

Neuropsychological Comparison of Guilt and Grief: A Review of Guilt Aspects in Prolonged Grief Disorder

OMEGA—Journal of Death and Dying

0(0) 1–23

© The Author(s) 2021

Article reuse guidelines:

sagepub.com/journals-permissions

DOI: 10.1177/00302228211024111

journals.sagepub.com/home/ome

Brandon Joa¹  and
Andrew B. Newberg¹ 

Abstract

Taking an integrative approach toward developmental psychology and neurophysiology, this review selects findings from the psychological and medical literature on guilt and bereavement that are relevant to considering whether and how guilt contributes to the development of prolonged grief disorder (PGD) in bereaved persons. Mention of guilt is ubiquitous in literature on general grief and PGD, including 54 articles related to the neuropsychological development and manifestations of guilt and grief, as well as their neuroimaging correlates, that met scoping review criteria. However, mechanisms connecting guilt to development of PGD are scarce. Aspects of guilt are conceptually connected to many PGD criteria, opening avenues to explore treatment of PGD by targeting guilt. Positive and prosocial aspects of guilt are especially neglected in the treatment of psychiatric disorders, and consideration of these aspects may improve interventions for PGD such as complicated grief treatment.

Keywords

bereavement, death, developmental psychology, moral emotions, neuroanatomy

¹Thomas Jefferson University, Philadelphia, Pennsylvania, United States

Corresponding Author:

Andrew B. Newberg, Thomas Jefferson University and Hospital, 925 Chestnut Street, Suite 120, Philadelphia, PA 19107, United States.

Email: Andrew.newberg@jefferson.edu

*Divoto mi gittai a' santi piedi;
misericordia chiesi e ch'el m'aprìsse,
ma tre volte nel petto pria mi diedi.*

Devoutly I cast myself down at his holy feet.
I begged him for mercy and to let me enter,
But first, three times, I smote my breast.

Dante, Purgatorio IX.109-111.

Introduction

The codification of prolonged grief disorder (PGD) advanced clinical understandings of bereavement at a fortuitous time. The American Psychiatric Association accepted PGD—which supersedes previously used terms such as “pathological” or “complicated” grief—as a diagnosis to include in the DSM-5-TR during a period when many expressed concern that increased problems of grieving would arise due to the COVID-19 pandemic (Eisma et al., 2020). The pandemic brought about disruptions in social support, rituals of mourning, care for the dead and dying, and other aspects of normal grief, and one potential effect of these disruptions is a change in the way people express and resolve bereavement guilt. Guilt receives ubiquitous mention in popular and scientific discussions of both the general grieving process and prolonged grief, but its actual role in grief has not been well studied (Li et al., 2014). A nuanced treatment of guilt is warranted to elucidate its effects on grief and thus guide future research and clinical practice for treating PGD.

Article Review Methods

Articles related to the neuropsychological development and manifestations of guilt and grief, along with their neuroimaging correlates (including fMRI), were selected from among the wide array of literature considering these two phenomena separately. Guilt and grief are reviewed separately and then compared. Next, to examine the role of guilt in prolonged grief disorder (PGD) as a scoping review with PRISMA guidelines (see Figure 1), all articles related to *guilt* and prolonged grief (using terms such as *prolonged*, *pathologic*, *pathological*, and *complicated* for the disorder, and terms such as *grief*, *grieving*, *bereavement*, *bereaved* to search for grief-related words) were considered when searching in PubMed, Scopus, and PsycInfo. Qualitative, quantitative, and mixed-methods studies from all years (ranging from 1964 to 2021) were included if they considered psychological or medical aspects of guilt and prolonged grief, discussed or involved human participants, and defined guilt or distinguished it specifically from other emotions. Papers were excluded that primarily compared guilt with other disorders besides PGD (e.g. major depressive disorder), did not discuss guilt relative to PGD, or did not fit the conceptual framework of the review. Data was charted independently, and synthesis of data is presented in a

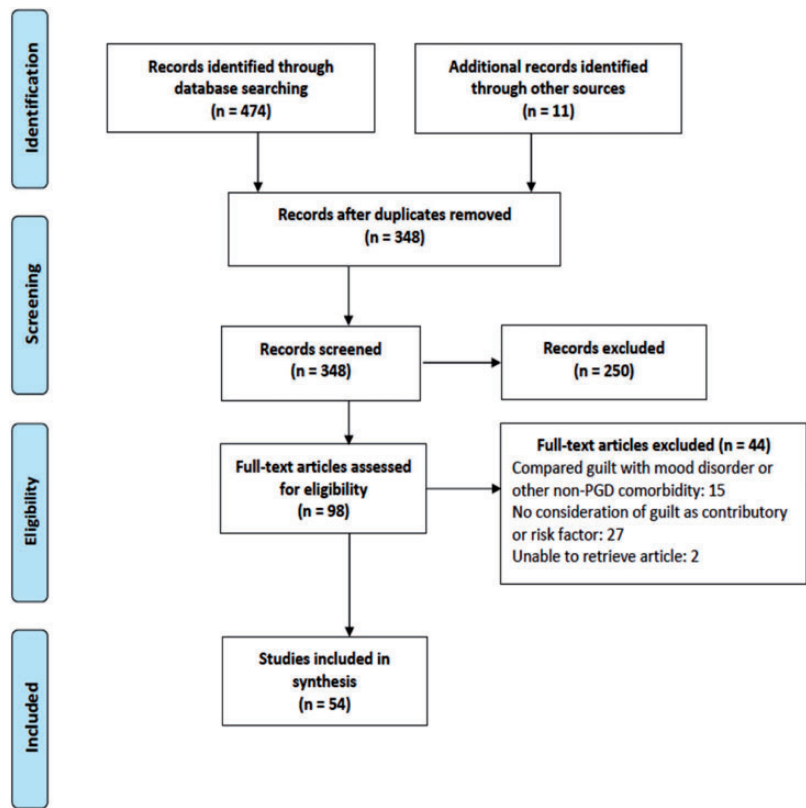


Figure 1. PRISMA Flow Diagram. Search of PubMed, Scopus and PsycInfo, 20 March 2021.

narrative format. Mechanisms by which guilt affects the development and resolution of PGD are discussed, with novel consideration of the role of positive developmental and prosocial aspects of guilt for research of PGD.

Defining and Distinguishing the Functions of Guilt

To examine the potential mechanisms by which guilt may influence the development and treatment of prolonged grief, we must first understand the concept of guilt and the ways it interacts with normal grief.

Guilt plays a strong role in the development of a sense of self, adding an emotional drive that motivates the individual’s perception of duty and the effects of his or her actions in the world. Defined as the emotion of being troubled by an action one has done or failed to do, guilt arises from a burden

of responsibility for unwanted consequences resulting from that action (Tangney, 1998). Guilt therefore enables a powerful (negative) sense of agency while impressing a burden of responsibility for consequences. Through this emotion, the individual identifies herself as the actor connected to a specific action—or inaction—and is able to see that action having an effect on others, constructing a sense of self to which she assigns responsibility for how her actions affect others. It is a self-conscious emotion, which means that it arises from self-appraising processes that contrast the current understanding of the self with the imagined ideal self, and thus guilt is essential to identity formation and regulating social behavior (Tracy & Robins, 2004). It generally arises in response to a negative appraisal of a situation but can manifest as both a positive or negative emotion, which can thus promote adaptive or maladaptive responses in the grieving process and other reactions to loss.

Hoffman's (2000) definition of guilt relates it to the development of empathy, for both are involved in motivating a person to change the consequences of behavior based on concern for the person affected, with whom the guilty person empathizes. Although empathy is not a part of every experience of guilt, the ability to empathize is necessary for developing the ability to feel mature guilt, as individuals must be able to make causal attributions to their actions in relation to their effect on others' emotional states (Silfver-Kuhalampi, 2008). With more developed empathy, one can maintain elaborate representations of others and thus feel guilty about more abstract concepts including missed opportunities or duties towards the deceased. Guilt thus provides one emotional impetus for the individual's development of "theory of mind," which is the ability to attribute to the self and to others mental states such as emotions, knowledge, beliefs, and intentions. Theory of mind is necessary for human cooperation and maintenance of trust within social groups, as accurate attribution of knowledge and motivations to others is a part of many basic and complex cooperative activities from building a group shelter to drafting an article. The link between the development of empathy—one emotional component of theory of mind—and mature guilt highlights the prosocial function of guilt and accounts for some of guilt's neuroanatomical correlates.

Without confining a definition of guilt to a wholly positive or negative emotion, a nuanced understanding of guilt can consider both its potentially adaptive and maladaptive effects while relating these effects to the ways people might cope with grief. Adaptive guilt refers to guilt that promotes positive outcomes, motivating a person to avoid transgressive actions such as that which contributed to the guilt in the first place. Adaptivity in guilt includes the impulse to make amends to the person or value system wronged, the development of empathy for victims of wrongdoing, and prosocial behavior such as seeking help from others (Tilghman-Osborne et al., 2010). In contrast, maladaptive guilt reduces motivation to engage in constructive behavior and is related to problems like mood disorders, avoidant behavior, and excessive fixation on the guilty action.

These adaptive and maladaptive effects may be further modified by shame, which is different from guilt and which is conceptually useful for contrasting with guilt in order to understand guilt's distinct functions especially with regard to grief. The two are sometimes mistakenly equated, in part due to the fact that self-conscious emotions can appear similar on the level of affect while differing markedly in what may stimulate them and how the individual may be aware of them (cf. Lewis, 2003; Tomkins, 1963). While guilt is focused on an individual's behavior, i.e. what one has or has not done, shame is an emotion connected to negative self-perception and is thus directed more towards the self than towards behavior.

Shame arises from a negative internal attribution that is stable and global—"I am a bad/low-status person"—while guilt occurs when the internal attribution relates to an action and is not stable or global—"My action/inaction caused harm to another person" (Lewis, 2003; Silfver-Kuhlampi, 2008). Whereas both shame and guilt have been popularly associated with mental disorders and excessive fixation on the self, their roles in promoting socialization and regulating interpersonal interactions are now more recognized throughout psychological literature (Tangney & Dearing, 2002). A recent example may be shame mediating the willingness of people to self-isolate and *not be seen with others* during the COVID-19 pandemic, contributing to an effective concerted effort to "stop the spread." In the same example, guilt would be at work in someone who, upon hearing a family member or friend had acquired the disease, *experienced self-blame* for being a possible carrier or limited further interactions with others out of *concern of putting others at risk*.

Actions pertaining to guilt are often intended to benefit others altruistically, and guilt is thought to be the more prosocial emotion. Still, there are many situations when shame and guilt might be maladaptive for responding to negative events: the individual can lose motivation via unresolved shame from a fixed perception of worthlessness in a social hierarchy causing self-directed anger, or the individual may feel guiltily overwhelmed by accumulated duties that he or she may not be able to meet, leading to negative self-attributions that contribute to pathologies such as anxiety disorder and depression (Silfver-Kuhlampi, 2008).

Defining Normal and Prolonged (Complicated) Grief

The grieving process over the death of loved ones, divorce, job loss, etc. is a process of coping with the loss such that the bereaved can eventually accept it, and navigating grief often involves participating in culturally specific rituals that assist in expressing emotion and moving the bereaved towards resolution (Kagawa-Singer, 1998). Throughout the grieving process, the bereaved typically experiences disbelief, yearning for the lost person or thing, anger, depression, and acceptance (Maciejewski et al., 2007). People experiencing bereavement

also experience physiological changes such as cortisol increases, sleep disturbances, hemodynamic alterations, and suppressed immune functioning, all of which may contribute to the increased morbidity and mortality observed in people surviving the loss of a close loved one (Buckley et al., 2012). Factors such as guilt may affect the quality and duration of the grieving process and thereby modify the cumulative effects of these physiological changes accompanying the psychiatric profile.

Grieving is a natural part of life that, though involving changes and responses to major changes in life, in itself should not usually be treated as pathological (cf. Shear et al., 2011). However, there are circumstances in which grief can fail to resolve and can prove disabling to individuals, persisting longer and more intensely than is acceptable to the bereaved and to the cultural norms of their community. Whereas Freud had cautioned against pathologizing grief, arguing that the depression associated with bereavement should be the focus of clinical treatment rather than the grief itself, some grief symptoms have now been found to be distinct from bereavement-related depression and can persist until treated with their own specific interventions (Boelen, 2020; Prigerson et al., 2009). Following the recommendation by the ICD-11 Workgroup on Stress-Associated Disorders to recognize prolonged grief disorder (PGD) as a new mental disorder, the American Psychiatric Association reviewed PGD—previously included in section III of DSM-5 for further study as “persistent complex bereavement disorder”—and in November 2020 approved its inclusion in DSM-5-TR (Moran, 2020; Prigerson et al., 2021). PGD is defined as “a grief response characterized by intense yearning/longing for the deceased person or a preoccupation with thoughts or memories of the deceased person” to a clinically significant degree at least twelve months following the death (American Psychiatric Association, 2013).

The codification of PGD comes at an opportune time: higher incidence of the disorder is thought to accompany those bereaved by cataclysmic or complex events involving large segments of society (Shear et al., 2011), and some articles have speculated that there will be a steep rise in complicated grief after the COVID-19 pandemic (Eisma et al., 2020; Kokou-Kpolou et al., 2020; Stroebe & Schut, 2021). During the pandemic, people were forced to reconsider practices surrounding the concept of a good death (Butler, 2020) and were often unable to participate in activities that could facilitate grieving such as group prayer (Anderson & De Souza, 2021) or being present at the moment of death (Menichetti Delor et al., 2021) or the funeral rite (Corpuz, 2021). The loss of such practices can cement the feelings of guilt that many rituals attempt to alleviate, and the effects of this loss may be borne out as we observe trends in mental health after the pandemic given the time criteria for PGD. This review does not focus exclusively on the impact of the pandemic on PGD, but the contribution of guilt to pandemic-related PGD is important and can be readily inferred from the following descriptions of the general relationship between

guilt and PGD. Since guilt is an inherently social emotion that often motivates individuals to act correctively to improve their relationships within communities, social isolation exacerbating guilt is one of the “conditions surrounding the pandemic” that creates “an unfortunate incubator for complicated grief” of the sort Doka’s letter warned could generate a “second pandemic” of PGD (2021).

While guilt is often mentioned as a presumed factor contributing to normal grief and especially pathological grief, notably in the settings of post-traumatic stress (Hibberd et al., 2010) and disenfranchisement (Attig, 2004), limited research has been devoted to understanding the exact relationship and mechanisms by which guilt influences the development of grief pathology (see LeBlanc et al., 2019 for an exception). Many articles list guilt as a potential contributing factor to grief pathology and assume a simple positive association between the intensity of guilt and grief, as in Kokou-Kpolou et al. (2020) consideration of guilt exacerbation—from lack of participation in mourning rituals—as one of several main factors to monitor in the predicted rise of COVID-related prolonged grief disorder incidence.

Given the multifaceted nature of guilt, there is no established consensus on whether and how guilt is associated with the development of prolonged grief (cf. Golden & Dalgleish, 2012). Perhaps in part owing to these varied roles of guilt in positively or negatively mediating recovery in grief, the DSM-5-TR does not directly list guilt among the criteria for PGD. In their review of bereavement-related guilt, Li et al. (2014) noted that there is “no general statement about the prevalence” of guilt in bereavement that is “possible or probably even useful,” because the question of prevalence necessitates understanding the different subgroups of people grieving and a clarification of guilt content, which can be diverse. They particularly noted that “whether guilt is causally related to complicated grief is a matter for further investigation,” and there remains a lack of conceptual and empirical knowledge on that relationship since their review (Li et al., 2014). Still, some progress has occurred to paint a fuller picture of the relationship between guilt and prolonged grief by respecting the complexity of guilt, examining each different aspect of guilt in turn. I.e., guilt may not be simply related to prolonged grief, but each facet of guilt may distinctly contribute towards or even protect against the development of prolonged grief.

In their study of the relationship between guilt and well-being in bereaved persons, Li et al. (2019) conducted both cross-sectional and longitudinal surveys to examine the hypotheses of positive association between guilt and complicated grief (CG, one older term now subsumed under prolonged grief disorder), positive association between guilt and depression, and a closer association of bereavement-related guilt with CG than with depression. Building on Li et al. (2014) multidimensional definition of bereavement guilt as “a remorseful emotional reaction in grieving, with the recognition of having failed to live up to one’s own inner standards” towards the deceased and death, they found that

there was some overlap between CG-guilt and depression-guilt, but that the magnitude of the association was greater between CG and guilt and that there were guilt subtypes specific to CG such as “responsibility guilt,” “indebtedness guilt,” and “guilt feeling” (Li et al., 2019). They thus clearly demonstrated different roles of guilt in prolonged grief from the well-known way grief contributes to depression. However, the mechanism for these roles and avenues for treatment remain generally unexplored, and there has also been a lack of consideration for how the positive and prosocial aspects of guilt could factor into protection against and treatment of prolonged grief. Furthermore, they did not consider shame as a confounding variable.

Since each subtype or particular aspect of guilt can affect the grieving process differently, further research should bear in mind the importance of examining different guilt-related manifestations independently in relation to different grief outcome variables. In their 2014 longitudinal study, Stroebe et al. found that high levels of self-blame—assigning to the self culpability for a death due to failure to meet standards (Weinberg, 1994)—were associated with higher initial levels of grief and slower decrease of grief symptoms over time. Meanwhile, they found that another manifestation of guilt, regret—painful thoughts and feelings about past actions and how potentially better outcomes could have occurred (Roese et al., 2009)—was unlikely to play any causal role in adjusting to loss, as initial levels of regret were unrelated to immediate levels and long-term changes in grief and depression (Stroebe et al., 2014). Thus, one implication of their study is that researchers and clinicians should specify which aspects of guilt, particularly those maladaptive to processing grief, that would be beneficial to target in treatment of PGD.

Other significant empirical studies exist that particularly link guilt to development of PGD remain scarce. Of those articles that do mention a relationship of guilt to pathological forms of grief, they tend to list guilt as among a constellation of emotions, for example as experienced by those grieving suicide (Norris & Clark, 2012), in combat-related comorbid PTSD as survivors’ guilt (Simon et al., 2018; 2020), in surviving family and caregivers of those chronically ill (Lientscher, 2006), after abortion (Gurpegui & Jurado, 2009; Whitney, 2017), and following stillbirth and perinatal death (Hvidtjørn et al., 2018; Martínez-Serrano et al., 2019; Schulze & Wermuth, 2007; Wells, 1991). Guilt thus commonly figures into popular and scholarly accounts of prolonged grief (and its predecessors prior to PGD codification) and warrants theoretical and empirical inquiry into guilt’s mechanisms in grief and treatment of prolonged grief.

Conceptual Bridges

Guilt is a complex emotion that is neither wholly negative nor wholly maladaptive, and therefore its role in the development of some forms of prolonged grief

cannot be one of simple causality. Instead of focusing on eliminating guilt entirely, research and treatment targeting guilt in PGD may be more successful in finding ways to prevent or correct guilt from becoming a maladaptive type. Guilt can become maladaptive to grief in various ways, of which we suggest several: excessive proneness to guilt may cause a person to hold him or herself unreasonably responsible for a death or loss, guilt becomes globalized or perceived as a stable characteristic of the individual such that an individual views him or herself as a “guilty person” (cf. Tracy & Robins, 2004), or some task or duty towards the object of guilt becomes impossible to fulfill and thereby becomes a perpetual stimulus for feeling unresolved guilt. Maladaptive guilt responses that correspond to aspects of PGD can provide promising areas for research and treatment, while novelty the prosocial aspects of guilt can yield ways to integrate the bereaved into a larger community of support to facilitate the grieving process.

Self-Blame in Guilt Proneness

Feeling unreasonably responsible for circumstances surrounding a loss would relate to the criteria under “grief response” in PGD, which mentions a “preoccupation with thoughts or memories of the deceased” or (in adolescents and children) on the circumstances of the death. The guilt response is dependent on theory of mind and the ability to empathize, connecting one’s own actions with an emotional and cognitive response in another person, and maladaptive guilt would do this to an unhealthy degree. A maladaptive guilt response could replay the circumstances of death and perceptions of negative affect in the deceased, unfairly attributing them to something blameworthy in the bereaved person. For the bereaved, maladaptive guilt would therefore cause or strengthen that preoccupation with the deceased through continual self-blame over the circumstances of death; a guilt prone person could easily think of many hypotheticals of how the death could have been prevented, how the bereaved could have made the passing more comfortable for the deceased, how the bereaved could have treated the deceased better in life, etc. Thus, there is the possibility to break such cycles of self-blame in guilt-prone people or those with a maladaptive guilt response in PGD using complicated grief treatment or other cognitive behavioral therapies, which we discuss in our recommendations for researching potential treatments.

Globalized Guilt: Perceived Failure to Fulfill a Role or Identity

The developmental aspects of guilt are relevant to other criteria of PGD, such as “identity disruption,” difficulty in “reintegration into life after the death,” and feeling meaninglessness in life as a result of the death. Although many popularly consider guilt simply as a negative emotion, we have discussed how it is instrumental to a sense of self and agency; the ability to feel negatively about an action

is linked to the ability to understand the self as the originator of that action. Guilt's role in developing a sense of self means that maladaptive guilt has the potential to disrupt that sense of self, leading to the self-perception of global and stable negative traits. If, for instance, the bereaved had found the relationship with the deceased unsatisfactory, such an assessment may introduce problems for relationships in other areas of life; one example would be a widower who had conflict with his wife over finances, and after the death of whom he could feel like as though his identity as a supporter and provider are gone, causing him to be a poor manager of his financial obligations to his children, friends, or other family. In cases of poorly regulated guilt resulting from conflict or other aspects related to the deceased, such guilt could lead to difficulty in maintaining an identity or reintegrating into normal life.

Duty-Related Guilt

Guilt can become maladaptive when it lingers in spite of the impossibility of fulfilling a guilt-inducing duty (cf. Silfver-Kuhlampi, 2008). Since guilt has a prosocial function and relates to the commission or omission of an action, one immediate question regarding the relationship between guilt and grief is what might be the functions and course of guilt towards a social object that is no longer accessible, e.g. the deceased. In addition to religious and spiritual reasons for feeling such guilt, guilt towards the dead may, as a more abstract form, continue to serve a developmental purpose while motivating the guilty person to be more considerate of others and engage in altruistic activities (Hoffman, 2000). It would seem the resolution of such guilt remains ambiguous, as the person towards whom one feels guilty is apparently unavailable to receive the benefits of any corrective action. However, as a more abstract form of guilt reflecting more mature powers of empathy, guilt towards a distant or deceased person can find resolution through more abstract fulfillments of duty or more complex acts of reconciliation and atonement.

Neuroanatomy of Guilt

The associations of guilt with functional regions have been well studied using functional magnetic resonance imaging (fMRI), while more recently there have been inroads towards establishing structural neurodevelopmental responses to guilt using structural magnetic resonance imaging. One of the earlier studies by Takahashi et al. (2004) compared brain activation during an emotional judgment task between guilt, embarrassment (now found to be a subtype of shame), and neutral control conditions. They sought to elucidate the evaluative process of guilt at the neural basis level rather than the direct effect of experiencing guilt through an induced emotional state, i.e. the subjects were reading and evaluating guilt-related sentences without feeling guilty themselves. In the guilt vs. the

neutral state, there were greater activations in the medial prefrontal cortex, left posterior superior temporal sulcus, and visual cortex. The medial prefrontal cortex in particular is necessary for memory retrieval and drawing from memory for decision-making: this area processes memories to form a context through which to interpret past experiences and uses those experiences to predict the most favorable outcome for a given situation (Euston et al., 2012). Embarrassment judgment activated the aforementioned areas even more intensely, along with broader activation in other areas such as the hippocampus, suggesting a more complex socially evaluative process in shame. As Takahashi et al. noted in their study, activation of these areas has been implicated in theory of mind. Thus, the study results supported the conceptual understanding of guilt as a self-conscious emotion important for development, since we had noted how theory of mind is necessary for socialization and identity formation.

Since the pilot studies by Takahashi and others, a much fuller picture of the neural mapping of guilt has developed through use of fMRI. Gifuni et al.'s (2017) meta-analysis reviewed 16 fMRI studies on guilt and identified 12 brain regions most consistently associated with the emotion. They first found activation clustered in the anterior cingulate cortex and the left anteromedial and superior prefrontal cortex. Other clusters were located in the right inferior frontal gyrus, the superior temporal cortex, the parahippocampal gyrus, and the middle temporal gyrus; there was also strong activation of the occipital visual regions. Additionally, their analysis showed strong functional connectivity between all of these clusters.

Regarding the anterior cingulate cortex (ACC) activation in grief, they hypothesized the structure is involved in first "detecting the conflict between what has been done and what should have been done" before "signaling this conflict through an aversive emotional experience and psychological pain" and finally "generating the associated physiological changes." Normally, the ACC contributes to the individual's powers of executive function through its responsibility for error recognition and adaptive responses to changing conditions (cf. Allman et al., 2001). Activations of the lingual gyrus and the cuneus of the visual cortex suggested strong responses to emotional visual stimuli in the development and processing of guilt. Besides other visual functions, the lingual gyrus and cuneus normally contribute to inhibitory control, i.e. the ability to focus attention to carrying out plans and to relevant visual stimuli while suppressing distractions. Thus, increased activity in those regions could indicate effort to suppress the emotional distraction occasioned by guilt. Taken overall, the activation and close functional interconnectedness of these areas support the characterization of guilt as a complex self-conscious emotion involving cognitive tasks ranging from self-representation and theory of mind, to evaluation of actions relative to internal standards and social standards, to conflict monitoring and weighing of moral values.

Beyond its role in contributing to a neuroanatomical model of guilt in general, neuroimaging has now also contributed to exploration of the role of guilt in normal development and in psychiatric disorders. Whittle et al. 2016 were the first to bring a developmental framework to studying neurodevelopmental correlates of guilt (and shame) in their 2016 structural MRI study of adolescents and young adults. Higher guilt-proneness was thought to be associated with less cortical thinning (since cortical thinning is linked to maturity and better socioemotional functioning), but once corrected for the effects of shame, it was found that only shame-proneness was associated with attenuation of cortical thinning, specifically in the lateral orbitofrontal cortex. Higher shame-proneness was also associated with thinner posterior cingulate cortex thickness and smaller amygdala volume. These findings bolster Tangney's (1998) argument that proneness to shame is usually maladaptive, centering on the self, while guilt proneness is more complicated and may promote prosocial cognition and behavior changes. While guilt proneness itself may not contribute to pathology, guilt that is maladaptive is clearly associated with the development of disorders such as depression, anxiety, OCD, and, we hypothesize, prolonged grief. Neuroimaging has already made fruitful comparisons between guilt and the manifestations of depression (Green et al., 2012), OCD (Basile et al., 2014), and other disorders, so similar comparisons may elucidate the ways guilt can be maladaptive in prolonged grief disorder.

Comparing Neuroimaging Findings Between Grief and Guilt

In the last two decades, neuroimaging of both general grief and complicated grief has distinguished areas of activation specific to each, creating potential to compare these areas to those of other emotional conditions such as guilt or depression. O'Connor (2019), who was involved in many of the following studies, summarized the neuroimaging findings in her 2019 review of grief. In the first ever fMRI study of grief, Gündel et al. (2003) used the modality to paint broad descriptive strokes of the variety of mental functions involved in grief, which is a complex emotional state involving brain regions for "affect processing, mentalizing, episodic memory retrieval, processing of familiar faces, visual imagery, autonomic regulation, and modulation/coordination of these functions." Viewing photos of deceased loved ones captioned with grief-related words, compared to a control of neutral word-captioned photos of strangers, demonstrated activation of hubs in the default network and salience network: photos activated the dorsal anterior cingulate cortex and insula, hubs of the salience network, while grief-related words activated the posterior cingulate cortex and medial prefrontal cortex, hubs in the default network (Andrews-Hanna et al., 2014; Gündel et al., 2003). The salience network allows the individual to distinguish objects of interest in the perceived environment and within the individual's thoughts and emotions, and thoughts of the deceased remain important to the bereaved until those thoughts are modified by the resolution of grief. The default network is a series

of networks that are less active when performing external tasks but activate during activities of self-cognition such as remembering, envisioning the self in the future, and evaluating one's social status and roles. These findings suggested that grief has very strong components of self-generated thought and paved the way for studies relating grief to mood disorders.

In addition to replicating the results of her and Gündel et al., 2003 study, O'Connor found in a comparison of bereaved women with and without CG that the basal ganglia's nucleus accumbens was more active in women with CG. Using the same grief elicitation task with captioned photos, they demonstrated that nucleus accumbens activation and self-reported yearning were positively and specifically correlated, while there was no correlation between nucleus accumbens activation and time since loss or positive or negative affect (O'Connor et al., 2008). The nucleus accumbens contains a high concentration of dopamine receptors that potentiate the formation of reward systems between particular actions and the feelings of motivation and reward that are related to the commission of such actions. Responding to memories of rewarding behavior encoded by the amygdala and hippocampus, the nucleus accumbens is thus activated when the individual is motivated to complete behaviors that have been associated with reward in the past. The region is activated as part of the yearning or "wanting" part of the ventral tegmental area—nucleus accumbens (VTA-NAcc) reward pathway, and its activity is also high in response to living attachment figures (Bartels & Zeki, 2004; Berridge et al., 2009). In bereavement, memories of deceased loved ones are associated with clear rewards like feelings of love and acceptance, fulfillment of physical needs, and in the case of some deceased attachment figures even the neurodevelopmental formation of the reward pathway in early life. Since the grieving process involves changing behaviors and relationships towards the deceased, the motivational responses towards memory stimuli of the deceased must change in the nucleus accumbens: the bereaved can no longer expect the same types of rewards and fulfilling behavior that interacting with the deceased previously provided. Neurons in the nucleus accumbens expressing GABA receptors may also regulate slow-wave sleep, which could account for some of the sleep disturbances that often accompany mourning. Thus, O'Connor et al.'s 2008 study points to a failure to downregulate yearning in the continued activation of the nucleus accumbens as one possible mechanism underlying the development of PGD, especially following the death of an attachment figure.

Other fMRI studies examining bereavement alone have not demonstrated consistent activation areas or added to a foundational understanding of PGD, perhaps due to heterogeneity in type of loss (e.g. pets in Freed et al., 2009) or participant age and time since loss (Arizmendi et al., 2016). Freed et al. (2009) used the Emotional Stroop task, which pairs emotionally salient words against neutral control words all printed in different colored ink, to test for participants' attentional bias towards deceased pets based on time taken to name the printed color. In the Emotional Stroop task, participants whose pets died took longer to

name the color of words (like “dog”) related to the pet, and they used fMRI to identify brain activity while the task was being completed. The study design produced difficulty in distinguishing which areas were activated by an emotional grief response distinct from regions involved in detecting word salience in general. In another neuroimaging study, Fernández-Alcántara et al. (2020) confirmed O’Connor et al.’s 2008 findings and also found differences in activation of large areas including the amygdala, midbrain, periaqueductal gray, cerebellum, and hippocampus in CG individuals viewing death-related pictures compared to non-bereaved controls; the nonspecificity of the activation areas coupled with how the study design compared CG individuals to non-bereaved (instead of non-CG bereaved) did not add to a neurophysiological understanding of how PGD develops. However, since we noted that a promising area of study has been the use of neuroimaging to compare guilt and psychiatric disorders, neuroimaging comparing guilt with prolonged grief—as well as comparing PGD with other disorders—may also generate insights into the physiology of grief and possible treatments for PGD. A neuroanatomical understanding of the role of guilt in PGD would additionally have applicability in assessing the effectiveness of psychiatric interventions. One way this assessment could occur is through evaluation of the functional connectivity between guilt- and grief-related regions before and after interventions similar to how fMRI studies have already assessed the effects of interventions for issues such as post traumatic stress (Monti et al., 2017).

No studies have yet directly examined the functional neuroanatomy of guilt in PGD, though we may hypothesize neural mechanisms of PGD vulnerability related to different forms of guilt. Drawing from the aforementioned imaging studies of guilt and grief separately, grief-related guilt could involve activation of the anterior cingulate cortex, which is active in both guilt (Gifuniet al., 2017) and grief (Gündel et al., 2003). The ACC is part of the salience network, which would be activated in the tendency of the bereaved to see everything as a reminder of the object of grief. In these activations, we could speculate that the ACC would be involved in continually bringing to attention obligations to the object of grief or an unfulfilled duty, causing psychological distress and intrusive thoughts when the obligations are not completed—a function of guilt. The nucleus accumbens, which we also saw activated in O’Connor’s (2008) study of grief, could also be involved in a comparison of guilt and grief. The nucleus accumbens would have a role in “yearning” for the object of grief, e.g. desire to be united with the dead or desire to make up some task or part of the relationship that was lacking while the person was alive.

Areas of Treatment to Explore

Treatments for PGD should consider how to take advantage of adaptive aspects of guilt while minimizing maladaptive guilt and promoting eventual extinction

of guilt feelings, given the conceptual and neurophysiological connections between guilt and PGD. Complicated grief treatment (CGT), also known as complicated grief therapy, is a well-established intervention for PGD, while interventions such as biofeedback and community-based rituals are promising complements to individuals' efforts in resolving grief.

Complicated grief treatment was developed by Shear et al. (2005) and draws from cognitive behavioral therapy and interpersonal psychotherapy to treat grief "symptoms such as sadness, guilt, and social withdrawal." According to their protocol, the treatment facilitates grief by alternating patients' attention to loss (the experience of losing the deceased) and restoration (to a satisfying life) through reimagining situations related to the death and recalling or imagining conversations with the deceased, altogether called "revisiting exercises." Restoration entails patients considering "what they would like for themselves" if grief were not so intense, identifying goals, and making concrete plans to achieve the goals and resolve any interpersonal disputes. In PGD involving guilt, guilt is a powerful paradigm that involves both attention to loss, through self-blame in the death and regret over how events occurred, and restoration, through motivating the bereaved to make amends. Attention to guilt within the structure of CGT will thus help clinicians and patients to identify the guilt present in the revisiting exercises and the goals that arise in response to guilt, resolving prolonged grief and accompanying guilt. Positively, guilt motivates corrective action and is thus a source of goals such as making peace with others connected to the deceased or fulfilling a promise made to the deceased.

In one of the few clinical trials specifically examining guilt in PGD, Glickman et al. (2017) randomly assigned complicated grief-screened positive participants to receive either CGT ($n = 35$) or interpersonal psychotherapy ($n = 34$), with the outcome of improvement measured by the Clinical Global Impression Improvement Scale, i.e. self- and independent evaluator-reported. They found that reduction of guilt—as self-blame—was a significant mediator in reducing CG symptoms in participants and also in accounting for greater improvement in the complicated grief treatment group versus the interpersonal psychotherapy group. Reduced negative thoughts about the future and reduced avoidance were also significant mediators, and the study controlled for potential interactions between the three mediators. While their clinical trial linked one negative aspect of guilt, self-blame, with PGD, the roles of other aspects of guilt in mediating PGD development and recovery warrant exploration as potentially fruitful targets in CGT.

Biofeedback therapy is a form of patient training that can supplement patients' other treatment modalities through developing awareness of and responses to guilt and grief-related symptoms in PGD. It has been shown to be efficacious for a variety of medical conditions including constipation, hypertension, anxiety, and chronic pain, and possibly efficacious for depressive disorders and PTSD (Frank et al., 2010). In biofeedback, patients learn to use

variables (e.g. heart rate or heart rate variability) to gain control of physical processes that patients had previously considered automatic responses. Use of biofeedback in PGD in general has not yet received much study, and extensive description of possible biofeedback applicability for PGD is beyond the scope of this review (but see Arnette (1996) for a conceptual review of biofeedback in PGD). Treatment modalities associated with biofeedback, such as relaxation training and desensitization, may help patients recognize and mitigate stress responses to guilt in PGD since there are many physiological changes accompanying grief as already discussed.

Humans have historically discharged obligations towards the dead and mitigated the effects of guilt through rituals surrounding the period of death. Prior to death, the dying person's will, the gathering of loved ones, and reconciliations all converge in the rituals of *ars moriendi* that provides spiritual aid to the dying and helps the living prepare for change. Afterwards, burial rites and other mourning rituals provide a sense of closure and help the bereaved adjust to a new stage of life without the deceased. Part of this sense of closure is the discharge of duties intended to honor the deceased and, in some cases, to ease their passage into the next realm of existence. Being present for the time of death may allow another experience closely related to grief, forgiveness, to occur between the dying and the bereaved, which may remove sources of physiological and psychological stress and improve social cohesion (Newberg et al., 2000). Rituals such as a wake or reception of the body provide further opportunities to express guilt or direct forgiveness toward the deceased, while the bereaved may also console and resolve conflicts with one another.

In addition to providing space to express sorrow and ask for forgiveness, some rituals enable the fulfillment of duty—preventing guilt related to inaction—by virtue of being performed on behalf of the deceased, as in the case of the Requiem or other Masses offered for the sake of the dead in Roman Catholicism to speed their time of purification in Purgatory. In these and other services, there is a release of the living from their roles as caregivers and an acknowledgement that the major obligation towards the deceased is to give them up. In the committal service of burial in the Anglican Book of Common Prayer (one of the defining influences on the development of the English language), action for the sake of the deceased finally entails letting go of the charge of their care to God, hence the name of the service: “We *commend* to Almighty God our brother (or sister), and we *commit* his body to the ground” (The Anglican Church in North America, 2019, emphasis ours). Mourning rituals simultaneously allow fulfillment of obligations, provide closure, and strengthen the support community, among other benefits, which could help resolve guilt and facilitate normal grieving.

The loss of mourning rituals or an inability to complete them can raise concerns for increased incidence of PGD, which some warned could occur during the COVID-19 pandemic (Corpuz, 2021; Goveas & Shear, 2020).

Some rituals could not be performed due to time sensitivity—they required travel, or performance within a certain time from the death—or due to limitations on gathering, as when Orthodox Jewish men were unable to gather in the quorum (minyan) of ten required to say the mourner's Kaddish. Failure to complete such rituals could contribute to development of PGD through maladaptive guilt that continually brings to attention unfulfilled obligations, interfering with the abatement of attention towards the deceased that is necessary in resolution of grief. Given the importance of mourning rituals and potential consequences of their loss, facilitating mourning rituals could be considered in possible interventions for PGD. Researchers could draw from the prosocial aspects of guilt when designing and testing interventions, and the role of guilt in social interaction can drive people to work together to complete rituals of mourning. Interventions involving rituals have already shown promise in treatment of PGD (Norton & Gino, 2014; Sas & Coman, 2016) and other disorders, and consideration of guilt may bolster such interventions and elucidate new possibilities for treatment.

Summary, Limitations, and Future Directions

Guilt is a complex self-conscious emotion instrumental to moral and cognitive development but also implicated in disorders such as major depressive disorder, obsessive-compulsive disorder, and prolonged grief disorder. Neuroimaging of guilt has advanced in the past two decades along with our conceptual understanding, allowing comparisons of the role of guilt with various psychiatric disorders. In these comparisons and future studies, it is important to distinguish the particular aspect of guilt thought to contribute to a disease process, as guilt has diverse manifestations that may be adaptive or maladaptive. A substantial understanding of grief and its pathologies has developed, notably with the recent codification of PGD, while neuroanatomical models of grief are beginning to form. Despite extensive mention of guilt in literature on grief, there are few studies examining the mechanisms by which guilt affects grief and the development of PGD.

Therefore, a limitation of this comparison and review is the ongoing iterative understanding and application of PGD research, which may result in the removal of some aspects of PGD that we had considered from future guidelines. Conversely, new understandings of general and prolonged grief that we had not considered may arise during this iterative process, once the DSM-5-TR is released and PGD is incorporated into it. While this comparison of guilt and grief will, we hope, remain relevant to conceptual understandings of the two, the research and clinical implications of its function as a scoping review are up to date as of March 2021.

Neuroimaging comparisons of PGD with other psychiatric disorders as well as with guilt will provide a fuller neurophysiological and anatomical picture of

the newly codified disorder while informing current methods for treating PGD. We proposed several aspects of guilt as areas for further research on the development of PGD based on the conceptual proximity of these aspects with certain criteria for PGD, including excessive guilt proneness, globalization of guilt, and unresolved obligation-related guilt. The prosocial and developmentally important aspects of guilt have not received much attention in literature related to guilt in the treatment of mental disorders. Since guilt has a role in the development of a sense of self and networks of social support, and PGD involves disruption of that sense of self and social dysfunction, the potentially positive aspects of guilt present a novel avenue for research of treatment of PGD and other disorders.

Acknowledgments

We thank Allie Burton, Samantha Einspahr, Hope Kean, and William Grant Schultheis for discussions and comments on the manuscript. We also thank Sidney Kimmel Medical College at Thomas Jefferson University for its support.

Declaration of Conflicting Interests


The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

ORCID iDs

Brandon Joa  <https://orcid.org/0000-0001-6792-4193>

Andrew B. Newberg  <https://orcid.org/0000-0001-8230-1752>

References

- Allman, J. M., Hakeem, A., Erwin, J. M., Nimchinsky, E., & Hof, P. (2001). The anterior cingulate cortex. The evolution of an interface between emotion and cognition. *Annals of the New York Academy of Sciences*, 935, 107–117.
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Arlington, VA: Author.
- Anderson, D., & De Souza, J. (2021). The importance and meaning of prayer rituals at the end of life. *British Journal of Nursing*, 30(1), 34–39. <https://doi.org/10.12968/bjon.2021.30.1.34>
- Andrews-Hanna, J. R., Smallwood, J., & Spreng, R. N. (2014). The default network and self-generated thought: Component processes, dynamic control, and clinical relevance. *Annals of the New York Academy of Sciences*, 1316(1), 29–52. <https://doi.org/10.1111/nyas.12360>

- Arizmendi, B., Kasznia, K. A. W., & O'Connor, M. F. (2016). Disrupted prefrontal activity during emotion processing in complicated grief: An fMRI investigation. *NeuroImage*, 124(Pt A), 968–976. <https://doi.org/10.1016/j.neuroimage.2015.09.054>
- Arnette, J. K. (1996). Physiological effects of chronic grief: A biofeedback treatment approach. *Death Studies*, 20(1), 59–72. <https://doi.org/10.1080/07481189608253411>
- Attig, T. (2004). Disenfranchised grief revisited: Discounting hope and love. *OMEGA—Journal of Death and Dying*, 49(3), 197–215. <https://doi.org/10.2190/P4TT-J3BF-KFDR-5JB1>
- Bartels, A., & Zeki, S. (2004). The neural correlates of maternal and romantic love. *NeuroImage*, 21(3), 1155–1166. <https://doi.org/10.1016/j.neuroimage.2003.11.003>
- Basile, B., Mancini, F., Macaluso, E., Caltagirone, C., & Bozzali, M. (2014). Abnormal processing of deontological guilt in obsessive-compulsive disorder. *Brain Structure & Function*, 219(4), 1321–1331. <https://doi.org/10.1007/s00429-013-0570-2>
- Berridge, K. C., Robinson, T. E., & Aldridge, J. W. (2009). Dissecting components of reward: ‘liking’, ‘wanting’, and learning. *Current Opinion in Pharmacology*, 9(1), 65–73. <https://doi.org/10.1016/j.coph.2008.12.014>
- Boelen, P. A., Eisma, M. C., Smid, G. E., & Lenferink, L. I. M. (2020). Prolonged grief disorder in section II of DSM-5: A commentary. *European Journal of Psychotraumatology*, 11(1), 1771008–1771025
- Buckley, T., Sunari, D., Marshall, A., Bartrop, R., McKinley, S., & Tofler, G. (2012). Physiological correlates of bereavement and the impact of bereavement interventions. *Dialogues in Clinical Neuroscience*, 14(2), 129–139. <https://doi.org/10.31887/DCNS.2012.14.2/tbuckley>
- Butler, K. (2020). Covid is reshaping death. And maybe life. *The Wall Street Journal*. <https://www.wsj.com/articles/covid-is-reshaping-death-and-maybe-life-11608061681?mod=e2fb&fbclid=IwAR0JpYBO20NB5q8c0cP66ulHB6SW0fk6q1izPIb-Q3LILmI4jkXksuv482U>
- Corpuz, J. C. G. (2021). Beyond death and afterlife: The complicated process of grief in the time of COVID-19. *J Public Health (Oxf)*. <https://doi.org/10.1093/pubmed/fdaa247>
- Eisma, M. C., Boelen, P. A., & Lenferink, L. I. M. (2020). Prolonged grief disorder following the coronavirus (COVID-19) pandemic. *Psychiatry Research*, 288, 113031. <https://doi.org/10.1016/j.psychres.2020.113031>
- Euston, D. R., Gruber, A. J., & McNaughton, B. L. (2012). The role of medial prefrontal cortex in memory and decision making. *Neuron*, 76(6), 1057–1070. <https://doi.org/10.1016/j.neuron.2012.12.002>
- Fernández-Alcántara, M., Verdejo-Román, J., Cruz-Quintana, F., Pérez-García, M., Catena-Martínez, A., Fernández-Ávalos, M. I., & Pérez-Marfil, M. N. (2020). Increased amygdala activations during the emotional experience of death-related pictures in complicated grief: An fMRI study. *Journal of Clinical Medicine*, 9(3), 851–820
- Frank, D. L., Khorshid, L., Kiffer, J. F., Moravec, C. S., & McKee, M. G. (2010). Biofeedback in medicine: Who, when, why and how? *Mental Health in Family Medicine*, 7(2), 85–91.
- Freed, P. J., Yanagihara, T. K., Hirsch, J., & Mann, J. J. (2009). Neural mechanisms of grief regulation. *Biological Psychiatry*, 66(1), 33–40. <https://doi.org/10.1016/j.biopsych.2009.01.019>

- Gifuni, A. J., Kendal, A., & Jollant, F. (2017). Neural mapping of guilt: A quantitative meta-analysis of functional imaging studies. *Brain Imaging and Behavior*, 11(4), 1164–1178. <https://doi.org/10.1007/s11682-016-9606-6>
- Glickman, K., Shear, M. K., & Wall, M. M. (2017). Mediators of outcome in complicated grief treatment. *Journal of Clinical Psychology*, 73(7), 817–828. <https://doi.org/10.1002/jclp.22384>
- Golden, A.-M J., & Dalgleish, T. (2012). Facets of pejorative self-processing in complicated grief. *Journal of Consulting and Clinical Psychology*, 80(3), 512–524. <https://doi.org/10.1037/a0027338>
- Goveas, J. S., & Shear, M. K. (2020). Grief and the COVID-19 pandemic in older adults. *The American Journal of Geriatric Psychiatry*, 28(10), 1119–1125. <https://doi.org/10.1016/j.jagp.2020.06.021>
- Green, S., Lambon Ralph, M. A., Moll, J., Deakin, J. F. W., & Zahn, R. (2012). Guilt-Selective functional disconnection of anterior temporal and subgenual cortices in major depressive disorder. *Archives of General Psychiatry*, 69(10), 1014–1021. <https://doi.org/10.1001/archgenpsychiatry.2012.135>
- Gündel, H., O'Connor, M. F., Littrell, L., Fort, C., & Lane, R. D. (2003). Functional neuroanatomy of grief: An FMRI study. *The American Journal of Psychiatry*, 160(11), 1946–1953. <https://doi.org/10.1176/appi.ajp.160.11.1946>
- Gurpegui, M., & Jurado, D. (2009). Complicaciones psiquiátricas del aborto [Psychiatric complications of abortion]. *Cuad Bioet*, 20(70), 381–392.
- Hibberd, R., Elwood, L. S., & Galovski, T. E. (2010). Risk and protective factors for posttraumatic stress disorder, prolonged grief, and depression in survivors of the violent death of a loved one. *Journal of Loss and Trauma*, 15(5), 426–447. <https://doi.org/10.1080/15325024.2010.507660>
- Hoffman, M. L. (2000). *Empathy and moral development: Implications for caring and justice*. Cambridge University Press. <https://doi.org/10.1017/CBO9780511805851>
- Hvidtjørn, D., Prinds, C., Bliddal, M., Henriksen, T. B., Cacciatore, J., & O'Connor, M. (2018). Life after the loss: Protocol for a danish longitudinal follow-up study unfolding life and grief after the death of a child during pregnancy from gestational week 14, during birth or in the first 4 weeks of life. *BMJ Open*, 8(12), e024278. <https://doi.org/10.1136/bmjopen-2018-024278>
- Kagawa-Singer, M. (1998). The cultural context of death rituals and mourning practices. *Oncology Nursing Forum*, 25(10), 1752–1756.
- Kokou-Kpolou, C. K., Fernández-Alcántara, M., & Cénat, J. M. (2020). Prolonged grief related to COVID-19 deaths: Do we have to fear a steep rise in traumatic and disenfranchised griefs? *Psychological Trauma: Theory, Research, Practice, and Policy*, 12(S1), S94–S95. <http://dx.doi.org/10.1037/tra0000798>
- LeBlanc, N., & Toner, E., & O'Day, E., & Moore, C., & Marques, L., & Robinaugh, D., & McNally, R. (2019). Shame, guilt, and pride after loss: Exploring the relationship between moral emotions and psychopathology in bereaved adults. *Journal of Affective Disorders*, 263. <https://doi.org/10.1016/j.jad.2019.11.164>
- Lewis, M. (2003). The role of the self in shame. *Social Research*, 70(4), 1181–1204. www.jstor.org/stable/40971966
- Li, J., Tendeiro, J. N., & Stroebe, M. (2019). Guilt in bereavement: Its relationship with complicated grief and depression. *International Journal of Psychology: Journal International de Psychologie*, 54(4), 454–461. <https://doi.org/10.1002/ijop.12483>

- Li, J., & Stroebe, Ms., & Chan, C., & Chow, A. (2014). Guilt in bereavement: A review and conceptual framework. *Death Studies*, 38(1–5), 165–171. <https://doi.org/10.1080/07481187.2012.738770>
- Lientscher, M. (2006). Kann die begleitung angehöriger eines palliativpatienten eine pathologische trauerreaktion verhindern? [Is it possible to avoid pathological grief if relatives of patients with palliative diseases are supported?]. *Wiener Medizinische Wochenschrift*, 156(9–10), 288–293. <https://doi.org/10.1007/s10354-006-0291-8>. PMID: 16830248
- Maciejewski, P. K., Zhang, B., Block, S. D., & Prigerson, H. G. (2007). An empirical examination of the stage theory of grief. *JAMA*, 297(7), 716–723. <https://doi.org/10.1001/jama.297.7.716>. Erratum in: *JAMA*, 2007, 297, 2200.
- Martínez-Serrano, P., Pedraz-Marcos, A., Solís-Muñoz, M., & Palmar-Santos, A. M. (2019). The experience of mothers and fathers in cases of stillbirth in Spain. A qualitative study. *Midwifery*, 77, 37–44. <https://doi.org/10.1016/j.midw.2019.06.013>.
- Menichetti Delor, J. P., Borghi, L., C. d., San Marco, E., Fossati, I., & Vegni, E. (2021). Phone follow up to families of COVID-19 patients who died at the hospital: Families' grief reactions and clinical psychologists' roles. *International Journal of Psychology*, <https://doi.org/10.1002/ijop.12742>
- Monti, D. A., Tobia, A., Stoner, M., Wintering, N., Matthews, M., He, X. S., Doucet, G., Chervoneva, I., Tracy, J. I., & Newberg, A. B. (2017). Neuro emotional technique effects on brain physiology in cancer patients with traumatic stress symptoms: Preliminary findings. *Journal of Cancer Survivorship*, 11(4), 438–446. <https://doi.org/10.1007/s11764-017-0601-8>
- Moran, M. (2020). Board approves new prolonged grief disorder for *DSM*. *Psychiatric News*, 55(21). <https://doi.org/10.1176/appi.pn.2020.11a12>
- Newberg, A., & D'Aquili, E. G., & Newberg, S. K., & Demarici, V. (2000). The neuro-psychological correlates of forgiveness. *Forgiveness: Theory, Research and Practice*, 91–110.
- Norris, D., & Clark, M. S. (2012). Evaluation and treatment of the suicidal patient. *American Family Physician*, 85(6), 602–605.
- Norton, M. I., & Gino, F. (2014). Rituals alleviate grieving for loved ones, lovers, and lotteries. *Journal of Experimental Psychology General*, 143(1), 266–272. <https://doi.org/10.1037/a0031772>
- O'Connor, M. F., Wellisch, D. K., Stanton, A. L., Eisenberger, N. I., Irwin, M. R., & Lieberman, M. D. (2008). Craving love? Enduring grief activates brain's reward center. *NeuroImage*, 42(2), 969–972. <https://doi.org/10.1016/j.neuroimage.2008.04.256>
- O'Connor, M. F. (2019). Grief: A brief history of research on how body, mind, and brain adapt. *Psychosomatic Medicine*, 81(8), 731–738. <https://doi.org/10.1097/PSY.0000000000000717>
- Prigerson, H. G., Horowitz, M. J., Jacobs, S. C., Parkes, C. M., Aslan, M., Goodkin, K., Raphael, B., Marwit, S. J., Wortman, C., Neimeyer, R. A., Bonanno, G. A., Block, S. D., Kissane, D., Boelen, P., Maercker, A., Litz, B. T., Johnson, J. G., First, M. B., & Maciejewski, P. K. (2009). Prolonged grief disorder: Psychometric validation of criteria proposed for DSM-V and ICD-11. *P LoS medicine*, 6(8), e1000121. <https://doi.org/10.1371/journal.pmed.1000121>.

- Prigerson, H., & Boelen, P. A., & Xu, J., & Smith, K. V., & Maciejewski, P. (2021). Validation of the new DSM-5-TR criteria for prolonged grief disorder and the PG-13-revised (PG-13-R) scale. *World Psychiatry*, 20(1), 96–106. <https://doi.org/10.1002/wps.20823>
- Roose, N. J., Epstude, K., Fessel, F., Morrison, M., Smallman, R., Summerville, A., Galinsky, A. D., & Segerstrom, S. (2009). Repetitive regret, depression, and anxiety: Findings from a nationally representative survey. *Journal of Social and Clinical Psychology*, 28(6), 671–688. <https://doi.org/10.1521/jscp.2009.28671>
- Sas, C., & Coman, A. (2016). Designing personal grief rituals: An analysis of symbolic objects and actions. *Death Studies*, 40(9), 558–569. <https://doi.org/10.1080/07481187.2016.1188868>.
- Schulze, A., & Wermuth, I. (2007). Palliative versorgung bei früh- und reifgeborenen mit sehr ungünstiger prognose [Compassionate care for terminally ill term and preterm infants. *Zeitschrift Für Geburtshilfe Und Neonatologie*, 211(2), 54–59. <https://doi.org/10.1055/s-2005-836629>. PMID: 17486525.
- Shear, K., Frank, E., Houck, P. R., & Reynolds, C. F. (2005). Treatment of complicated grief: A randomized controlled trial. *JAMA*, 293(21), 2601–2608. <https://doi.org/10.1001/jama.293.21.2601>
- Shear, M. K., Simon, N., Wall, M., Zisook, S., Neimeyer, R., Duan, N., Reynolds, C., Lebowitz, B., Sung, S., Ghesquiere, A., Gorscak, B., Clayton, P., Ito, M., Nakajima, S., Konishi, T., Melhem, N., Meert, K., Schiff, M., O'Connor, M.-F., . . . Keshaviah, A. (2011). Complicated grief and related bereavement issues for DSM-5. *Depression and Anxiety*, 28(2), 103–117. <https://doi.org/10.1002/da.20780>
- Silfver-Kuhlampi, M. (2008). *The sources of moral motivation: Studies on empathy, guilt, shame and values*. Department of Social Psychology, University of Helsinki.
- Simon, N. M., Hoepfner, S. S., Lubin, R. E., Robinaugh, D. J., Malgaroli, M., Norman, S. B., Acierno, R., Goetter, E. M., Hellberg, S. N., Charney, M. E., Bui, E., Baker, A. W., Smith, E., Kim, H. M., & Rauch, S. A. M. (2020). Understanding the impact of complicated grief on combat related posttraumatic stress disorder, guilt, suicide, and functional impairment in a clinical trial of post-9/11 service members and veterans. *Depression and Anxiety*, 37(1), 63–72. <https://doi.org/10.1002/da.22911>. Erratum in: *Depress Anxiety*, 2020, 37(9), 944.
- Simon, N. M., O'Day, E. B., Hellberg, S. N., Hoepfner, S. S., Charney, M. E., Robinaugh, D. J., Bui, E., Goetter, E. M., Baker, A. W., Rogers, A. H., Nadal-Vicens, M., Venners, M. R., Kim, H. M., & Rauch, S. A. M. (2018). The loss of a fellow service member: Complicated grief in post-9/11 service members and veterans with combat-related posttraumatic stress disorder. *Journal of Neuroscience Research*, 96(1), 5–15. <https://doi.org/10.1002/jnr.24094>
- Stroebe, M., Stroebe, W., van de Schoot, R., Schut, H., Abakoumkin, G., & Li, J. (2014). Guilt in bereavement: The role of self-blame and regret in coping with loss. *PLoS One*, 9(5), e96606. <https://doi.org/10.1371/journal.pone.0096606>.
- Stroebe, M., & Schut, H. (2021). Bereavement in times of COVID-19: A review and theoretical framework. *Omega*, 82(3), 500–522. <https://doi.org/10.1177/0030222820966928>
- Takahashi, H., Yahata, N., Koeda, M., Matsuda, T., Asai, K., & Okubo, Y. (2004). Brain activation associated with evaluative processes of guilt and embarrassment: An

- fMRI study. *NeuroImage*, 23(3), 967–974. <https://doi.org/10.1016/j.neuroimage.2004.07.054>.
- Tangney, J. P. (1998). *How does guilt differ from shame?* In J. Bybee (Ed.), *Guilt and children* (pp. 1–17). (Reprinted in modified form from *American Behavioral Scientist*, 1995, 38, pp. 1132–1145). Academic Press. <https://doi.org/10.1016/B978-012148610-5/50002-3>
- Tangney, J. P., & Dearing, R. L. (2002). *Emotions and social behavior. Shame and guilt*. Guilford Press.
- Tilghman-Osborne, C., Cole, D. A., & Felton, J. W. (2010). Definition and measurement of guilt: Implications for clinical research and practice. *Clinical Psychology Review*, 30(5), 536–546. <https://doi.org/10.1016/j.cpr.2010.03.007>
- Tomkins, S. (1963). *Affect imagery consciousness: Vol. 2. The negative affects*. Springer.
- Tracy, J., & Robins, R. (2004). Putting the self into self-conscious emotions: A theoretical model. *Psychological Inquiry—Inquiry*, 15(2), 103–125. https://doi.org/10.1207/s15327965pli1502_01
- Weinberg, N. (1994). Self-blame, other blame, and desire for revenge: Factors in recovery from bereavement. *Death Studies*, 18(6), 583–593.
- Wells, R. G. (1991). Managing miscarriage. The need for more than medical mechanics. *Postgraduate Medicine*, 89(2), 207–212. <https://doi.org/10.1080/00325481.1991.11700829>
- Whitney, D. K. (2017). Emotional sequelae of elective abortion: The role of guilt and shame. *The Journal of Pastoral Care & Counseling*, 71(2), 98–105. <https://doi.org/10.1177/1542305017708159>
- Whittle, S., Liu, K., Bastin, C., Harrison, B. J., & Davey, C. G. (2016). Neurodevelopmental correlates of proneness to guilt and shame in adolescence and early adulthood. *Developmental Cognitive Neuroscience*, 19, 51–57. <https://doi.org/10.1016/j.dcn.2016.02.001>

Author Biographies

Brandon Joa is a medical student at the Sydney Kimmel Medical School at Thomas Jefferson University. He is also an ENS, Medical Corps, USNR. He graduated from Princeton with a BA in religion.

Andrew B. Newberg, MD, is a professor in the Department of Integrative Medicine and Nutritional Sciences and research director at the Marcus Institute of Integrative Health at Thomas Jefferson University. Dr. Newberg has published extensively on the relationship between the brain and various mental processes including cognition, emotion, and spirituality.