionality of large-scale neural networks corresponds to different clinical PTSD phenotypes with respect to trauma-induced self-emotions (Guilt and Shame). It relies on the notion that dysfunction of the DMN and SN, known to sub-serve different aspects of self-related processing (introspection and interoception, respectively), underlie trauma-induced feelings of Guilt and Shame and accompanying symptoms. Importantly, considering the dominance of these emotions, they could respectively trigger specific phenotypes of PTSD characterized by either heightened emotion dysregulation and intrusions or withdrawal and dissociation (Figure 1). It should be noted that patients with PTSD may show various response patterns corresponding to differing phenotypes at different time points, reflecting the alternating symptom profiles not only between but also within individuals (Lanius et al., 2010b).

Future Research Directions

Further theoretical and empirical research should investigate this conceptualization. Specificity, we suggest to incorporate contemporary neurological accounts of the self, such as Damasio's groundbreaking work (Damasio, 2003) bridging between self-stances and the neural basis of feelings. The framework suggested here has possible parallels with Damasio's suggested self-structures: proto-self, core-self, and autobiographical self (Damasio, 2003). Disturbances in the primitive 'proto-self' or 'core-self' may represent a more fundamental and global wound to the self-tied core consciousness, resulting in dissociative experiences evident in the Shame-driven phenotype. Disturbances to the 'autobiographical-self' that comprise an individual's self-representation, on the other hand, might result in distorted intrusive memories, relying on higher consciousness, as evident in the Guilt-driven phenotype. This intriguing view should be further developed and associated with classical psychological theories and neural functions.

In light of this proposed perspective, approaches that directly address mechanisms of change in self-referential trauma-related processes could be instrumental for trauma healing (Koban et al., 2021; Tull & Kimbrel, 2020). Importantly, our perspective accounts for the neural mechanism of such self-related abnormalities pointing to the functionality of large-scale neural networks. We believe that our neuroscientific-informed framework closely considers the complexity of post-traumatic psychic experience, involving several self-related emotions and processes subserved by multiple brain regions and networks. The neural aspect of our framework may further be developed for potential treatments of disturbed self-percepts via brain-guided interventions, such as targeted neuromodulation treatments, aiming to restore dysfunctional neural networks, later to be evident in alleviating Guilt and Shame and improved clinical outcomes.

Data availability statement

No datasets were generated or analyzed during the current study.

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