Kinship in Prolonged Grief Disorder: Exploring the Role of Unexpectedness of Death and Time Since Loss

Shafqat A. Buttar (s2666324)

Department of Psychology, University of Twente

Behavioural Management and Social Sciences

1st Supervisor: Lieke Nijborg

2nd Supervisor: Justina Pociunaite

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Abstract

Grief is a universal emotion, but for some (10%), it becomes pathological, which can be categorized as Prolonged Grief Disorder (PGD). This study examines risk factors contributing to PGD in traumatically bereaved individuals, focusing on kinship and circumstances of death. We hypothesized that losing a child or partner would lead to more severe PGD symptoms compared to other relationships. Additionally, those distantly related to the deceased who lost someone due to suicide, might experience intensified symptoms due to the suddenness and lack of preparedness of the loss. We also expected PGD symptoms to decrease more over time for those who lost distant relatives or friends. The study included 47 participants. Data were collected in three phases (T1, ESM, T2), primarily focusing on demographics and grief through surveys. Only T1 data were used for analysis, which included a t-test to analyze kinship and PGD, and two separate moderation analyses. The first moderation examined unexpectedness of death as a possible variable influencing the relationship between kinship and PGD in suicidally bereaved people. A second moderation analysis examined whether time since loss moderated the relationship between kinship and PGD in the context of traumatic bereavement.
No significant findings emerged; kinship was not associated with PGD, nor did unexpectedness or time since loss moderate this relationship. These results highlight the need for larger, more diverse samples in future research on traumatic bereavement. In order to understand these risk factors better, it is essential to explore additional variables, such as the quality of the relationship. Identifying risk factors is crucial for providing timely support to those affected by traumatic loss.

Key words: Prolonged Grief , Traumatic bereavement, Kinship, Unexpectedness of loss, Time since loss.

<center>**Introduction**</center>

Prolonged grief disorder

      Grief is a universal and natural emotion that everyone experiences at some point in their lives (Prigerson et al., 2021). The majority of individuals experience grief most intensely in the immediate aftermath of loss, and it gradually fades over several months. However, for a considerable minority of people (10%) the grief becomes pathological, leading to dysfunctionality in daily life (Lundorff et al., 2017). This has been referred to as *Prolonged Grief Disorder* (PGD). Since 2022, PGD has been included in the Diagnostic and Statistical Manual of Mental Disorders, Text Revision (DSM-5-TR) (American Psychiatric Association, 2020).

      The main symptoms of PGD consist of an intense yearning for the deceased, along with preoccupation with thoughts or memories of them (Lundorff et al.,2017). Besides impairments in daily activities, individuals may also be unable to experience positive emotions or accept the loss. Moreover, these symptoms result in substantial distress or disruptions in social, work-related, or other key aspects of daily life. For a possible diagnosis of PGD, these symptoms should have occurred nearly every day for at least the last month. A time criterion of 1 year post-loss has been suggested to ensure that normal grief reactions after bereavement are not confounded with PGD (Prigerson et al., 2021).

Traumatic Bereavement

      In research about bereavement a distinction between natural and unnatural loss is frequently made. Natural bereavement typically involves losing a loved one because of causes such as illness or old age (Lundorff et al., 2017). Conversely, traumatic deaths include sudden or violent deaths, such as accidents, homicide or suicide. In a recent meta-analysis, it was discovered that PGD is significantly more common in traumatically bereaved individuals compared to naturally bereaved individuals (Djelantik et al., 2020). This meta-analysis revealed a pooled prevalence of nearly 50%, which suggests that one out of two unnaturally bereaved individuals screened positive for PGD.

      There are several differences between traumatic bereavement and natural bereavement

that may explain this difference in prevalence rate. One difference could be the nature of the loss itself: violent deaths are more shocking, and more difficult to accept (Smid, 2020). Furthermore, a common feature of PGD following traumatic loss is that subjects tend to experience intrusive mental imagery of the loved one's death, which are more negative than in cases of natural loss (Baddeley et al., 2014). Moreover, deaths caused by suicide, homicide and accidents also possess some unique stressors: for example, in the case of homicide there might be an added burden, especially for close relatives, of media coverage or contact with the criminal justice system (Kristensen et al., 2012). Similarly, in the case of accidents, there may be absent or disfigured bodies, which may increase the risk of a traumatic bereavement due to the lack of closure and the unsettling nature of the loss (Cardoso et al.,2016). Lastly, losing a loved one due to suicide is associated with stigma, which frequently leads to a reluctance to seek help in people left behind (Kristensen et al., 2017). Despite this, research surrounding the risk factors attached to PGD following traumatic bereavement remains limited (Djelantik et al., 2020; Heeke et al., 2017; Kokou-Kpolou et al., 2020). More research is necessary to identify the factors that put individuals at risk for developing PGD in the context of traumatic bereavement.

Kinship

One of the loss-related factors that is often considered to be related to PGD symptom severity is kinship (Heeke et al., 2017; Kokou-Kpolou et al.,2020). For example, Heeke et al. (2017) explored the correlates of PGD in adults exposed to violent loss, and found that people who lost a close family member are more at risk of developing PGD than those who lost a distant family member or friend. More specifically, several studies report that losing a child or partner, leads to more intense bereavement reactions than a distant loved one (Buur et al., 2024; Camacho et al., 2018; Djelantik et al., 2020; Thieleman et al., 2023). A reason for this is that closer kinship relationships such as partner or child, are generally more crucial than more distant relationships, for several basic needs such as emotional support and companionship (Fernańdez-Alcántara et al., 2017). Additionally, a partner or child is largely involved in a person's daily life, in comparison to other family members, making the loss more impactful (Stroebe, Schut, & Stroebe, 2007). Therefore, losing these kinship relationships can lead to

different emotions such as shock, sadness, loneliness etc., ultimately leading to persistent grief reactions (Fernańdez-Alcántara et al., 2017). This highlights the importance of considering kinship as a crucial factor in PGD research.

Unexpectedness of death

Another loss-related risk factor for the development of PGD is the unexpectedness of the death. As previously mentioned, studies indicate that the prevalence of PGD is higher (50%) following sudden and traumatic deaths compared to deaths from natural causes (Djelantik et al., 2020). In this context, unexpectedness refers to how surprising or sudden the bereaved person perceived the death to be (Doering et al., 2022).

Unexpectedness can contribute to PGD through several mechanisms: firstly, it can lead to a lack of so called 'grief rituals', such as saying good-bye, that usually make it easier for the bereaved individual to adapt to the loss (Doering et al., 2022). Secondly, it can hinder feelings of 'preparedness' which has previously been found to be a risk factor for developing PGD (Barry et al., 2002). Thirdly, studies that investigate the perceived expectedness of death suggest that preparing oneself might be part of a protective mechanism, and that the less prepared someone is, the more distress they will experience (Doering et al., 2022, McIntosh et al., 1993). Lastly, the unexpected nature of the death may lead to complicated grief reactions as the bereaved individuals may feel remorseful for not having anticipated or prevented the death from happening (Jordan, 2011).

More specifically, looking at suicide, it seems that there is some variation, as some people mostly expect losing the loved one, while others remain unaware (Mitchell et al., 2004; Prigerson et al., 2000). To elaborate, in research it has been found that for members of the nuclear family, such as spouses, parents, children or siblings, the death of their loved one due to suicide is not completely unexpected (Cleiren & Diekstra, 1995; Grad & Zavasnik, 1996). These findings indicate that the families of many (though not all) suicide completers have experienced a history of living with an emotionally disturbed person. More specifically, the suicidal person might struggle with serious mental disorders, and might expose their close family members to many difficulties or worry, often in the form of suicide attempts (Sveen et al., 2008).

Subsequently, the families may experience a so-called "relief effect" where feel relieved at not having to cope with the destructive behavior of the suicidal person (Jordan, 2001). In such cases, it seems plausible to suggest that for members of the nuclear family, due to the awareness of the prior suicidal ideation of the deceased. PGD symptom severity may remain relatively low however painful the loss may be (Cerel et al., 2008; Kõlves et al., 2019; Sveen et al., 2008). Conversely, for relatives or friends that are not a part of the nuclear family, the opposite might be true: as they might have been less aware of the deceased's struggles, they may exhibit higher levels of PGD symptom severity as they did not expect the death, and might subsequently ruminate on missed signs and opportunities to intervene (Chiang et al., 2022, Sveen et al., 2008). Hence, more research is needed to analyze how unexpectedness might play a role in the development of PGD after the loss of a loved one due to suicide.

Time since loss

Time since loss is another loss-related variable that may be associated with PGD symptom severity. While a significant minority (7-25%) experience persistently high symptoms, most individuals (34-71%) exhibit low symptoms, and a notable proportion (18-48%) show a gradual decrease in symptoms over time (Bonanno & Malgaroli, 2020; Djelantik et al., 2022; Kristensen et al., 2020; Lenferink et al., 2020; see Table Pociunaite et al., 2023).

Importantly, certain kinship may partially determine how symptoms develop over the long-term (Buur et al., 2024; Currier et al., 2021; Holland et al., 2013; Kristensen et al.,2020; Nielsen et al., 2019; Sveen et al., 2018). For example, individuals who have lost close family members, such as partners or parents, may experience more prolonged grief than those who have lost other family members or friends (Currier et al., 2021; Nielsen et al., 2019). For example, Sveen et al. (2018) found that the strongest predictor of chronic grief was the loss of one's child. Moreover, Buur et al. (2024) examined the risk factors for PGD and found that for partners the passage of time did not reduce grief symptoms, indicating a persistence or worsening of PGD symptoms. This implies that time since loss moderated the relationship between PGD symptoms and the loss of a partner.

Contrastingly, it seems that in the case of distantly bereaved individuals, more time since loss may facilitate a decrease in PGD symptoms over time (Nielsen et al., 2019). This difference

in PGD symptom severity may be due to the loss having a lower impact of the loss on daily life, which is different for spouses or parents who may engage with their children or partners on a daily basis (Nielsen et al., 2019). However, it is important to note that only three of the mentioned studies considers the development of grief over time in the context of traumatic bereavement (i.e., Sveen et al., 2018; Kristensen et al.,2020; Lenferink et al., 2020), and more research in this population is needed to validate the association between time since loss, kinship and PGD.

Current study

The present study aimed to contribute to the current understanding of PGD by investigating how kinship, the unexpectedness of loss, and time since loss influence PGD symptom severity in the context of traumatic bereavement. Although research indicates that traumatic bereavement often leads to more severe PGD symptoms compared to natural bereavement (Djelantik et al., 2020), there remains a lack of comprehensive studies exploring how specific risk factors interact to contribute to PGD in the context of traumatic bereavement (Djelantik et al., 2020; Heeke et al., 2017; Kokou-Kpolou et al., 2020). More specifically, there remains a lack of understanding how different levels of kinship (e.g., spouse/child vs. other relatives) influence PGD severity in this context. To address this gap in research, the following research question has been formulated: *"To what extent does kinship relate to the severity of prolonged grief disorder (PGD) symptoms following traumatic bereavement?"*. It is hypothesized that the loss of a child or partner will be associated with more severe PGD symptoms compared to other kinship relationships (Heeke et al., 2017; Kokou-Kpolou et al., 2020).

Additionally, while it is known that unexpected losses can exacerbate grief due to the lack of preparedness especially in the context of suicide (Doering et al., 2022; Jordan, 2011), how this effect varies between close and distant kinship relationships remains unclear. Therefore, to examine this effect the following research question had been formulated: *"To what extent does the Unexpectedness of Loss moderate the relationship between kinship and PGD symptom severity in suicidally bereaved individuals ?"*. It was hypothesised that distantly bereaved individuals who are not members of the nuclear family of the deceased and lost someone

unexpectedly due to suicide will experience more intense PGD symptoms due to the added effects of suddenness and lack of preparedness (Doering et al., 2022; Jordan, 2011). Conversely, the effect of unexpectedness may be less pronounced in members of the nuclear family. Figure 1 demonstrates this potential moderating effect.

Figure 1

The moderating role of Unexpectedness of death
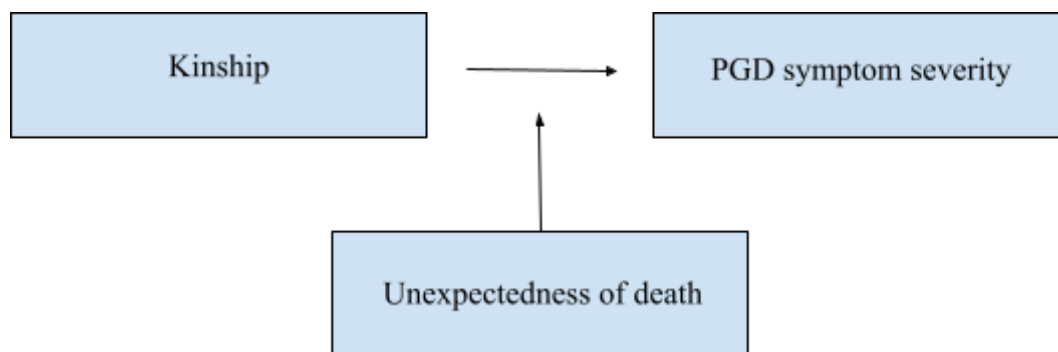
Lastly, while some studies suggest that PGD symptoms decrease over time (Bonanno & Malgaroli, 2020; Kristensen et al., 2020), there is a need to explore how time since loss impacts grief among individuals who have lost close family members versus more distant relatives (Nielsen et al., 2019). To address the impact of time since loss the following research question had been formulated: *"To what extent does the Time since loss moderate the relationship between kinship and PGD symptom severity in traumatically bereaved individuals?"*. It was hypothesized that for those who have lost more distantly related relatives or friends, a longer time since loss is expected be associated with a greater decrease in PGD symptoms over time. This assumption is based on the fact that for distantly related individuals more time since loss may facilitate a decrease in PGD symptoms over time (Nielsen et al., 2019). This difference in PGD symptom severity may be due to the loss having a lower impact of the loss on daily life. (Nielsen et al., 2019). Figure 2 displays this potential moderating effect.

Figure 2

The moderating role of Time since loss
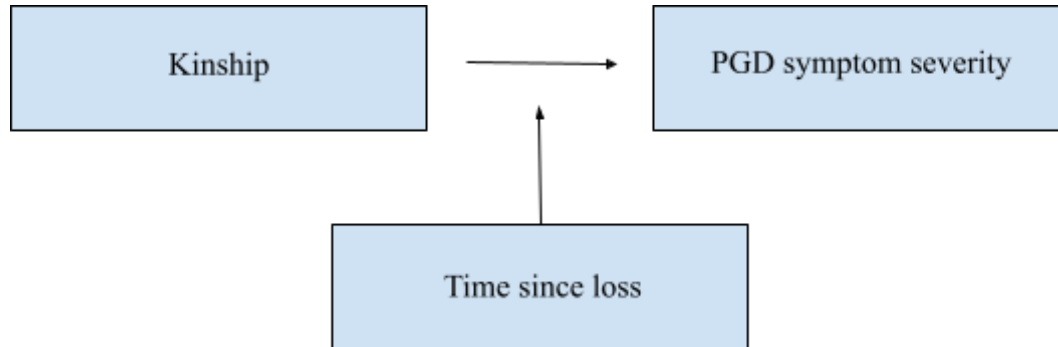
Methods

Procedures and Participants

The current study is part of the Grief in Daily Life (Grief -ID) project, which aims to examine changes in PGD symptoms in daily life, by making use of Experience Sampling Methodology (ESM). The participants were adults (at least 18 years of age) who had experienced the loss of a loved one at least 12 months prior to the start of the study. They filled out a questionnaire, which offers them a means to understand their bereavement experience on the website www.rouwbehandeling.nl. After filling in the questionnaire, they had given permission to be contacted for future research.

Upon expressing interest, individuals received an information letter detailing study procedures and objectives. Participants then gave informed consent. Subsequently, they completed a questionnaire aimed at gathering background information and assessing PGD severity. In addition to that, scales to assess possible symptoms of PTSD and depression were also administered (this phase is hereafter referred to as T1).

After T1, participants were instructed on how to install the smartphone application (Avicenna) for the ESM phase. They were also provided with other instructional materials, such as a YouTube video created by the research team guiding them through app installation and usage. Participants were contacted after a few days to ensure proper functioning of the

application and to address any potential issues. Technical support was provided via telephone or email when needed. Approximately a week after completing the ESM phase, participants were given another questionnaire (this phase is hereafter referred to as T2). Finally, a similar questionnaire as T1 was administered at T2. The current study solely makes use of the T1 data. Ethical approval was obtained from the University of Twente (240186).

Inclusion criteria were fluency in Dutch and possessing a smartphone. Furthermore, participants were included only if they had experienced the traumatic loss of a loved one (i.e., homicide, suicide, accident.), and had completed the T1 phase. Exclusion criteria were a high risk of suicide and a diagnosis of a psychotic disorder as participation in the study might further burden them. Originally, 52 participants took part in the study, but after excluding participants who did not meet the inclusion criteria, only 47 remained on which the analyses were performed. Notably, only suicidally bereaved participants were enquired about the unexpectedness of the death due to ethical concerns, which is why analyses with the unexpectedness of death variable were done on a total of 23 participants. All participants were entered in a lottery where they had a chance to win a €50 voucher. Data collection took place from January 2022 until March 2022.

Measures

Traumatic Grief Inventory Self Report Plus (TGI-SR+)

At T1, a measure employed was the TGI-SR+, which is a 22-item questionnaire that provides an indication of PGD symptom severity (Lenferink et al., 2022). An example item is *"I felt alone or detached from others"*. Participants rated how frequently they experienced each symptom over the past month on a scale from 1(= never), to 5 (= always). The psychometric properties of the TGI-SR+ are sound (Lenferink et al., 2022). A PGD sum score was calculated by summing the scores on all 22 items. A first validation study indicated that a cut-off score of ≥71 can be used to distinguish disturbed grief from normal grief (Lenferink et al., 2022).

Loss-related characteristics

Furthermore, at T1 participants also provided information on loss-related characteristics. Firstly, the date of death, which was converted into time since loss by calculating the total number of days elapsed since the death of the deceased. Additionally, data on their relationship

to the deceased (1 = child, partner; 0 = parent, sibling, friend or other) was collected. Participants were grouped according to their kinship: for the unexpectedness of death variable, a distinction was made between nuclear family members and other relatives, while for the time since loss variable the groups consisted of having lost either partner/child or other relationships. Lastly, participants provided information on the perceived unexpectedness of the death (1 = completely expected, to 5 = completely unexpected).

Statistical analyses

The data was analyzed using the statistical software R [version 1.4.1717]. Statistical significance for all tests was set at $\alpha = 0.05$. The R-code can be found in Appendix A.

Firstly, data cleaning was done, by removing participants that had answered yes to the suicide question, and missing values. To address the first research question, namely regarding the association between Kinship and PGD severity, a t-test was conducted. Kinship served as the independent variable, while PGD symptom severity served as the dependent variable. Before proceeding with the analysis, all assumptions underlying t-tests were assessed to ensure the validity of the results, and found to be met.

To address the second research question, namely if Unexpectedness of loss moderates the relationship between Kinship and PGD symptom severity, a multiple regression analysis was conducted. Hereby, Kinship and Unexpectedness of loss were entered as independent variables (IVs) and PGD as the dependent variable (DV). In the first step, the direct effects of Kinship and Unexpectedness of loss on PGD were examined. In the subsequent step, an interaction term between Kinship and Unexpectedness of loss was added to the model.

Finally, to address the third research question, namely if Time since loss moderates the relationship between Kinship and PGD symptom severity, another multiple regression analysis was conducted. Hereby, Kinship and Time since loss were entered as IVs and PGD as the DV. In the first step, the direct effects of Kinship and Time since loss on PGD were examined. In the subsequent step, an interaction term between Kinship and Time since loss was added to the model.

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Results

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Sample characteristics

Sample characteristics are displayed in Table 1. The majority of participants were female and from the Netherlands. The age of the participants ranged from 29 to 76 years (M = 51.2; SD = 10.4). Most of the participants lost their child followed by their partner. Participants lost their loved one most often due to suicide. Additionally, time since loss was on average 2.43 years (SD = 1.16), while unexpectedness of death was on average found to be *"quite unexpected"* (M = 3.60; SD=1.34*)*. Lastly, the minimum PGD sum score was 35, while the maximum was 96, with a mean score of 69.23 (SD = 14.3). According to the results, 25 participants (53.19%) have a PGD score of ≥71 and can therefore be classified as having probable PGD.

Table 1

Sample Characteristics (N=47)

Characteristic	N(%)
Gender	
Male	7 (23)
Female	40 (78)
Other	0
Nationality	
Dutch	37 (78.7)
Belgian	8 (17.0)
Other	2 (4.2)
Level of education	
Higher education	28 (59.6)
Vocational education	13 (27.7)

High school	6 (12.8)
Cause of death	
Suicide	28(59.5)
Accident	16 (34.0)
Homicide	2 (4.2)
Other	1(2.1)
Kinship	
Child	19 (40.4)
Partner	12 (25.5)
Parent	5 (10.6)
Sibling	5 (10.6)
Friend	2 (4.3)
Other	4 (8.5)

The association between Kinship and PGD symptom severity

The analysis revealed no statistically significant difference in the severity of PGD symptoms between individuals who experienced the loss of a child or partner compared to those who lost other loved ones ($\beta = 0.17$, $t(45) = 0.81$, $p = .423$). Based on these findings, Kinship is not significantly associated with PDG symptom severity. Therefore, the hypothesis can be rejected.

The possible moderating effect of Unexpectedness of death on the relationship between Kinship and PGD symptom severity

The overall model was not statistically significant, ($F(19) = 0.1705$, $p = .915$, $R^2 = .026$, adjusted $R^2 = -.128$). Neither the relationship between Kinship and PGD symptom severity (B =

0.643, SE = 0.939, t = 0.685, p = .501) nor the relationship between Unexpectedness of death and PGD symptom severity was statistically significant (B = .081, SE = .227, t = .357, p = .725). Moreover, the interaction term (Unexpectedness of death x Kinship) was not significantly associated with PGD symptom severity (B = -.161, SE = .286, t = -.598, p = .557), suggesting that Unexpectedness of death did not moderate the relationship between Kinship and PGD symptom severity.

The possible moderating effect of Time since loss on the relationship between Kinship and PGD symptom severity

The overall model was not statistically significant, (F(43) = 1.44, p = .243, R^2 = .092, adjusted R^2 = .028). Neither the relationship between Kinship and PGD symptom severity (B = 0.532, SE = 0.392, t = 1.357, p = -.128) nor the relationship between Time since Loss and PGD symptom severity was statistically significant (B = 0.003, SE = 0.003, t = 0.803, p = .426). Moreover, the interaction term (Time since Loss x Kinship) was not significantly associated with PGD symptom severity (B = -0.003, SE = 0.003, t = -0.999, p = .323) suggesting that Time since loss did not moderate the relationship between Kinship and PGD symptom severity.

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Discussion

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The aim of the current study was to examine whether kinship, unexpectedness of death and time since loss are related to PGD symptom severity following traumatic loss. In light of this goal, data of 47 people was analyzed. The findings revealed that there was no significant difference in PGD symptom severity between individuals who lost a child or partner compared to those who lost other loved ones, suggesting that kinship is not significantly associated with PGD symptom severity. Furthermore, the potential moderating effect of unexpectedness of death on the relationship between kinship and PGD symptom severity was not supported, as neither the main effects nor the interaction were statistically significant. This implies that PGD symptom severity in suicidally bereaved people does not vary based on how unexpected the death was for members of the nuclear family members and those more distantly related to the deceased. Lastly, the hypothesized moderating effect of time since loss on the relationship between kinship and

PGD symptom severity was also not supported by the findings. This implies that the PGD symptom severity did not decline for traumatically bereaved people who are distantly related to the deceased, depending on the time elapsed since loss.

The Relationship between Kinship and PGD symptom severity

Contrary to expectations and prior research (Buur et al., 2024; Camacho et al., 2018; Djelantik et al., 2020; Thieleman et al., 2023), kinship was unrelated to PGD symptom severity. It was initially hypothesized that the loss of a child or partner would be associated with higher PGD symptom severity due to the significant daily involvement and close bond shared with a child or spouse (Fernández-Alcántara et al., 2017).

There are three possible explanations for the failed replication of previous findings in research: Firstly, in two of the mentioned studies (Camacho et al., 2018; Thieleman et al., 2023), participants had lost their loved one mostly due to illness (approximately 45%), while the current study only examined traumatically bereaved individuals. Therefore, the effect of a traumatic loss may have overshadowed the influence of kinship, due to the severe nature of such a loss and unique stressors that come with it, such as added feelings of shock, inability to understand the loss, self-blame, etc. (Baddeley et al., 2014).

Secondly, according to research, it is known that the quality of the relationship (closeness/conflict) to the deceased which may have been a better explanation for higher or lower PGD levels rather than the relationship to the deceased in general (Coelho et al., 2021). For example, it is known that a relationship which is characterized by more love and support might elicit graver grief symptoms (Coelho et al., 2021). On the other hand, if the relationship was marked by conflict, it can also complicate the grieving process, as the bereaved individual might feel guilty about unresolved issues with the deceased (Coelho et al., 2021).

Thirdly, it is also unclear how gender of the deceased child affects the bereavement experience. More specifically, in the context of losing a child, there is a difference between parents and their general attachment towards their children: fathers are known to be more attached to their sons, while mothers do not necessarily differentiate between their children (Werthmann et al., 2020). These differences could affect the grief experience of the bereaved

individuals and highlight the necessity to include such factors in future research when exploring kinship.

The Moderating role of Unexpectedness of death

In spite of prior findings suggesting a possible moderating role of unexpectedness of death in the relationship between kinship and PGD in the context of suicide, (Cerel et al., 2008; Kõlves et al., 2019; Sveen et al., 2008; Jordan, 2011), in the current study the proposed model was found to be non-significant. It was hypothesized that relatives or friends that are not a part of the nuclear family, might have been less aware of the deceased's struggles, they may exhibit higher levels of PGD symptom severity as they did not expect the death. One explanation to explain this discrepancy in prior research and the current study might be the existence of warning signs that the suicidal person might have shown. For instance Cerel et al., 2008 found, that warning signs are an important factor that predicts unexpectedness: the deceased might have exhibited clear signs of distress, such as isolating themselves from social interactions, or being vocal about their suicidal thoughts. However, these signs could have been unnoticed or misinterpreted by friends and relatives due to not being aware whether the suicidal person was coping adequately. This oversight could result in the death being perceived as more unexpected (Cerel et al., 2008). Conversely, suicide is also highly stigmatised and nuclear family members may have concealed mental health struggles from extended family due to fear of judgment (Breen et al., 2010). More research is needed to explore how warning signs may affect the role of unexpectedness in predicting PGD symptom severity.

Secondly, suicide is a mode of death largely characterised by feelings of self-blame, which means that bereaved individuals might feel responsible for the loss. Research suggests that especially members of the nuclear family who have lost their loved one due to suicide, may struggle with a heightened feeling of self-blame because they feel remorse for not having prevented the death (Kristensen et al., 2012). Particularly in the case where the deceased had suicidal ideation, and close members might have anticipated the death, these self-blame feelings may be even more pronounced. Conversely, this suggests that grief levels might be higher for members of the nuclear family upon losing the loved one, due to not being able to hinder the

death, despite being aware of the suicidal ideation of the deceased (Jordan, 2011). More research is needed to explore whether self-blame might be a confounding factor in the relationship between unexpectedness and PGD symptom severity after the loss of a loved one due to suicide.

The Moderating role of Time since loss

Contrary to what prior research suggests (Currier et al., 2007; Buur et al., 2024; Kristensen et al., 2020; Nielsen et al., 2019; Sveen et al., 2018), the relationship between kinship and PGD symptom severity was not moderated by time since loss in the current study.

The current study hypothesized that more distantly bereaved individuals might experience a decline in PGD symptoms as time passes, due to the loss having a lower impact on their daily life than more closely bereaved individuals (Nielsen et al., 2019). One important distinction, is that most of the mentioned studies did not explore the in a population of traumatically bereaved individuals (Currier et al., 2007; Buur et al., 2024; Nielsen et al, 2019). Research shows that individuals who have lost someone due to violent or traumatic deaths, have been found to struggle with persistently high PGD symptoms than people who lost someone due to natural losses (Pociunaite et al., 2023). Therefore, it is possible that the traumatic nature of the loss may intensify the impact of grief symptoms over time, even if a person is more distantly related to the deceased.

Furthermore, the sample in this study had an average time since loss of 2.43 years (SD = 1.16). This relatively short duration might not have been long enough to capture significant changes in PGD symptom severity over time, especially in the context of traumatic loss where previous research has found that individuals may display a higher grief level and slow recovery over time (Kristensen et al., 2020).

Lastly, it is also crucial to highlight that the current study employed the TGI-SR+ to measure PGD levels, while prior research has used different measures, such as the *Inventory of Complicated Grief* (ICG), as well as the *13- Item Prolonged Grief Scale* (PG-13) which are measures that do not encompass all criteria of the DSM-5-TR for PGD (Kristensen et al., 2020; Sveen et al., 2018). Hereby, it is difficult to compare findings of studies that employ different measures to study grief, as well as different criteria sets.

Strengths and limitations

  An important strength of the current study is that it adds to the limited research on traumatically bereaved individuals. Secondly, next to the study by Buur et al., 2024, it is to our knowledge the first time that a study examined time since loss as a potential moderator variable of the relationship between kinship and PGD in the context of traumatic bereavement. Additionally, it is to our knowledge also the first time that different kinship groups were compared as to how unexpected they perceive the loss of their loved one to be in the context of suicide, and how their grief levels differ in that regard.

  Regardless of these strengths, the study has limitations, which is why the results are to be interpreted with caution. Firstly, participants were recruited through self-selection, a method that may introduce bias, as individuals experiencing greater grief may have been more inclined to participate (Keiding et al., 2016). Moreover, the data collected in this study is also possibly biased as it was reliant on self-report measures, since, for example, participants are more prone to under- or overestimate their grief experiences (Rosenman et al., 2011). Additionally, the questionnaire administered at T1 to collect data on PGD symptoms might be subject to retrospection, and hence may have been biased as well, as individuals might not have been able to recall factors related to their PGD symptoms which further limits the validity of the data (Tofthagen 2021).

  Secondly, in this study, the majority of the sample were women (85.1%), which limits the generalisability of the results to men, since women are generally more likely to develop symptoms of PGD after bereavement (Kersting et al., 2010). Similarly, more than half of people in the study lost someone through suicide. This is also a variable that limits generalisability of results to a wider population of violently bereaved people, since violently bereaved people may face more heightened challenges than suicidally bereaved individuals such as feelings of self-blame, guilt and a lack of understanding of the loss, and other stressors such as contact with the criminal justice system (Young et al., 2012).

  Thirdly, there is an overrepresentation of nuclear family members compared to more distantly related members, in the sample of the current study. An effective moderation analysis

requires a sufficient number of participants in each subgroup being compared (Admirall et al., 2011). Hence, insufficient representation of these groups limits the ability to compare findings between different types of relationships. Future research should aim to employ more diverse samples. Lastly, the sample in the current study was relatively limited in size, especially when looking at the variable unexpectedness of death due to only suicidally-bereaved people being examined (*N=23)* which increases the probability of making a type II error (Harmon et al., 2005).

Recommendations for future research

To enhance the understanding of PGD symptom severity and loss-related risk factors, future research should address several key areas. First, increasing sample size and ensuring more demographic diversity is crucial to increase the statistical power of studies and improve the generalizability of findings across different populations.

Secondly, future studies assessing suicidally bereaved individuals should examine how stressors specific to suicide might affect the development of PGD for different kinship groups, for instance warning signs. Lastly, it is worth considering how personal factors such as individual differences may affect how PGD symptom severity might develop as time passes. More specifically, the current study did not take into account if there are specific coping strategies that may facilitate a decline in PGD symptoms or impede it (Song et al., 2023). For example, certain cognitive processes such as rumination about the loss have been frequently known to contribute to a maintenance of prolonged grief as time passes, especially in violently bereaved samples (Milman et al., 2019; Smid et al., 2015, Smith & Ehlers, 2020). The current study did not account for this variable, which might have affected the findings. Future research should consider rumination to provide a better understanding of how grief progresses over time.

Conclusion

In conclusion, the current study highlights the complexities of understanding PGD symptom severity following traumatic loss. Contrary to previous research, the current findings indicate that kinship, unexpectedness of death, and time since loss are not significantly

associated with PGD symptom severity. This discrepancy highlights the importance of further research with larger, more diverse samples. Addressing these limitations can enhance the accuracy and generalizability of future studies, ultimately contributing to a better understanding of who is at risk of developing PGD, which is crucial in order to provide timely support. Future studies may want to consider variables such as warning signs in the context of suicide or rumination about the death. Despite its limitations, the current study adds to the literature on traumatically bereaved individuals by exploring the role of kinship in PGD symptom severity and whether this relationship is moderated by other loss-related factors such as unexpectedness of death and time since loss.

References

American Psychiatric Association. (2022). Diagnostic and Statistical Manual of Mental Disorders,

Fifth Edition, Text Revision (DSM-5-TR). American Psychiatric Association Publishing.

https://www.psychiatry.org/psychiatrists/practice/dsm

Baddeley, J. L., Williams, J. L., Rynearson, T., Correa, F., Saindon, C., & Rheingold, A. A. (2014).

Death Thoughts and Images in Treatment-Seekers After Violent Loss. *Death Studies*, *39*(2),

84–91. https://doi.org/10.1080/07481187.2014.893274

Barry, L. C., Kasl, S. V., & Prigerson, H. G. (2002). Psychiatric Disorders among

Bereaved persons: the role of perceived circumstances of death and preparedness

for death. *The American Journal of Geriatric Psychiatry*, *10*(4), 447–457.

https://doi.org/10.1097/00019442-200207000-00011

Boelen, P. A. (2015). Peritraumatic distress and dissociation in prolonged grief and

posttraumatic stress following violent and unexpected deaths. *Journal of Trauma*

& Dissociation, *16*(5), 541–550. https://doi.org/10.1080/15299732.2015.1027841

Boelen, P. A., & Smid, G. E. (2017). The Traumatic Grief Inventory Self-Report Version

(TGI-SR): Introduction and preliminary Psychometric evaluation. *Journal of Loss*

& Trauma, *22*(3), 196–212. https://doi.org/10.1080/15325024.2017.1284488

Boelen, P. A., & Van Den Bout, J. (2003). Gender Differences in Traumatic Grief

    Symptom Severity after the Loss of a Spouse. *Omega*, *46*(3),

    183–198.ehttps://doi.org/10.2190/6c8g-c0xr-f0q4-vr3x

Bonanno, G. A. (2004). Loss, trauma, and human resilience: Have we underestimated the

    human capacity to thrive after extremely aversive events? *American*

    Psychologist/the American Psychologist, *59*(1), 20–28.

    https://doi.org/10.1037/0003-066x.59.1.20

Buur, C., Zachariae, R., Komischke-Konnerup, K. B., Marello, M. M., Schierff, L., &

    O'Connor, M. (2024). Risk factors for prolonged grief symptoms A systematic

    review and meta-analysis. *Clinical Psychology Review*, *107*, 102375.

    https://doi.org/10.1016/j.cpr.2023.102375

Camacho, D., Nieto, M. Á. P., & León, F. G. (2018). Cause of Death and Guilt in

    Bereavement: The role of emotional regulation and Kinship. *Journal of Loss and*

    Trauma, *23*(7), 546–558. https://doi.org/10.1080/15325024.2018.1485277

Cardoso, D., Ferreira, L., Rocha, J., Leite, M., & Almeida, V. (2016). Long-term effects

    of the Entre-os-Rios tragedy on grief and traumatic stress symptoms. *Death*

    Studies, *41*(4), 256–260. https://doi.org/10.1080/07481187.2016.1271836

Cerel, J., Jordan, J. R., & Duberstein, P. R. (2008). The impact of suicide on the family.

    Crisis, 29(1), 38-44.

Chiang, Y., Ma, Y., Lin, Y., Jiang, J., Wu, M., & Chiang, K. (2022). The Relationship

between Depressive Symptoms, Rumination, and Suicide Ideation in Patients with

Depression. *International Journal of Environmental Research and Public

Health/International Journal of Environmental Research and Public Health*,

19(21), 14492. https://doi.org/10.3390/ijerph192114492

Cleiren, M. (1993). *Bereavement and adaptation: A comparative study of the aftermath of

death* Washington, DC: Hemisphere.

Coelho, A., Roberto, M., Barros, L., & Barbosa, A. (2021). Family caregiver grief and

post-loss adjustment: A longitudinal cohort study. *Palliative & Supportive Care*,

20(3), 348–356. https://doi.org/10.1017/s147895152100095x

Currier, J. M., Holland, J. M., & Neimeyer, R. A. (2007). The Effectiveness of

Bereavement Interventions with Children: A Meta-Analytic Review of Controlled

Outcome Research. *Journal of Clinical Child and Adolescent Psychology*, *36*(2),

253–259. https://doi.org/10.1080/15374410701279669

Diekstra, R., & Garnefski, N. (1995). On the nature, magnitude, and causality of suicidal

behaviors: An international perspective. *Suicide and Life-Threatening Behavior*,

25, 36–57.

Djelantik, A. a. a. M. J., Smid, G. E., Kleber, R. J., & Boelen, P. A. (2017). Early

indicators of problematic grief trajectories following bereavement. *European

Journal of Psychotraumatology*, *8*(sup6).

https://doi.org/10.1080/20008198.2018.1423825

Djelantik, A. a. a. M. J., Smid, G. E., Mróz, A., Kleber, R. J., & Boelen, P. A. (2020). The

    prevalence of prolonged grief disorder in bereaved individuals following

    unnatural losses: Systematic review and meta regression analysis. *Journal of*

    Affective Disorders, *265*, 146–156. https://doi.org/10.1016/j.jad.2020.01.034

Doering, B. K., Barke, A., Vogel, A., Comteße, H., & Rosner, R. (2022). Predictors of

    prolonged grief disorder in a German representative population sample:

    Unexpectedness of bereavement contributes to grief severity and prolonged grief

    disorder. *Frontiers in Psychiatry*, *13*. https://doi.org/10.3389/fpsyt.2022.853698

Fernańdez-Alcántara, M., & Zech, E. (2017). One or Multiple Complicated Grief(s)? The

    Role of Kinship on Grief Reactions. *Clinical Psychological Science*, *5*(5),

    851–857. https://doi.org/10.1177/2167702617707291

Glickman, K. (2021). Prolonged grief disorder in a diverse college student sample.

    Frontiers in Psychology, *11*. https://doi.org/10.3389/fpsyg.2020.604573

Harmon, L. J., & Losos, J. B. (2005). THE EFFECT OF INTRASPECIFIC SAMPLE

    SIZE ON TYPE I AND TYPE II ERROR RATES IN COMPARATIVE

    STUDIES. *Evolution*, *59*(12), 2705–2710.

    https://doi.org/10.1111/j.0014-3820.2005.tb00981.x

Heeke, C., Kampisiou, C., Niemeyer, H., & Knaevelsrud, C. (2017b). A systematic

    review and meta-analysis of correlates of prolonged grief disorder in adults

exposed to violent loss. *European Journal of Psychotraumatology*, *8*(sup6). https://doi.org/10.1080/20008198.2019.1583524

Holland, J. M., Thompson, K. L., Rozalski, V., & Lichtenthal, W. G. (2013). Bereavement-Related regret trajectories among widowed older adults. *the Journals of Gerontology. Series B, Psychological Sciences and Social Sciences*, *69B*(1), 40–47. https://doi.org/10.1093/geronb/gbt050

Jordan, J. R. (2001b). Is Suicide bereavement different? A reassessment of the literature. *Suicide & Life-threatening Behavior/Suicide and Life-threatening Behavior*, *31*(1), 91–102. https://doi.org/10.1521/suli.31.1.91.21310

Keesee, N. J., Currier, J. M., & Neimeyer, R. A. (2008). Predictors of grief following the death of one's child: the contribution of finding meaning. *Journal of Clinical Psychology*, *64*(10), 1145–1163. https://doi.org/10.1002/jclp.20502

Keiding, N., & Louis, T. A. (2016). Perils and Potentials of Self-Selected Entry to Epidemiological Studies and Surveys. *Journal of the Royal Statistical Society. Series a. Statistics in Society/Journal of the Royal Statistical Society. Series a, Statistics in Society*, *179*(2), 319–376. https://doi.org/10.1111/rssa.12136

Kersting, A., Kroker, K. Prolonged grief as a distinct disorder, specifically affecting female health. *Arch Womens Ment Health* **13**, 27–28 (2010). https://doi.org/10.1007/s00737-009-0112-3

Kokou-Kpolou, C. K., Moukouta, C. S., Masson, J., Bernoussi, A., Cénat, J. M., & Bacqué, M. (2020). Correlates of grief-related disorders and mental health outcomes among adult refugees exposed to trauma and bereavement: A systematic review and future research directions. *Journal of Affective Disorders*, *267*, 171–184. https://doi.org/10.1016/j.jad.2020.02.026

Kokou-Kpolou, C. K., Cénat, J. M., Noorishad, P., Park, S., & Bacqué, M. (2020). A comparison of prevalence and risk factor profiles of prolonged grief disorder among French and Togolese bereaved adults. *Social Psychiatry and Psychiatric Epidemiology*, *55*(6), 757–764. https://doi.org/10.1007/s00127-020-01840-w

Kõlves, K., Zhao, Q., Ross, V., Hawgood, J., Spence, S. H., & De Leo, D. (2019). Suicide and other sudden death bereavement of immediate family members: An analysis of grief reactions six-months after death. *Journal of Affective Disorders*, *243*, 96–102. https://doi.org/10.1016/j.jad.2018.09.018

Kristensen, P., Dyregrov, K., & Dyregrov, A. (2017). Can visiting the site of death be beneficial for bereaved families after terror? A qualitative study of parents' and siblings' experiences of visiting Utøya Island after the 2011 Norway terror attack. *European Journal of Psychotraumatology*, *8*(sup6). https://doi.org/10.1080/20008198.2018.1463795

Kristensen, P., Dyregrov, K., & Gjestad, R. (2020). Different trajectories of prolonged

    grief in bereaved family members after terror. *Frontiers in Psychiatry*, *11*.

    https://doi.org/10.3389/fpsyt.2020.545368

Kristensen, P., Weisæth, L., & Heir, T. (2012). Bereavement and Mental Health after

    Sudden and Violent Losses: A Review. *Psychiatry*, *75*(1), 76–97.

    https://doi.org/10.1521/psyc.2012.75.1.76

Lenferink, L., Boelen, P. A., Smid, G. E., & Paap, M. C. S. (2019). The importance of

    harmonising diagnostic criteria sets for pathological grief. *The British Journal of*

    Psychiatry, *219*(3), 473–476. https://doi.org/10.1192/bjp.2019.240

Lenferink, L., & Boelen, P. A. (2023). DSM-5-TR prolonged grief disorder levels after

    natural, COVID-19, and unnatural loss during the COVID-19 pandemic. *Journal*

    of Affective Disorders Reports, *12*, 100516.

    https://doi.org/10.1016/j.jadr.2023.100516

Lenferink, L., Eisma, M. C., Smid, G. E., De Keijser, J., & Boelen, P. A. (2022). Valid

    measurement of DSM-5 persistent complex bereavement disorder and DSM-5-TR

    and ICD-11 prolonged grief disorder: The Traumatic Grief Inventory-Self Report

    Plus (TGI-SR+). *Comprehensive Psychiatry (Print)*, *112*, 152281.

    https://doi.org/10.1016/j.comppsych.2021.152281

Lundorff, M., Holmgren, H., Zachariae, R., Farver-Vestergaard, I., & O'Connor, M.

    (2017). Prevalence of prolonged grief disorder in adult bereavement: A systematic

review and meta-analysis. *Journal of Affective Disorders*, *212*, 138–149.

https://doi.org/10.1016/j.jad.2017.01.030

McIntosh, D.N., Silver, R.C., & Wortman, C.B. (1993). Religion's role in adjustment to a

negative life event: Coping with the loss of a child. Journal of Personality and

Social Psychology, 65, 812–821.

Mitchell, A. M., Kim, Y., Prigerson, H. G., & Mortimer-Stephens, M. (2004b).

Complicated grief in survivors of suicide. *Crisis*, *25*(1), 12–18.

https://doi.org/10.1027/0227-5910.25.1.12

Neimeyer, R.A., & Holland, J.M. (2006). Bereavement overload. In N.J. Salkind, (Ed.),

Encyclopedia of human development. Thousand Oaks, CA: Sage.

Nielsen, M. K., Carlsen, A. H., Neergaard, M. A., Bidstrup, P. E., & Guldin, M. (2019).

Looking beyond the mean in grief trajectories: A prospective, population-based

cohort study. *Social Science & Medicine*, *232*, 460–469.

https://doi.org/10.1016/j.socscimed.2018.10.007

Pociunaite, J., Van Dijk, I., Reitsma, L., Nordström, E. E. L., Boelen, P. A., & Lenferink,

L. I. M. (2023). Latent trajectories of DSM-5-TR-based Prolonged Grief

Disorder: findings from a data pooling project MARBLES. *European Journal of

Psychotraumatology*, *14*(2). https://doi.org/10.1080/20008066.2023.2281183

Prajapati, B., Dunne, M. C., & Armstrong, R. A. (2010). Sample size estimation and

statistical power analyses. *PEERREVIEWED*, *2010*.

http://geneticauprrp.weebly.com/uploads/2/2/5/4/22542214/gpower_by_prajapati-et-al.--2010-.pdf

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., 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. *PLoS Medicine*, *6*(8), e1000121. https://doi.org/10.1371/journal.pmed.1000121

Prigerson, H. G., Kakarala, S. E., Gang, J., & Maciejewski, P. K. (2021). History and status of Prolonged Grief Disorder as a Psychiatric diagnosis. *Annual Review of Clinical Psychology*, *17*(1), 109–126. https://doi.org/10.1146/annurev-clinpsy-081219-093600

Rando, T.A. (1983). An investigation of grief and adaptation in parents whose children have died from cancer. Journal of Pediatric Psychology, 8, 3–20.

Rosenman, R., Tennekoon, V., & Hill, L. G. (2011). Measuring bias in self-reported data. *International Journal of Behavioural and Healthcare Research*, *2*(4), 320. https://doi.org/10.1504/ijbhr.2011.043414

Smid, G. E. (2020). A framework of meaning attribution following loss. *European Journal of Psychotraumatology*, *11*(1). https://doi.org/10.1080/20008198.2020.1776563

Smith, K. V., & Ehlers, A. (2020). Cognitive predictors of grief trajectories in the first

    months of loss: A latent growth mixture model.*Journal of Consulting and Clinical*

    Psychology, 88(2), 93–105. https://doi.org/10.1037/ccp0000438

Song, C., Fu, Z., Li, W., Yu, Y., Ma, J., Li, X., & Wang, J. (2023). Social support and

    prolonged grief disorder symptoms in parents who lost their only child from urban

    and rural China. *Psychological Trauma: Theory, Research, Practice, and Policy,*

    15(2), 304–312. https://doi.org/10.1037/tra0001116

Stroebe, M., Schut, H., & Stroebe, W. (2007). Health outcomes of bereavement. *Lancet*,

    370(9603), 1960–1973. https://doi.org/10.1016/s0140-6736(07)61816-9

Sveen, C., & Walby, F. A. (2008b). Suicide survivors' mental health and grief reactions:

    A Systematic Review of Controlled studies. *Suicide & Life-threatening*

    Behavior/Suicide and Life-threatening Behavior, *38*(1), 13–29.

    https://doi.org/10.1521/suli.2008.38.1.13

Sveen, J., Johannesson, K. B., Cernvall, M., & Arnberg, F. K. (2018). Trajectories of

    prolonged grief one to six years after a natural disaster. *PloS One*, *13*(12),

    e0209757. https://doi.org/10.1371/journal.pone.0209757

Thieleman, K., Cacciatore, J., & Frances, A. (2023). Rates of Prolonged Grief Disorder:

    Considering relationship to the person who died and cause of death. *Journal of*

    Affective Disorders, *339*, 832–837. https://doi.org/10.1016/j.jad.2023.07.094

Tofthagen, C. (2012, June 1). *Threats to validity in retrospective studies*. PubMed Central

    (PMC). https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4093311/

Werthmann, J., Smits, L. J., & Li, J. (2010). Parental mortality rates in a western country

    after the death of a child: assessment of the role of the child's sex. *Gender*

    Medicine, *7*(1), 39–46. https://doi.org/10.1016/j.genm.2010.02.002

Young, I. T., Iglewicz, A., Glorioso, D., Lanouette, N., Seay, K., Ilapakurti, M., &

    Zisook, S. (2012). Suicide bereavement and complicated grief. *Dialogues in*

    Clinical Neuroscience, *14*(2), 177–186.

    https://doi.org/10.31887/dcns.2012.14.2/iyoung

Appendix A

R code

#cleaning data and adjusting variables

#install packages

install.packages("foreign")

library(foreign)

install.packages("dplyr")

library(dplyr)

install.packages("tidyverse")

library(tidyverse)

install.packages("haven")

library(haven)

install.packages("lubridate")

library(lubridate)

install.packages("tibble")

library(tibble)

#set working directory

setwd("/Users/shaf/Desktop/bachelor thesis ")

```
#import dataset

data <- read.spss("ESM3_T1.sav", to.data.frame = TRUE)

str(data)


#exclude participants with suicide question yes

suicide_no <- data %>%

  filter(suicidal1.1 != "Ja" | is.na(suicidal1.1)) %>%

  filter(Ex.psychotic != 1)


#select columns relevant for analyses

  selected_data <- suicide_no[c(6,9,10,18,26,28,37, 38, 46, 55, 74:94)]

data_no_na <- na.omit(selected_data)


#Define columns to convert

tgi_columns <- 11:31  # Assuming these are the column indices you want to convert


# Apply conversion to selected columns

selected_data[, tgi_columns] <- lapply(selected_data[, tgi_columns], function(x) {
```

```r
# Use nested ifelse to convert values

ifelse(x == "Nooit", 1,

    ifelse(x == "Zelden", 2,

        ifelse(x == "Soms", 3,

            ifelse(x == "Vaak", 4,

                ifelse(x == "Altijd", 5, as.numeric(x))))))

})

str(selected_data[, 9:31])

is.numeric(tgi_columns)


# Convert date of birth to Date object

selected_data$DoD<- dmy(selected_data$DoD)

# Create a new variable time since loss & DoB

selected_data$TSL<- as.integer((Sys.Date() - selected_data$DoD))

# Convert date of birth to Date object

selected_data$DoB<- dmy(selected_data$DoB)

# Create a new variable DoB

selected_data$Age_respondent<- as.integer((Sys.Date() - selected_data$DoB)/365.25)
```

#change unexpectedness of death to numeric

data_no_na = data_no_na %>%

  mutate_at(c("A_un_expected"),

       funs(recode(., "Helemaal niet onverwacht" = 1, "Een beetje onverwacht" = 2, "Nogal onverwacht" = 3,

             "Erg onverwacht" = 4, "Volledig onverwacht" = 5)))

data_no_na$A_un_expected <- as.numeric(data_no_na$A_un_expected)

is.numeric(data_no_na$A_un_expected)

#descriptives

summary(selected_data)

summary(data_no_na)

sd(selected_data$Age_respondent)

sd(data_no_na$A_un_expected)

#sumscore tgi

#Define the indices of the rows you want to sum

selected_rows <- selected_data[c(11:31)]

Sum up selected rows

```r
row_sums <- rowSums(selected_rows)

# Print the result

print(row_sums)

summary(row_sums)

sd(row_sums)

OR

#tgi mean-score

selected_data$mean_TGI <- rowMeans(selected_data[c(11:31)])

#probable tgi score

filter()
```

#research_Q_1

```r
selected_data$degree_of_relatedness <- ifelse(selected_data$kinship == "Kind" |
selected_data$kinship == "Partner", 1, 0)

out <- lm(mean_TGI ~ degree_of_relatedness, data=selected_data)

summary(out)
```

#research_Q_2

```r
#tgi sum-score for no NA data
```

```
# Apply conversion to selected columns

data_no_na[, tgi_columns] <- lapply(data_no_na[, tgi_columns], function(x) {

 # Use nested ifelse to convert values

 ifelse(x == "Nooit", 1,

    ifelse(x == "Zelden", 2,

       ifelse(x == "Soms", 3,

          ifelse(x == "Vaak", 4,

             ifelse(x == "Altijd", 5, as.numeric(x))))))

})




data_no_na$mean_TGI <- rowMeans(data_no_na[c(11:31)])

data_no_na<-data_no_na %>%

 mutate(mean_TGI2=selected_data$mean_TGI)

data_no_na$degree_of_relatedness <- ifelse(data_no_na$kinship == "Kind" |
data_no_na$kinship == "Partner", 1, 0)

out <- lm(mean_TGI ~ A_un_expected*degree_of_relatedness, data=data_no_na)

summary(out)
```

#research_Q_3

out <- lm(mean_TGI ~ TSL*kinship, data=selected_data)

summary(out)

out <- lm(mean_TGI ~ TSL*degree_of_relatedness, data=selected_data)

summary(out)