Prolonged Grief Disorder in Children: Influence of Age and Kinship

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Abstract

Grief is a feeling that everyone experiences at some point in life after losing a loved person. For some individuals, it can lead to Prolonged Grief Disorder (PGD) defined as an intense and persistent grief that disrupts daily life and causes significant challenges. So far research explored PGD in adults while PGD in children is particularly underexplored. Therefore, this study aims to explore the risk factors of age and kinship of PGD in children. The research question is formulated as *To what extent does age level moderate the relationship between kinship and PGD symptom level?* To answer this question the first hypothesis is that children are prone to experience higher levels of PGD after a parent loss. Moreover, we expected that the younger age of children is associated with PGD symptom level. Lastly, we assumed that the severity of PGD after losing a parent depends on child's age. The data is recruited through the Dutch website www.rouwbehandeling.nl. 133 participants took part in this study, which were parents who answered the survey for their children. For the first two hypotheses, a linear regression model was used and for the last hypothesis a moderated regression analysis. In contrast to our hypotheses, the results showed that kinship has a non-significant association with PGD in children. Besides that, the variable age is not a predictor of PGD symptom level. Lastly, age does not moderate the relationship between kinship and PGD. These findings emphasize the need for diverse age groups and multicultural groups to ensure the reliability and validity of the results.

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Introduction

At some point in life, everyone experiences the feeling of grief by losing their loved ones. Bereavement can affect one's mental wellbeing and physical wellbeing in a negative way (Seiler et al., 2020). Each person faces and processes grief in an individual way as it can be different due to their age level, stage of development, and personal resources (Falala et al., 2024). Most people recover within the first year following the loss by using internal resources and external support in order to readapt to their normal life routine without the loved one (Lundorff et al., 2017; Pociunaite et al., 2023). However, around 10% of bereaved adults do not recover from loss and have impairments in their daily lives at least 12 months after loss (Djelantik et al., 2020). In these cases, people may have increased likelihood of developing Prolonged Grief Disorder (PGD) included in the text revised version of the 5th edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5-TR) (American Psychiatric Association [APA], 2022). It is defined as an intense and persistent grief that disrupts daily life and causes significant challenges (American Psychiatric Association [APA], 2022). In both children and adults, grief leads to distress due to the cues related to loss, such as absence in normal routine and reminders of the deceased person.

Especially children face challenges in school performance or in social interactions, which are expressed by emotions of withdrawal and anger (American Psychiatric Association [APA], 2022). These examples illustrate to what extent grief influences children's school routine and interaction, with diverse emotional reactions. Compared to adults, children experience these symptoms of PGD at least six months after the loss which interferes with their emotional regulation and cognitive functioning (Boelen and Spuij, 2024). Moreover, other symptoms of prolonged grief disorder are identity disruption, disbelief about the death, avoidance of reminders that person is dead, difficulty with reintegration, emotional numbness, feeling that life is meaningless, and intense loneliness (American Psychiatric Association [APA], 2022).

PGD in Children and Relevance

The impact of bereaved children and adolescents, leading to the development of PGD, is an underexplored field with limited research regarding prevalence, comorbidity, and related risk factors. According to statistics in the Netherlands (2022), 2% of young people face the death of a parent during their lifetime. The incidence rate of bereavement is higher after experiencing loss of siblings, grandparents, or close friends (Van Dijk et al., 2023). Comorbid psychological disorders for instance posttraumatic stress disorder (PTSD), major depressive

disorder (MDD), or having negative outcomes by impacting development are side effects of bereavement, emphasizing the importance of studying the effects of loss in children (Revet et al., 2020). Approximately, one in 10 bereaved children experience symptoms of prolonged grief (Van Dijk et al., 2023). To measure PGD symptoms in children and adolescents, an instrument named Traumatic Grief Inventory-Kids-Clinician Administered (TGI-K-CA) was developed (Van Dijk et al., 2023). Furthermore, the study of Boelen and Spuij (2024) highlights the findings that PGD level in children is correlated with negative cognitions, avoidant coping, and different parenting styles. However, there is still a lack of knowledge of other psychological variables (e.g. coping mechanism) and systematic variables (e.g. parenting style) influencing grief in children (Boelen and Spuij, 2024).

Kinship

The first predictor which could be related to PGD level is kinship regarding the deceased person. Individuals who lost a close family member tend to suffer from more PGD symptoms than losing a more distantly related person (Heeke et al., 2017). Another distinction can be made between a loss of a caregiver such as a parent or the loss of siblings and grandparents. The most traumatic event a child can experience is losing a parent since the loss has effects on emotional, cognitive, and social development (Haine et al., 2008). Children who have a strong bond with their parents may experience insecurity and disorganization such as emotional instability in their life without them (Kaplow et al., 2014). Research indicates that some children may be at risk of experiencing disrupted attachment after losing the caregiver (Kaplow et al., 2014). The loss of a caregiver could be a loss of support system, which makes the grief process more complicated which enhances the PGD symptoms such as intense loneliness and identity confusion (Maccallum et al., 2017). In contrast to caregiver loss, 5-8% of children experience the death of a sibling before getting into adulthood (D'Alton et al., 2022). Losing a grandparent or sibling may not be as severe as losing a parent, but children may experience a different type of grief compared to the grief while losing a parent. The siblings are mostly at similar age level and more likely to be a peer than caregiver (Baker et al., 1992). Since children lose a sibling, they know from birth on, it may evoke feelings of loneliness and absence of companionship (Stocker et al., 2019). However, the bereavement process for siblings may have less difficulty compared to parent loss (Baker et al., 1992). The loss of a grandparent can also cause sadness in a child, especially if they had a close relationship, but it is not as intense as losing a parent since they may not provide the support system as parents do (Alvis et al., 2022). Thus, more research is needed to explore

whether PGD symptoms are stronger after parental or other type of loss which has not been studied.

Age

Age is another predictor of prolonged grief disorder. So far, studies found that individuals at an older age tend to suffer from higher PGD levels than younger people (Newson et al., 2011). Older people experience more grief due to the number of losses they experience during their lifetime (Tofthagen et al., 2017). As a result, feelings of loneliness and difficulty with processing the loss causes high level of PGD (Pinquart & Sorensen, 2001). Since grief is different between age groups due to the emotional, cognitive, and developmental factors, it varies how individuals face and understand the loss of loved ones (Lobb et al., 2010). Within the age group there could also be specific differences in terms of grief, especially as children are going through different developmental stages.

Jean Piaget's cognitive developmental model for children can potentially explain the differences in grief responses with regards to children's age. Jean Piaget introduced four stages in cognitive development called sensory motor stage (birth to two years), preoperational stage (two to seven years), concrete operational stage (seven to 11 years) and formal operational stage (12 years plus) (Piaget, 1964). During the first stage, toddlers sense the world through sensory experiences and objects. In the age period of two to seven, children start to use words and pictures to describe objects. Followed by the third stage, in which children start to think logically and concretely. Lastly, the formal operational stage represents adolescents who understand abstract ideas by using deductive reasoning (Al-Harbi, 2024). Children in the concrete operational stage (seven to 11 years) may have the understanding about the concept of death like the cause and consequence of loss (Slaughter, 2005). Despite their awareness of the loss, it may show children's grief through anger or by having health complaints (Melhem et al., 2007). Additionally, adolescents in the formal operational stage (12 years plus) possibly have the cognitive ability to understand the natural stage of life namely death (Kaplow et al., 2014). However, during this stage they may experience feelings such as depression, hopelessness or identity confusion, which will interfere with the process of developing a sense of self (Kaplow et al., 2014). While different developmental stages are associated with different emotional and cognitive reactions, the relationship between different children ages and grief is unknown. Thus, further research is required to examine whether younger children are more affected of PGD symptoms than older children.

Moderation between Age and Kinship

The interplay between age and kinship to the deceased person is possibly influencing the grieving process. According to the developmental stages of Piaget, children get familiar with the concept of death and the consequences of a loss while getting through the stages of cognitive development (Al-Harbi, 2024). However, children may struggle with realizing the permanent loss of the caregiver, which were children's security and support system (Alvis et al., 2022). Hence, younger children may be vulnerable to PGD symptoms by showing different grief reactions when losing a caregiver (Alvis et al., 2022). Since, the interaction between age and kinship in influencing PGD severity is underexplored, this study is referring to this gap.

Current Study

Prolonged Grief Disorder in children is an underexplored area of research including relatively little study about how kinship to lost person and age level is affecting PGD severity. So far, parental loss seems to be one of the most traumatic events children may experience since parents tend to be an emotional support system, leading to severe grieving symptoms (Haine et al., 2008; Maccallum et al., 2017). Moreover, age is another important predictor since children receive specific understandings about the concept of death during different age periods based on the cognitive developmental stage of Jean Piaget (Al-Harbi, 2024; Piaget, 1964; Slaughter, 2005). Since the moderating factor of age in relation with kinship and PGD severity is lacking, this direction remains as a research gap. Based on this aim the research question is formulated as *To what extent does age level moderate the relationship between kinship and PGD symptom level?*

Based on prior studies, three hypotheses are proposed. Firstly, children are prone to experience higher levels of PGD after a parent loss. Secondly, the younger age of children is associated with PGD symptom level. Thirdly, the severity of PGD after losing a parent depends on the child's age.

Methods

Participants and Procedure

A grief reaction of children between the age of five to 16 years old was measured in this online survey study. Since the children are minors, the parents participated for their children. They answered the survey based on what they think their children are feeling or thinking about the loss. The sample consisted of 146 participants and by removing 13 participants due to kinship to a deceased person such as a pet, only 133 participants were included. Having experienced a loss of a close person, and speaking Dutch fluently were prior conditions to take part in the survey. The informed consent was obtained from the parents.

This study is part of a bigger research, the data was collected through a Dutch bereavement website called www.rouwbehandeling.nl. This website provides information about grief and includes supportive resources. Besides that, it contains a survey where the participants have an opportunity to rate the grief level of their children. The study was conducted in accordance with the declaration of Helsinki.

Measures

Kinship and Age

Kinship to deceased person is measured based on the options such as parents (father or mother), siblings (brother or sister), stepparents (stepfather or stepmother), step-siblings (stepbrother or stepsister), grandparents (grandfather or grandmother), uncle or aunt and other option, which were selected by the parents for their children. Besides that, child's age was provided in years.

Traumatic Grief Inventory-Kids-Clinician Administered

The prolonged grief symptoms were assessed through the Traumatic Grief Inventory-Kids-Clinician Administered (TGI-K-CA), which contained 16 items in total (Van Dijk et al., 2023). This instrument is specifically made for children to measure their PGD symptoms. To adjust the items to this study, the items included questions such as *"Did your child have difficulty in the past month experiencing any kind of emotions (such as sadness, anger, or happiness)?"* While answering the questions, the participants were required to rate the frequency of the grief symptom, which was experienced over the last month, on a 5- point Likert scale (1= never, 2= seldom, 3= sometimes, 4= often, 5= always) (Van Dijk et al., 2023). The scores of the 16 items were added together to determine the PGD sum score. The instrument of TGI-K-CA is based on good psychometric properties, which includes factor structure, internal consistency, temporal stability, incremental and convergent validity and cut-off score (Van Dijk et al., 2024). The Cronbach's alpha in this study was $\alpha = 0.91$, which represents a good internal consistency.

Data Analysis

During the data analysis, the gathered data is structured and analyzed in R-Studio. After cleaning the data, the assumptions are examined, and the main analyses are conducted to check the hypotheses. The script for the analysis is available under Appendix A. Based on the research question the independent variable is kinship, dependent variable is PGD symptom level and age is the moderator variable.

For the first hypothesis a linear regression model was used to determine the effect of kinship to deceased person on PGD symptom level. Therefore, kinship was distinguished in

two categories. By using dummy coding, the first category included biological parents as well as stepparents, while the second category contained grandparents, siblings, step-siblings as well as uncles and aunts. This variable was dummy coded as 1 and others as 0, where 1 is parents, and 0 is others.

Similar to the first hypothesis, in the second hypothesis a linear regression analysis was applied to assess the effect of age on PGD symptom level by using two dummy variables. The age variable was categorized in three groups: five to six years, seven to 11 years and 12 to 16 years. The age group five to six is the reference group. Moreover, the age variable was also tested as a continuous variable.

The third hypotheses were evaluated by using a moderated regression analysis. By using a moderation analysis, the moderating effect of age on the relationship between kinship and PGD symptom level is measured. Through this analysis it can be examined whether the association between kinship and PGD symptom levels in children is dependent on the age level of the children.

Results

Sample Characteristics

The sample consists of 133 participants. The mean age of children whose grief was rated is 9.2 with a standard deviation of 3.86. The minimum age of children was 5 and maximum 16 years old. 64 children (48.1%) were female, 66 children (49.6%) were male, one participant (0.8%) others and two participants (1.5%) preferred not to share. It was reported that the majority of losses happened due to physical illness (66.2%). Furthermore, the kinship to deceased person was mostly a parent either a mother or father (48.12%). Following with the loss of an aunt or uncle (32.33%), siblings (9.77%), others (3.76%) and grandparents (3.01%). The mean of time since loss was 24.68 months with a standard deviation of 41.03 months. Lastly, the mean of the PGD sum score was 38.06 with standard deviation of 11.24. The minimum PGD sum score was 16 and the maximum score was 70.

Assumptions

Before using a simple linear regression all four assumptions of normality, homogeneity of variance, linearity and independence of residuals were measured (Field et al., 2012). Normality is determined by using the Shapiro-Wilk test, which assess whether the residuals are normally distributed. Since the value is $p = 0.277$, the test is non-significant indicating a non-violation of normality (Field et al., 2012). The second assumption of homogeneity of variance is assessed by examining whether variance of residuals is constant during all levels of independent variables. By using the Breusch-Pagan test a value of $p =$

0.229 illustrates a support for the assumption of homogeneity (Breusch & Pagan, 1979). Linearity is evaluated by using a scatterplot with residuals and fitted values for both the independent variable relationship and the relationship between independent variable as well as moderator (Field et al., 2012). Since the relationship was linear and did not show a systematic pattern, the assumption was met. Lastly, using a scatterplot with the residuals of both the relationships indicated independence of each other, which did not violate the fourth assumption. Hence, none of the four assumptions were violated.

The association between Kinship and PGD symptom level

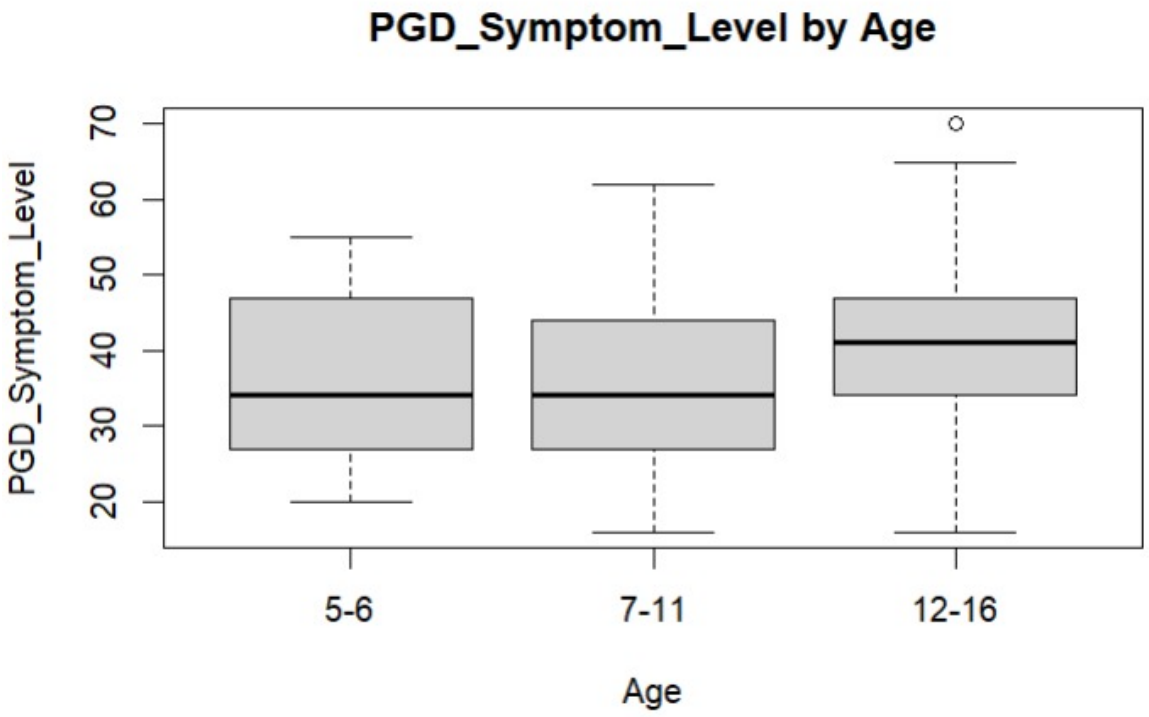
The analysis indicated that kinship was not significantly associated with PGD symptom level (t (131) = -1.583, p = .116). Moreover, kinship is not a predictor of PGD symptom level since the regression model only explains 1.9% of the variance in PGD levels (R^2 = 0.019). Based on the outcomes, the first hypothesis that children are prone to experience higher levels of PGD after a parent loss compared to losing another close person is rejected.

The association between Age and PGD symptom level

The regression analysis showed that age level is not significantly associated with PGD symptom level. The age group 7-11 (t (130) = -0.317, p = .751) did not have a significant effect compared to 5-6 age group, the age group of 12-16 (t (130) = 1.687, p = .0939) compared to 5-6 age group did not show a significant effect on PGD either. Additionally, the age group did not significantly contribute in explaining the variance in PGD symptom level (F (2,130) = 2.606, p = .0777, R^2 = .0386). By testing age as a continuous variable, no association between age and PGD severity was found (t (131) = 1.808, p = .0729). Moreover, by displaying the association of age and PGD symptom level in a boxplot, it can be seen that the median of PGD symptom level remains consistent across the age groups and all three age groups have similar interquartile ranges (see Figure 1). Hence, the second hypothesis that the younger age of children is associated with PGD symptom level is rejected.

Figure 1

Boxplot displaying association between Age and PGD Symptom Level

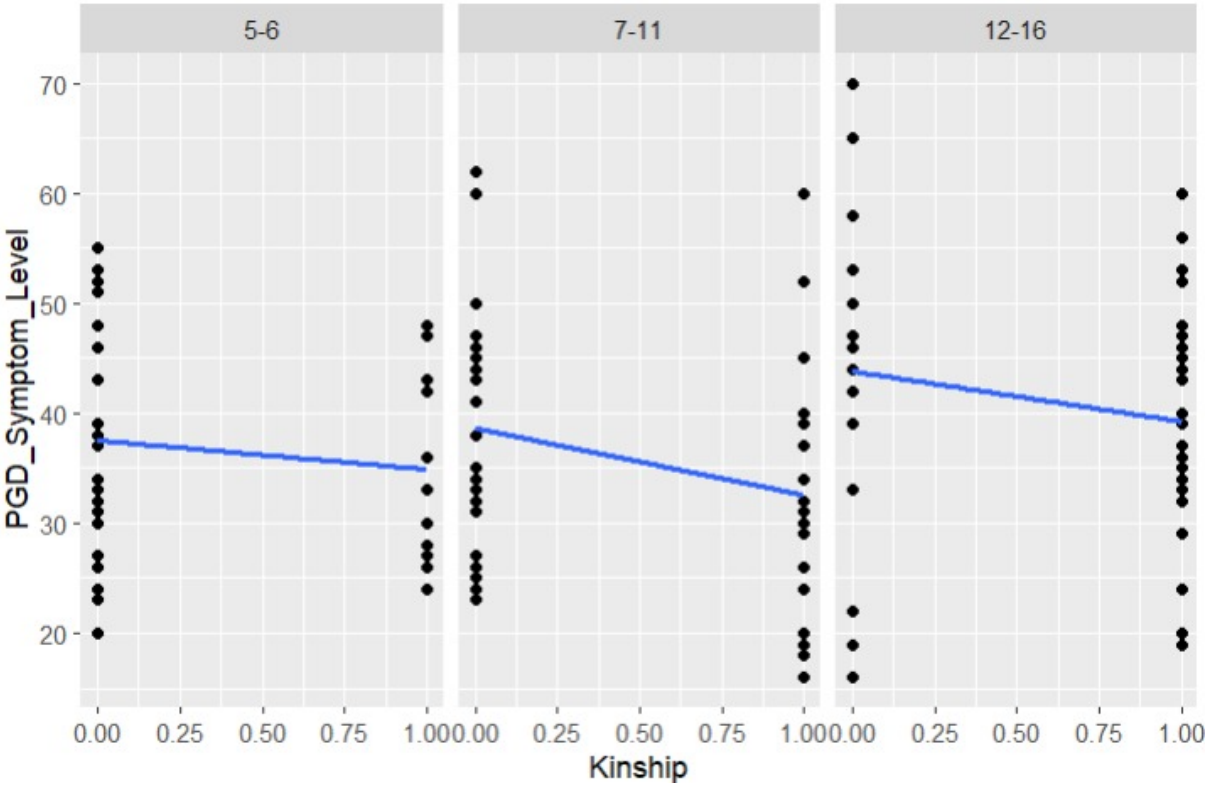


The moderating effect of Age on the relationship between Kinship and PGD symptom level

The moderation analysis indicated that age level did not have a significant effect on the relationship between kinship and PGD symptom level (F (5,127) = 0.225, p = .799). Moreover, the regression model explained 8.1% of the variance in PGD symptom level (R^2 = 0.081), but this model was nevertheless insignificant. By displaying the relationship between kinship and PGD symptom level across age groups, it can be highlighted that the regression line in all groups is negative and the slope across age groups similarly negative in the relationship between kinship and PGD symptom level (see Figure 2). Based on the findings, the last hypothesis that the severity of PGD after losing a parent depends on the child's age is rejected.

Figure 2

Scatterplot displaying the relationship between Kinship and PGD Symptom Level across Age groups



Discussion

The purpose of this current study was to examine the association between PGD in children, kinship and age. Therefore, it was measured whether the loss of parent is associated with a stronger PGD severity. Additionally, whether age is a predictor of PGD symptom level in children. Lastly, whether age moderated the relationship between kinship to the deceased person and PGD severity. The current results did not show any support in the interplay between PGD in children, kinship and age.

The Relationship between Kinship and PGD Symptom Level in Children

In contrast to prior research (Baker et al., 1992; D'Alton et al., 2022; Haine et al., 2008; Heeke et al., 2017; Kaplow et al., 2014), my findings showed that kinship was not significantly associated with PGD symptom level in children. Based on prior studies, I expected the loss of a parent to be associated with stronger PGD severity, however, the current study findings did not support this. Possible explanations for the results of this study could be the role of the surviving caregiver, bond with deceased parent, resilience in children and cultural factors.

The first explanation of this result could be the behaviour and emotional support of the surviving parent. After one of the parents dies, usually the responsibility of the child is taken over by the other parent. The supportive and emotional presence of the parent could create a

secure environment for the children even during their grieving process (Sandler et al., 2003). Although children lose a parent with whom they possibly had a strong bond, the available attachment of the other parent could reduce the negative effect of parental loss (Bowlby, 1980). Secondly, the bond with the deceased parent could have been different. According to Haine et al. (2008), children experience negative consequences after parental loss since the parents are usually their support system. However, it could be that the relation between the child and the deceased parent was more distant and not strong (Fernández-Alcántara and Zech, 2017). This could lead to lower levels of grief symptoms, which may explain the insignificant association between parental loss and PGD severity in the current study.

Another explanation could be the resilience in children in how to cope with parental loss. Some children try to adapt to coping strategies similar to their parents after a loss. One of the methods is communication, in which the surviving parent talks openly about the deceased person with children in order to help them with the grieving process (Christ et al., 2002). Through this support children's questions regarding the loss could be clarified according to their age and the parent tend to be an understanding caregiver for the child. Lastly, cultural factors could have also influenced the current findings. Since in every culture the attitude, norms and beliefs towards grief is different such as talking openly about loss or suppressing it, there could have been an impact on how grief experienced (Hantrais, 1999). There is a distinction between individualistic culture and collectivistic culture. Individualists may focus on own coping mechanism during the grief process while collectivists may express grief in a societal manner with rituals and community support (Walter, 2010). Thus, parents from individualistic culture could have underreported the grief symptoms, while collectivists could have shared their truth perception regarding grief perception.

The Moderating Role of Age

Contrary to prior research (Al-Harbi, 2024; Alvis et al., 2022; Kaplow et al., 2014; Lobb et al., 2010; Melhem et al., 2007; Piaget, 1964; Slaughter, 2005) this study did not find a significant moderating effect of age in the relationship between kinship and PGD symptom level in children. The analysis showed that PGD severity when losing a parent is not based on children's age. Moreover, age is not associated with PGD symptoms. The reasons for this outcome could be lack of association, biased interpretation and attachment style of the children.

One of the explanations could be that according to Revet et al., (2021) age may be unrelated to PGD without additional explanation, highlighting the need for further research on these non-significant results to investigate potential indirect relationships. According to Jean

Piaget children during the concrete operational stage and formal operational stage have some understanding about the concept of death and stage of death (Kaplow et al., 2014; Slaughter, 2005). However, the resent findings highlight that grief responses are not based on cognitive developmental stages. Another reason could be that the parents have limited understanding of young children's emotional state. Young children already express their grief reactions in subtle ways by having somatic complaints such as withdrawal or anger according to Melhem et al. (2007), which could be misinterpreted by the parent (Melhem et al., 2007). These complaints may not align with the PGD criteria, which could explain the non-significant moderating effect of age. Although children at a young age could have some understanding about grief (Slaughter, 2005), it is possible that grief responses are not based on knowledge but rather on attachment disruption influencing their children's grief reaction (Nagy, 1948). Through the secure attachment from a young age (Bowlby, 1980), children could be more resilient inwards and could have used an effective coping mechanism during the grief process, which could explain the non-significant findings.

Limitations and Future Research

In this current study the main strength is the study of children in context with PGD as a target group, which is giving new insights to already existing research about prolonged grief disorder. Moreover, prolonged grief disorder in children is only included in some studies (Kaplow et al., 2014; Lobb et al., 2010; Melhem et al., 2007; Revet et al., 2021; Van Dijk et al., 2023), and this current research is a contributor for future research by measuring the interplay of age, kinship and PGD symptoms.

Apart from the strengths, the study also includes some limitations. One of the limitations is that parents answered the questions for their children. The reports could be biased since they answered the questions subjectively. In a study with parents who had PTSD it was found that in parental reports children were assessed as distressed although in objective assessments it was not similar to the report (Scheeringa & Zeanah, 2001). Therefore, the generalizability of these results should be considered with caution and researchers should include age groups where they can complete questionnaires themselves to avoid biases of parents.

Another limitation is the children's age range for whom the parents rated their PGD symptoms. The age was limited from five to sixteen years, which excludes the ages from sixteen onwards. To provide the generalizability, all the ages by the definition of children such as broader age groups based on Piaget's model of cognitive development should be included to meet the criteria of validity. By having a small sample size, the diversity of

different ages cannot be examined. Moreover, it is possible that with a greater number of participants different findings can emerge.

While there was sufficient prior research about PGD in children (Kaplow et al., 2014; Lobb et al., 2010; Melhem et al., 2007; Revet et al., 2021; Van Dijk et al., 2023) and PGD in adults (Lenferink et al., 2021), this current study is not aligned with the recent findings, since there was no significant association between the examined variables. This research only concentrated on the variables of age, kinship to deceased person and PGD symptom level, but other variables could be relevant too. For example, since the parent reported the PGD level of the children, there could exist a difference on how the parent overinterprets the emotional state based on the gender of their child (Chaplin & Aldao, 2012).

Conclusion

The purpose of this current study was to examine the relationship between PGD symptoms in children, kinship and age, where age was referred as predictor and moderator. However, based on the outcomes it was found that age does not have a moderating effect in the relationship between kinship and PGD. Even though no association between the variables was found, the findings serve as an initial step to look more deeper into the field of PGD in children. The lack of association between the variables of kinship, age and PGD in children, illustrates the difficulty of grief concept and highlights further research. Future studies are necessary to extend and replicate the current findings. Including the broader age groups and avoiding subjective misinterpretations of parents can strengthen generalizability as well as reliability and validity of the findings. Despite the limitations, this study was the first attempt to focus on PGD in children, while measuring the effects of age and kinship.

References

Al-Harbi, S. S. (2024). Theories to guide children development and their impact on early childhood education. *Journal of Ecohumanism*, *3*(3), 1517–1529. https://doi.org/10.62754/joe.v3i3.3622

Alvis, L., Zhang, N., Sandler, I. N. & Kaplow, J. B. (2022). Developmental Manifestations of Grief in Children and Adolescents: Caregivers as Key Grief Facilitators. *Journal Of Child & Adolescent Trauma*, *16*(2), 447–457. https://doi.org/10.1007/s40653-021-00435-0

American Psychiatric Association. (2022). Diagnostic and statistical manual of mental disorders (5th ed., text rev.). https://doi.org/10.1176/appi.books.9780890425787

Baker, J. E., Sedney, M. A., & Gross, E. (1992). Psychological tasks for bereaved children. *American Journal of Orthopsychiatry*, *62*(1), 105–116. https://doi.org/10.1037/h0079310

Boelen, P. A., & Spuij, M. (2024). Individual and systemic variables associated with prolonged grief and other emotional distress in bereaved children. *PLoS ONE*, *19*(4), e0302725. https://doi.org/10.1371/journal.pone.0302725

Bowlby, J. (1980). *Attachment and Loss: Vol.3: Loss : Sadness and Depression*. https://openlibrary.org/books/OL7593654M/Loss

Breusch, T. S. & Pagan, A. R. (1979). A Simple Test for Heteroscedasticity and Random Coefficient Variation. *Econometrica*, *47*(5), 1287. https://doi.org/10.2307/1911963

Chaplin, T. M. & Aldao, A. (2012). Gender differences in emotion expression in children: A meta-analytic review. *Psychological Bulletin*, *139*(4), 735–765. https://doi.org/10.1037/a0030737

Christ, G. H., Siegel, K. & Christ, A. E. (2002). Adolescent grief. *JAMA*, *288*(10), 1269. https://doi.org/10.1001/jama.288.10.1269

D'Alton, S. V., Ridings, L., Williams, C., & Phillips, S. (2022). The bereavement experiences of children following sibling death: An integrative review. *Journal of Pediatric Nursing*, *66*, e82–e99. https://doi.org/10.1016/j.pedn.2022.05.006

Djelantik, A. A. A. M. J., Smid, G. E., Mroz, 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

Falala, A., Lannes, A., Bui, E., & Revet, A. (2024). Prevalence of prolonged grief disorder in bereaved children and adolescents: A systematic review. *L Encéphale*. https://doi.org/10.1016/j.encep.2023.11.016

Fernández-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

Field, A., Miles, J., & Field, Z. (2012). *Discovering statistics using R*.

Haine, R. A., Ayers, T. S., Sandler, I. N., & Wolchik, S. A. (2008). Evidence-based practices for parentally bereaved children and their families. *Professional Psychology Research and Practice*, *39*(2), 113–121. https://doi.org/10.1037/0735-7028.39.2.113

Hantrais, L. (1999). Contextualization in cross-national comparative research. *International Journal of Social Research Methodology*, *2*(2), 93-108. https://doi.org/10.1080/136455799295078

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

Kaplow, J. B., Howell, K. H., & Layne, C. M. (2014). Do circumstances of the death matter?

Identifying Socioenvironmental Risks for Grief-Related Psychopathology in Bereaved Youth. *Journal of Traumatic Stress*, *27*(1), 42–49. https://doi.org/10.1002/jts.21877

Lobb, E. A., Kristjanson, L. J., Aoun, S. M., Monterosso, L., Halkett, G. K. B. & Davies, A. (2010). Predictors of Complicated Grief: A Systematic Review of Empirical Studies. *Death Studies*, *34*(8), 673–698. https://doi.org/10.1080/07481187.2010.496686

Lenferink, L., Eisma, M., Smid, G., De Keijser, J., & Boelen, P. (2021). 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*, *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

Maccallum, F., Malgaroli, M. & Bonanno, G. A. (2017). Networks of loss: Relationships among symptoms of prolonged grief following spousal and parental loss. *Journal Of Abnormal Psychology*, *126*(5), 652–662. https://doi.org/10.1037/abn0000287

Melhem, N. M., Moritz, G., Walker, M., Shear, M. K. & Brent, D. (2007). Phenomenology and Correlates of Complicated Grief in Children and Adolescents. *Journal Of The American Academy Of Child & Adolescent Psychiatry*, *46*(4), 493–499. https://doi.org/10.1097/chi.0b013e31803062a9

Nagy, M. (1948). The Child's Theories concerning Death. *The Pedagogical Seminary And Journal Of Genetic Psychology*, *73*(1), 3–27. https://doi.org/10.1080/08856559.1948.10533458

Netherlands, S. (2022, October 11). Nearly 100 thousand young people are half-

orphans. *Statistics Netherlands*. https://www.cbs.nl/en-gb/news/2022/41/nearly-100-thousand-young-people-are-half-orphans

Newson, R. S., Boelen, P. A., Hek, K., Hofman, A., & Tiemeier, H. (2011). The prevalence and characteristics of complicated grief in older adults. *Journal of Affective Disorders*, *132*(1–2), 231–238. https://doi.org/10.1016/j.jad.2011.02.021

Piaget, J. (1964). Part I: Cognitive development in children: Piaget development and learning. *Journal of Research in Science Teaching*, *2*(3), 176–186. https://doi.org/10.1002/tea.3660020306

Pinquart, M., & Sorensen, S. (2001). Influences on Loneliness in Older Adults: A Meta-Analysis. *Basic and Applied Social Psychology*, *23*(4), 245–266. https://doi.org/10.1207/153248301753225702

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

Revet, A., Bui, E., Benvegnu, G., Suc, A., Mesquida, L., & Raynaud, J. (2020). Bereavement and reactions of grief among children and adolescents: Present data and perspectives. *L Encéphale*, *46*(5), 356–363. https://doi.org/10.1016/j.encep.2020.05.007

Revet, A., Suc, A., Auriol, F., Djelantik, A. a. a. M. J., Raynaud, J., & Bui, E. (2021). Peritraumatic distress predicts prolonged grief disorder symptom severity after the death of a parent in children and adolescents. *European Journal of Psychotraumatology*, *12*(1). https://doi.org/10.1080/20008198.2021.1936916

Sandler, I. N., Ayers, T. S., Wolchik, S. A., Tein, J., Kwok, O., Haine, R. A., Twohey-Jacobs, J., Suter, J., Lin, K., Padgett-Jones, S., Weyer, J. L., Cole, E., Kriege, G. & Griffin, W. A. (2003). The Family Bereavement Program: Efficacy evaluation of a theory-based

prevention program for parentally bereaved children and adolescents. *Journal Of Consulting And Clinical Psychology*, *71*(3), 587–600. https://doi.org/10.1037/0022-006x.71.3.587

Seiler, A., Von Känel, R. & Slavich, G. M. (2020). The Psychobiology of Bereavement and Health: A Conceptual Review From the Perspective of Social Signal Transduction Theory of Depression. *Frontiers in Psychiatry*, *11*. https://doi.org/10.3389/fpsyt.2020.565239

Slaughter, V. (2005). Young children's understanding of death. *Australian Psychologist*, *40*(3), 179–186. https://doi.org/10.1080/00050060500243426

Stocker, C. M., Gilligan, M., Klopack, E. T., Conger, K. J., Lanthier, R. P., Neppl, T. K., O'Neal, C. W. & Wickrama, K. A. S. (2019). Sibling relationships in older adulthood: Links with loneliness and well-being. *Journal Of Family Psychology*, *34*(2), 175–185. https://doi.org/10.1037/fam0000586

Tofthagen, C. S., Kip, K., Witt, A., & McMillan, S. C. (2017). Complicated Grief: Risk factors, interventions, and resources for oncology nurses. *Clinical Journal of Oncology Nursing*, *21*(3), 331–337. https://doi.org/10.1188/17.cjon.331-337

Van Dijk, I., Boelen, P., De Keijser, J., & Lenferink, L. (2023). Assessing DSM-5-TR and ICD-11 prolonged grief disorder in children and adolescents: development of the Traumatic Grief Inventory – Kids – Clinician-Administered. *European Journal of Psychotraumatology*, *14*(2). https://doi.org/10.1080/20008066.2023.2197697

Van Dijk, I., Boelen, P., De Keijser, J., & Lenferink, L. (2024). Initial validation of a measure assessing DSM-5-TR and ICD-11 prolonged grief in children and adolescents. *Journal of Affective Disorders, 320*, 308–316. https://doi.org/10.13140/RG.2.2.23044.74886

Walter, T. (2010). Grief and culture. *Bereavement Care*, *29*(2), 5–9. https://doi.org/10.1080/0268262100370743

Appendix A

R-Code

```
###Load libraries##
library(haven)
library(tidyverse)
library(car)
library(lmtest)
library(stats)
library(dplyr)
library(ggplot2)
library(writexl)
library(readxl)
library(psych)

############Specify the path to your .sav file###########
file_path <- "C:/R Projects/ThesisTrial1/DatasetGrief.sav"

##################Read the .sav file using read_sav()###########
DataGrief <- read_sav(file_path)

########Remove unusable variables##########

DataGrief$RecordedDate <- NULL
DataGrief$ResponseId <- NULL
DataGrief$Intro1 <- NULL
DataGrief$GenderParent <- NULL
DataGrief$AgeP <- NULL
DataGrief$KinshipP <- NULL
DataGrief$KinshipP_5_TEXT <- NULL
DataGrief$KinshipC_8_TEXT <- NULL
DataGrief$FilterVariable <- NULL
DataGrief$KindStart <- NULL
DataGrief$Ouder1 <- NULL
DataGrief$CoD_6_TEXT <- NULL


########Remove unused variables########
DataGrief <- DataGrief %>%
  select(-all_of(c("TGI_1", "TGI_2", "TGI_3", "TGI_4", "TGI_5", "TGI_6", "TGI_7",
                   "TGI_8", "TGI_9", "TGI_10", "TGI_11", "TGI_12", "TGI_13", "TGI_14",
                   "TGI_15", "TGI_16", "TGI_17", "TGI_18", "TGI_19", "TGI_20",
                   "TGI_21", "TGI_22")))

DataGrief <- DataGrief %>%
  select(-all_of(c("TGI_K_CA_1", "TGI_K_CA_2", "TGI_K_CA_3", "TGI_K_CA_4",
                   "TGI_K_CA_5", "TGI_K_CA_6", "TGI_K_CA_7", "TGI_K_CA_8",
                   "TGI_K_CA_9", "TGI_K_CA_10", "TGI_K_CA_11", "TGI_K_CA_12",
                   "TGI_K_CA_13", "TGI_K_CA_14", "TGI_K_CA_15", "TGI_K_CA_16")))
```

```
########Remove participantss that we cannot use (regarding deaths of of pets etc)###
DataGrief <- DataGrief[-37, ]
DataGrief <- DataGrief[-36, ]
DataGrief <- DataGrief[-35, ]
DataGrief <- DataGrief[-34, ]
DataGrief <- DataGrief[-33, ]
DataGrief <- DataGrief[-32, ]
DataGrief <- DataGrief[-31, ]
DataGrief <- DataGrief[-29, ]
DataGrief <- DataGrief[-6, ]
DataGrief <- DataGrief[-4, ]
DataGrief <- DataGrief[-3, ]
DataGrief <- DataGrief[-2, ]
DataGrief <- DataGrief[-1, ]

#######New Variable by combining the answers of parents for their kids#
DataGrief <- DataGrief %>%
  mutate(TGI_Kids_PR_Mean_1 = (TGI_K_CA_1_ParentReport + TGI_K_CA_2_PR +
TGI_K_CA_3_PR + TGI_K_CA_4_PR + TGI_K_CA_5_PR + TGI_K_CA_6_PR +
TGI_K_CA_7_PR +
                               TGI_K_CA_8_PR + TGI_K_CA_9_PR + TGI_K_CA_10_PR +
TGI_K_CA_11_PR + TGI_K_CA_12_PR + TGI_K_CA_13_PR + TGI_K_CA_14_PR +
TGI_K_CA_15_PR + TGI_K_CA_16_PR) / 16)


####Sum up individual scores#####

DataGrief <- DataGrief %>%
  mutate(TGI_Kids_PR_Sum_1 = rowSums(select(.,
                                    starts_with("TGI_K_CA_") & ends_with("_PR")
  )))

##################Descriptive Statistics############
###Age###
mean(DataGrief$AgeC)
sd(DataGrief$AgeC)
min(DataGrief$AgeC)
max(DataGrief$AgeC)

###Gender###
DataGrief %>%
  group_by(GenderChild) %>%
  summarize(count = n())

####Time since death in months#####
mean(DataGrief$TSL)
sd(DataGrief$TSL)

########Cause of death####
DataGrief %>%
  group_by(CoD) %>%
```

```
  summarize(count = n())

##Mean scores of symptoms across all participants###
mean(DataGrief$TGI_Kids_PR_Sum_1)
sd(DataGrief$TGI_Kids_PR_Sum_1)
min(DataGrief$TGI_Kids_PR_Sum_1)
max(DataGrief$TGI_Kids_PR_Sum_1)

###Number of participants with score ranging from 0 to 70###
###Considering that 16 is the lowest score and 70 is the highest ####

####Define the score ranges#####
ranges <- list(
  "16-20" = c(16, 20),
  "20-40" = c(21, 40),
  "40-60" = c(41, 60),
  "60-70" = c(61, 70)
)

####Create an empty vector to store the counts####
counts <- vector("numeric", length(ranges))
names(counts) <- names(ranges)

####Count the number of participants in each range###
for (i in 1:length(ranges)) {
  lower <- ranges[[i]][1]
  upper <- ranges[[i]][2]
  counts[i] <- sum(DataGrief$TGI_Kids_PR_Sum_1 >= lower &
                   DataGrief$TGI_Kids_PR_Sum_1 <= upper)
}

####Print the results####
for (i in 1:length(ranges)) {
  print(paste("Number of participants in range", names(ranges)[i], ":", counts[i]))
}

###what was the relationship of the diseased person to the child###

####Create a vector of scores######
scores <- 1:8

####Count the occurrences of each score###
kinship_to_child_counts <- sapply(scores, function(x) sum(DataGrief$KinshipC == x))

####Print the results####
print("Relationship to child:")
print(kinship_to_child_counts)

#####Cronbach's alpha for the TGI Scale####
```

```
Chronbach_alpha_TGI <- DataGrief[, c( "TGI_K_CA_1_ParentReport",
"TGI_K_CA_2_PR", "TGI_K_CA_3_PR", "TGI_K_CA_4_PR", "TGI_K_CA_5_PR",
"TGI_K_CA_6_PR", "TGI_K_CA_7_PR",
                                "TGI_K_CA_8_PR", "TGI_K_CA_9_PR", "TGI_K_CA_10_PR",
"TGI_K_CA_11_PR", "TGI_K_CA_12_PR", "TGI_K_CA_13_PR", "TGI_K_CA_14_PR",
"TGI_K_CA_15_PR", "TGI_K_CA_16_PR")]
alpha(Chronbach_alpha_TGI)

##########################Assumptions#######################
####1.Normality####
shapiro_test <- shapiro.test(DataGrief$TGI_Kids_PR_Sum_1)
print(shapiro_test)

################ 2. Homogeneity of Variance ###################

##Without moderator###
model <- lm(TGI_Kids_PR_Sum_1 ~ KinshipC, data = DataGrief)

########Visualize#########
plot(model, which = 1)

##Breusch-Pagan test for heteroscedasticity##
bptest(model)

####With the moderation ###
model <- lm(TGI_Kids_PR_Sum_1 ~ KinshipC * AgeC, data = DataGrief)

########Visualize#########
plot(model, which = 1)

plot(DataGrief$KinshipC, residuals(model), xlab = "X", ylab = "Residuals")
plot(DataGrief$AgeC, residuals(model), xlab = "M", ylab = "Residuals")

##Breusch-Pagan test for heteroscedasticity##
bptest(model)

#####3.Linearity#####

##Without moderator##
model_without_moderator <- lm(TGI_Kids_PR_Sum_1 ~ KinshipC, data = DataGrief)

##Visualize###
plot(model_without_moderator, which = 1)

###With moderator####
model_with_Moderator <- lm(TGI_Kids_PR_Sum_1 ~ KinshipC * AgeC, data = DataGrief)

########visualize########
plot(model_with_Moderator, which = 1)

######4.Independence########
```

```
###Without moderator####
model <- lm(TGI_Kids_PR_Sum_1 ~ KinshipC * AgeC, data = DataGrief)

##visualize##
plot(model$residuals, type = "l")

##With Moderator##
model <- lm(TGI_Kids_PR_Sum_1 ~ KinshipC * AgeC, data = DataGrief)

##visualize##
plot(model$residuals, type = "l")

######################Main Analyses######################

########## Hypothesis 1 #############

########IV and DV are transfered in a new dataset########
H1 <- data.frame(
  TGI_Kids_PR_Sum_1 = DataGrief$TGI_Kids_PR_Sum_1,
  KinshipC = DataGrief$KinshipC
)

###check the type of data of kinship###
str(H1$KinshipC)

####turn Kinship to numeric#######
H1$KinshipC <- as.numeric(H1$KinshipC)

###Dummy code the IV: every death that is not of a parent shoudd be 0####
H1$KinshipC <- as.numeric(H1$KinshipC == "1")

#####Run the linear regression analysis#####
model1 <- lm(TGI_Kids_PR_Sum_1 ~ KinshipC, data = H1)

#######Summary of the model######
summary(model1)

#######Coefficients######
coefficients(model1)

#######ANOVA table######
anova(model1)

###Visualize###
ggplot(DataGrief, aes(x = KinshipC, y = TGI_Kids_PR_Sum_1)) +
  geom_point() +
  geom_smooth(method = "lm", se = FALSE)

########Box plot#########
ggplot(H1, aes(x = KinshipC, y = TGI_Kids_PR_Sum_1)) +
```

```
  geom_boxplot()

#########Bar plot with error bars##########
ggplot(H1, aes(x = KinshipC, y = TGI_Kids_PR_Sum_1)) +
  stat_summary(fun.y = mean, geom = "bar", fill = "lightblue") +
  stat_summary(fun.data = mean_cl_normal, geom = "errorbar", width = 0.2)

#############Hypothesis 2#############

####Create new dataframe with AGE as IV and Symptoms as DV####
###Name H2#####
H2 <- data.frame(
  TGI_Kids_PR_Sum_1 = DataGrief$TGI_Kids_PR_Sum_1,
  AgeC = DataGrief$AgeC
)

###Define age breaks### 17 is excluded but we put it in the code to include 16 in the range##
age_breaks <- c(0, 6, 11, 17)

###Define labels for the age groups###
labels <- c("5-6", "7-11", "12-16")

###Create the Age_Group column###
H2$Age_Group <- cut(H2$AgeC, breaks = age_breaks, labels = labels, right = FALSE)

######Run the second Linear Regression#####
model2 <- lm(TGI_Kids_PR_Sum_1 ~ Age_Group, data = H2)

######Summary of the model######
summary(model2)

####Coefficients####
coefficients(model2)

####ANOVA table###
anova(model2)

###Rename Variables according to APA7###
names(H2)[names(H2) == "TGI_Kids_PR_Sum_1"] <- "PGD_Symptom_Level"
names(H2)[names(H2) == "Age_Group"] <- "Age"

###Vizualize##
boxplot(PGD_Symptom_Level ~ Age,
        data = H2,
        main = "PGD_Symptom_Level by Age",
        na.action = NULL)

###Redo hypothesis 2 with age as a continous variable to see any differences###

model2b <- lm(PGD_Symptom_Level ~ AgeC, data = H2)
```

```
summary(model2b)

####Coefficients####
coefficients(model2b)

####ANOVA table###
anova(model2b)

###vizualize###

boxplot(PGD_Symptom_Level ~ AgeC,
        data = H2,
        main = "PGD_Symptom_Level by Age")

####################Hypothesis 3###############

###Put all variables in the same dataframe for further coding###
H3 <- data.frame(
  TGI_Kids_PR_Sum_1 = DataGrief$TGI_Kids_PR_Sum_1,
  KinshipC = DataGrief$KinshipC,
  AgeC = DataGrief$AgeC
)

####turn Kinship to numeric#######
H3$KinshipC <- as.numeric(H3$KinshipC)

###Dummy code the IV: parent death =1, every death that is not of a parent shoud be =0####
H3$KinshipC <- as.numeric(H3$KinshipC == "1")

###Turn the independent variable Age into differnet groups####

###Define age breaks for up to 16 years##
age_breaks <- c(0, 6, 11, 17)

###Define labels for the age groups###
labels <- c("5-6", "7-11", "12-16")

###Create the Age_Group column###
H3$Age_Group <- cut(H3$AgeC, breaks = age_breaks, labels = labels, right = FALSE)

#######Fit the moderated regression model######
model3 <- lm(TGI_Kids_PR_Sum_1 ~ KinshipC + Age_Group + KinshipC*Age_Group,
data = H3)

#######Summarize the model######
summary(model3)

#######Coefficients######
coefficients(model3)

######ANOVA table######
```

```
anova(model3)

####Rename Variables to match APA7 regulations####

names(H3)[names(H3) == "KinshipC"] <- "Kinship"
names(H3)[names(H3) == "TGI_Kids_PR_Sum_1"] <- "PGD_Symptom_Level"
names(H3)[names(H3) == "Age_Group"] <- "Age"

######vizualize####
ggplot(H3, aes(x = Kinship , y = PGD_Symptom_Level)) +
  geom_point() +
  geom_smooth(method = "lm", se = FALSE) +
  facet_wrap(~ Age)

######Hypothesis 3 with Age as continious######

model3b <- lm(PGD_Symptom_Level ~ Kinship + AgeC + Kinship*AgeC, data = H3)

#######Summarize the model######
summary(model3b)

#######Coefficients######
coefficients(model3b)

######ANOVA table######
anova(model3b)

######vizualize####
ggplot(H3, aes(x = Kinship , y = PGD_Symptom_Level)) +
  geom_point() +
  geom_smooth(method = "lm", se = FALSE) +
  facet_wrap(~ AgeC)
```