The Role of Attachment Dimensions and Lingering Attachment in Prolonged Grief

Symptoms

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Abstract

This study investigated the role of adult attachment dimensions – attachment anxiety and attachment avoidance – in relation to prolonged grief symptoms. Four hypotheses were tested: (1) Attachment anxiety is positively associated with prolonged grief symptoms; (2) attachment avoidance is positively associated with prolonged grief symptoms; (3) attachment anxiety shows a stronger association with prolonged grief symptoms than attachment avoidance; and (4) lingering attachment mediates the relationship between attachment avoidance and prolonged grief symptoms. This aim of this study was to replicate the findings of Eisma et al. (2023) meta-analysis. A cross-sectional survey was conducted, with a sample of 351 bereaved adults, using self-report measures that assess attachment dimension, lingering attachment, and prolonged grief symptoms. Significant positive associations between both attachment dimension and prolonged grief were found, with attachment anxiety demonstrating a stronger effect. Mediation analysis revealed insignificant indirect effect of lingering attachment. These findings are consistent with attachment theory and can be explained through hyperactivation/deactivation of attachment systems. The results support attachment insecurity as a risk factor for maladaptive grief responses and highlights the importance of further longitudinal and clinical research.

Introduction

Loss is an inescapable fate that one must face at some point throughout human life. Whether it be a family member or a significant other, the death of a loved one can bring strong emotional distress (Eisma et al., 2023). Emotional experiences such as yearning or preoccupation with thoughts of the deceased are common amongst the bereaved and may be defined as "acute grief" (Zisook et al., 2014). Upon the experience of death, this form of grief varies from person to person, where they experience an array of responses and emotions – negative emotions like sadness, anxiety, shame, and anger; alongside positive emotions like joy and warmth while recalling fond memories (Zisook et al., 2014). Ultimately, most individuals make the transition from acute grief into "integrated grief", where acceptance of the loss takes place gradually over time and engagements with daily life can occur without disruptions albeit with occasional moments of emotional relapse (triggered by stressful or celebratory events)(Zisook et al., 2014).

However, in some cases, the highly stressful nature of loss may trigger pathological responses, preventing the individual from adapting to the loss and causing them to remain "stuck" in a state of prolonged grief (PG), characterized by persistent and severe acute grief symptoms, also referred to as prolonged grief symptoms (PGS) (Zisook et al., 2014; Eisma et al., 2023). A clinical diagnosis characterized by these PGS, labeled Prolonged Grief Disorder (PGD), was recently included in the text revision of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5-TR) (American Psychiatric Association, 2022; Eisma, Janshen, and Lenferink, 2022). This investigation focuses on the symptomatology associated with prolonged grief based on the DSM-5-TR diagnostic criteria, rather than the formal diagnosis of PGD. PGD is characterized by cognitive, emotional, and behavioural symptoms, for example avoidance of loss reminders, intense feelings of emotional pain like anger or bitterness, intense loneliness and

sentiment that life is meaningless (American Psychiatric Association, 2022; Eisma, 2023). It has been reported that approximately 10% of individuals who experience loss may experience PG, after a natural death (Lundorff et al., 2017; Eisma & Lenferink, 2016). To meet the criteria for PGD, symptoms must persist for at least six or twelve months (American Psychiatric Association, 2022). In addition, the endurance of this PGS may result in some negative outcomes such as functional impairment, which can disrupt certain areas of a person's life, for example, difficulty engaging in social or occupational activities (American Psychiatric Association, 2022). PGS are also related to negative mental and physical health outcomes, like sleep disturbances, reduced quality of life, risk of cardiac events, issues with substance use, intrusive thoughts and suicidal behaviors (Jordan & Litz, 2014).

PGS as a response to loss has been argued to result from maladaptive negative cognitions, intensifying the symptoms of prolonged grief and making it difficult for the bereaved individual to adaptively cope with the loss (Komischke-Konnerup et al., 2023). These bereaved individuals may also engage in maladaptive anxious or depressive avoidance strategies, which could further elevate and maintain PGS (Komischke-Konnerup et al., 2023; Boelen, 2021). Several risk-factors can be attributed to the development of PGD, such as a history of anxiety or mood disorders, a violent loss, a lack of perceived social support, and insecure attachments (Zisook et al., 2014). Recent studies have identified cognitive behavioural therapy as an effective intervention for PGS with long lasting benefits for some individuals (Currier et al., 2008; Jordan & Litz, 2014; Doering & Eisma, 2016; M.K. Shear et al., 2013; Eisma, 2023; Komischke-Konnerup et al., 2023). However, a notable proportion of individuals did not experience significant improvements, suggesting that even well-established treatments may not be universally successful (Currier et al., 2008; Doering & Eisma, 2016). For this reason, it is crucial

to examine how PGS are defined and identified, as this understanding highlights the complexity of PGD and forms the basis for developing effective interventions (Jordan & Litz, 2014).

 The intensity of grief response can be treated clinically through interventions that apply attachment-focused approaches (Eisma et al., 2023). The concept of attachment is closely related to understanding PGS and how the symptoms manifest. Attachment theory is a framework that suggests the role of early caregiving relationships and the resulting impact on the individual leads to distinct attachment styles (Bowlby, 1982). According to Bowlby (1982), attachment figures are individuals who provide a secure base during times of distress and emotional need, for individuals rely on attachment functions such proximity seeking (i.e., desire for closeness), safe haven (i.e., seeking comfort and support during distress), and secure base (i.e., source of emotional and psychological stability) (Bowlby, 1982; Eisma et al., 2025). These figures, typically early caregivers, shape both attachment patterns and internal working models (IWMs) based on the support and security they provide (Bowlby, 1982; Mikulincer & Shaver, 2021). IWMs are schemas of the self and others in relationships, these attachment patterns and IWMs remain active throughout life and influence future attachment relationships, often romantic partners or close family members (Mikulincer & Shaver, 2021).

 Experiencing the loss of an attachment figure may feel extremely distressing, as it disrupts attachment functions that were once provided by that attachment figure. This loss may also lead to maladapted IWMs, which resulting in difficulty reorganizing attachment priorities, also known as attachment hierarchy, due to prominent attachment to the deceased (Bowlby, 1982; LeRoy et al., 2019). Additionally, the level of distress and grief response may vary based on the bereaved individual's attachment orientation (Mikulincer & Shaver, 2021).There are four adult attachment styles; secure, anxious, avoidant, and disorganized attachment (Eisma et al.,

2023). Some suggest that adult attachment is better understood through two attachment dimensions: attachment-related anxiety and attachment-related avoidance (Fraley & Shaver, 2000).

Attachment anxiety refers to the degree to which individuals worry about the presence and responsiveness of attachment figures, during times of need (Mikulincer & Shaver, 2021). A person with high attachment anxiety and low attachment avoidance typically embodies an anxious attachment style (Mikulincer et al., 2003). These individuals usually fear rejection and abandonment, which generates a feeling of urgency to pursue the others' attention and support (Eisma et al., 2023; Mikulincer & Shaver, 2021). In the context of grief, these individuals often respond to loss with excessive rumination, intense distress, and difficulty accepting the reality of the death (Currier et al., 2014). Due to a hyperactive attachment system, individuals are likely to experience a persistent yearning for the deceased (Currier et al., 2014; Mikulincer & Shaver, 2021). Studies show that attachment anxiety is positively correlated with PGS, particularly in cross-sectional analyses (Eisma et al., 2023).

Attachment-related avoidance refers to the degree to which individuals doubt the sincerity of others' intentions and actively protects their emotional and behavioural autonomy (Mikulincer & Shaver, 2021). A person with high attachment avoidance and low attachment anxiety entails a person with an avoidant attachment style (Mikulincer & Shaver, 2003). Due to their deactivating attachment system, these individuals exhibit: emotionally detachment, less fear of losing attachment figures, minimized attachment needs, suppressed grief-related emotions and challenges with integrating loss into their reality (Mikulincer & Shaver, 2021). In addition, these individuals may develop defense mechanisms which may cause them to suppress any attempts to seek closeness or support from others (Mikulincer & Shaver, 2021). Consequently, their

avoidance becomes a barrier to building bonds with new people, as they instinctively inhibit proximity-seeking behaviors (Mikulincer & Shaver, 2021).

Despite their emotional detachment, individuals with high attachment avoidance may still rely on core attachment functions, such as proximity seeking (i.e., desire for closeness), safe haven (i.e., seeking comfort and support during distress), and secure base (i.e., source of emotional and psychological stability) (Eisma et al., 2025). In the context of prolonged grief, research suggests that avoidant individuals exhibit these attachment functions through co-occurring paradoxical behavioural tendencies - approach and avoidance - that serve to maintain an emotional bond with the deceased (Eisma et al., 2025). One mechanism that is positively and strongly associated with PGS severity is loss-related avoidance, whereby bereaved individuals do not cognitively process the loss and avoid painful reminders of the deceased (Eisma et al., 2025). In some cases, loss-related avoidance may resemble approach behaviors, such as yearning, rumination, or proximity seeking (Eisma et al., 2025). These co-existing behaviors can further complicate the emotional adaptation to the loss and preserve the emotional connection with the deceased (Eisma & Lenferink, 2023; Eisma et al., 2025).

Due to the continued emotional attachment to the deceased, these avoidantly attached individuals may struggle to effectively reorganize attachment hierarchies after a loss, making it difficult for them to redirect their attachment needs to someone living, which can be further explained by maladapted IWMs (Bowlby, 1982; LeRoy et al., 2019; Eisma et al., 2025). This ongoing connection with the deceased can be referred to as lingering attachment, which is characterized by the desire to use the deceased to fulfill their attachment needs (Eisma et al., 2025). Some studies report that lingering attachment and approach behaviors towards the deceased are predictive of severe symptoms of prolonged grief (Eisma et al., 2025; Boelen et al.,

2006; Eisma et al., 2022; Field et al., 2003). This inability to rearrange the attachment hierarchy could help explain why avoidantly attached individuals remain stuck in a state of unresolved prolonged grief, as their attachment to the deceased remains prominent due to IWMS not being updated to focus on other attachment relationships (Bowlby, 1982; LeRoy et al., 2019; Eisma et al., 2025; Bowlby, 1982). Further exploration of the role of lingering attachment in the relationship between attachment avoidance and PGS is needed to get more insight into the underlying mechanisms that contribute to the persistence of grief. (Eisma et al., 2025).

Current Study

Currently, the relationship between attachment anxiety and its role in PGS remains incongruent amongst cross-sectional and longitudinal studies (Eisma et al., 2023). Furthermore, attachment avoidance has not been thoroughly examined in relation to PGS, therefore it is worth exploring its potential implications, as its role in the persistence of PGS remains underexplored (Eisma et al., 2023). In this investigation, a study was conducted that seeks to replicate and extend the recent findings on attachment dimensions and prolonged grief. Eisma et al. (2023) examined the role of adult attachment in prolonged grief, reporting that both attachment anxiety and avoidance were positively associated with prolonged grief symptoms severity. Through a cross-sectional design, this study will test four key hypotheses related to attachment dimensions, lingering attachment, and PGS. First, we hypothesize that attachment anxiety will be positively correlated with PGS. The second hypothesis is that attachment avoidance will also be positively correlated with PGS. Third, we expect that attachment anxiety will be a relatively stronger predictor to PGS than attachment avoidance. Finally, we propose that lingering attachment mediates the relationship between attachment avoidance and PGS, indicating that higher levels of attachment avoidance is associated with increased lingering attachment, thus predicting

greater PGS. By addressing these questions, this study seeks to clarify the mechanisms linking attachment, lingering attachment, and prolonged grief, contributing to both theoretical understanding and clinical interventions.

Method

Procedure

The study was approved by the Ethics Committee for Behavioural and Social Sciences at the University of Groningen registered as PSY-2324-S-0263. The study was a cross-sectional, correlational survey and was administered using Qualtrics. A convenience sample of bereaved adults was used. Participants were recruited through the personal networks of psychology students at the University of Groningen, with each student inviting at least three bereaved individuals to take part in the study. Participants were provided with a link to access the online survey. Before starting the survey, participants were first presented with an information sheet followed by a consent form. They were informed that participation was voluntary and that they have the right to withdraw at any time, as well as personal data protection through anonymization. They were also informed about the research topic ("the role of social relationships in coping with bereavement"), as well as the study's potential benefits (such as contributing to improved care for bereaved individuals). The survey questionnaire took an estimated 20 minutes for completion.

An a priori power analysis was conducted using G*Power (Faul et al., 2007) to determine the required sample size for our primary research question which examines the relationship between attachment anxiety and attachment avoidance and prolonged grief symptoms. Previous meta-analytic findings have reported a small effect size ($r = .13$) for the association between

attachment avoidance and prolonged grief symptoms, and a moderately stronger effect ($r = .28$) between attachment anxiety and prolonged grief symptoms (Eisma et al. 2023).

Choosing a conservative approach to ensure sufficient statistical power to detect the smallest anticipated meaningful association, $r = .13$ was used in the a priori power analysis to determine the required sample size for this paper's research question. A one-sided test was applied, based on the directional hypothesis that higher levels of attachment anxiety and attachment avoidance would be positively associated with prolonged grief symptoms (Eisma et al., 2023). The power analysis was conducted with a significance level of .05, and a desired power of .80, for which a minimum of 364 participants were required to achieve a statistically significant effect

Individuals were excluded from the study if they did not meet the minimum age requirement of 18 years or older. Additionally, participants were required to meet the time criterion related to bereavement: the loss must have occurred at least six months prior to participation. 68 out of 429 people who accessed the questionnaire, did not complete both the TGISR+ and the ECR-SF. One entry was labeled as a "test survey", two participants were unable to answer the questions well due to some technical difficulties, and five participants had experienced loss less than 6 months. There were also two double entries, which were from the same person and same IP address. The final sample size resulted in *N=351*, after removing these entries.

Table 1

Sample demographics and characteristics (N=351)

Characteristics	Category	*n*	*%*
Gender of participant	Female	221	63

	Male	128	36.5
	Non-binary	2	0.6
Age in years		$M = 45.6$	$SD = 16.4$
Level of Education[a]	Lower education	155	44.1
	Higher Education	191	54.4
	Other education	5	1.4
Kinship to the deceased[b]	Partner	30	8.5
	Parent	237	67.5
	Sibling	25	7.1
	Child	5	1.4
	Other person	53	15.1
Gender of the deceased	Female	169	48.1
	Male	182	51.9
	Non-binary		
Cause of death[c]	Natural	316	90
	Accident	17	4.8
	Suicide	8	2.3
	Homicide	6	1.7
	Other causes	4	1.1
Expectedness of death[d]	Expected	140	39.9
	Unexpected	120	34.2

	Other experience	91	26
Time since loss in months	6-35	190	54.1
	36-60	103	29.3
	61-96	29	8.2
	97-120	11	3.1
	>120	18	5.1
Attachment Dimensions		*M*	*SD*
	Attachment avoidance	19.7	6.51
	Attachment anxiety	19.7	7.24
Prolonged Grief Symptoms		28.6	10.4

Note. [a]Lower Education = all education types except college or university education, Higher Education = College or University Education, Other Education = Postdoctoral *(n=5)*.
[b]Other person = friend *(n=4),* multiple losses *(n=6),* and other family members *(n=42).*
[c]Other causes = medical error *(n=2)* and unknown *(n=2).*
[d]Other experience= both expected and unexpected *(n=89),* neither expected or unexpected *(n=2).*

Measures

Sociodemographic and Loss-related Characteristics

A self-constructed questionnaire to assess sociodemographic characteristics (i.e., gender, age, education level) and loss-related characteristics (i.e., time since loss, relationship to the deceased, gender of the deceased, cause of death, and expectedness of death).

Prolonged Grief Symptoms

Prolonged grief symptoms were assessed using the Traumatic Grief Inventory Self Report Plus (TGI-SR+; Lenferink et al., 2022), a self-report questionnaire that aims to assess

prolonged grief symptoms. In the current study, only the 12 items reflecting the DSM-5-TR criteria for prolonged grief disorder were used. Participants were asked to rate the frequency of symptoms during the previous month on a 5-point Likert-scale ranging from 1 (*never*) to 5 (*always*). Items reflect core features of prolonged grief, such as persistent yearning and emotional distress (e.g., *"I found myself longing or yearning for the person who died", "I experienced intense emotional pain, sadness, or pangs of grief"*). A total prolonged grief symptoms score was calculated by summing the scores on all items (ranging from 12 to 60). A total score higher or equal to 33 indicates clinically significant levels of prolonged grief (Lenferink et al., 2022). Prior research supports the construct, convergent, and known-groups validity and the reliability of the TGI-SR+ for the Dutch and German version (Lenferink et al., 2022; Treml et al., 2024). In our study, reliability for the total score was excellent, $\alpha = .93$.

Attachment Dimensions

To assess attachment dimensions in relation to other people in general, we used the 12-item Experiences in Close Relationships Short Form (ECR-SF; Wei et al., 2007). A formal translation-back-translation procedure was used for the Dutch and German version. Participants were asked to indicate how they generally feel in social relationships (e.g., *"It helps to turn to people around me in times of need"*, "*I need a lot of reassurance that I am loved by the people around me*"). ECR-SF items were scored on a 7-point Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). To calculate the total scores, the six uneven numbered items were summed to obtain a total score for *Attachment Avoidance*. Reverse scored items 1, 5 and 9 were recoded before summing. Similarly, the six even numbered items were summed to calculate the total score for *Attachment Anxiety*, with reverse scored item 8 being recoded as well. Past research supports the reliability and construct validity of the ECR-SF (Wei et al., 2007). In the

present study, the subscales of attachment avoidance and attachment anxiety demonstrated (minimally) acceptable reliability, $\alpha = .69$, and $\alpha = .75$, respectively.

Lingering Attachment

To assess the extent to which participants still desired to use the deceased person as an attachment figure (i.e., lingering attachment), we used the 6-item WHOTO (Hazan & Zeifman, 1994). This measure assesses three attachment-related functions proposed by Bowlby (1982): proximity-seeking (e.g., "*Who is the person you most like to spend time with?*"), safe haven (e.g., "*Who is the person you want to be with when you are feeling upset or down?*"), and secure base (e.g., "*Who is the person you would want to tell first if you achieved something good?*"). Participants were asked to list two to five people in order of importance, with two items per attachment-related function. To assess lingering attachment, participants were asked to consider where they would place their deceased loved one on this list (e.g., "*Even if you know you cannot or should not, if you could place your deceased loved one anywhere on the above list, where would you desire to put him or her?*"). Assigning the deceased to the first place resulted in a score of 5 on the item, while assigning them to the fifth place resulted in a score of 1 on the item. In situations where the participant indicated that the deceased was not in the top five, 0 points were allocated on the item. By using scores from all six questions, we have calculated an average lingering attachment score (Fagundes, 2012). We recoded the average lingering attachment score such that high scores on lingering attachment correspond to high scores on the WHOTO. A formal translation-back-translation procedure was used for the Dutch and German version. Prior research has provided support for the reliability and validity of different versions of the WHOTO (e.g., Fagundes, 2012; Fraley & Davis, 1997). In the present sample, reliability for the WHOTO was excellent, $\alpha = .94$.

Main Data Analysis

TGI-SR+ total scores were used as a measure of prolonged grief symptoms in the main analyses, with higher scores indicating greater severity of prolonged grief. Total scores on the ECR-SF were used to represent the independent variables of attachment anxiety and attachment avoidance. Higher scores reflect higher levels of attachment insecurity. Total scores on the WHOTO measure were used to assess lingering attachment, where higher values reflect higher lingering attachment.

Descriptive statistics were computed for all sociodemographic and loss-related variables, as well as the aforementioned key variables (Table 1). Assumptions of linearity and (bivariate) normality were assessed through scatterplots, histograms, and Q-Q plots. Outliers were examined using boxplots as well as Cook's distance (with a recommended threshold of 1.0; Tabachnick & Fidell, 2007), ensuring no extreme values inappropriately influenced the results. The Durbin-Watson statistic was used to assess independence of residuals (Durbin & Watson, 1971) . Homoscedasticity was checked by inspecting scatterplots of the standardized residuals against predicted values to ensure constant variance across levels of the attachment dimensions. Multicollinearity was examined through the VIF and tolerance values.

To examine the strength and direction of the associations between attachment dimensions and prolonged grief symptoms, bivariate Pearson's correlations analyses were conducted. Additionally, whether the association between prolonged grief symptoms and attachment anxiety was significantly stronger than that with attachment avoidance was assessed with the use of a multiple linear regression analysis.

Mediation Data Analysis

To test the hypotheses that lingering attachment mediates the relationship between attachment avoidance and prolonged grief, a mediation analysis will be performed using Hayes Process Macro Model 5 on SPSS. The following variables were placed; accordingly, prolonged grief symptoms as Y (response variable), attachment avoidance as X (predictor variable) and Lingering Attachment as M (mediator). There are several pathways within the mediation model, figure 1 was created as a way to help visualize these paths. Path A tests whether attachment avoidance is positively associated with lingering attachment, this tells us if people with high levels of attachment avoidance experience more lingering attachment. Path B examines if lingering attachment is positively related to prolonged grief symptoms, so whether lingering attachment predicts prolonged grief symptoms even after controlling for attachment avoidance. Path C assesses the overall relationship between attachment avoidance and prolonged grief symptoms without accounting for the mediator, therefore the total effect of X on Y. Path C' investigates the remaining effect of attachment avoidance on prolonged grief symptoms after accounting for lingering attachment, which provides insight into how much of that relationship is not explained by the mediating variable. Path A, B, and C' can be referred to as direct effects within the model, meanwhile the indirect effect of x on y can be calculated by multiplying path A and path B together. This indirect effect is calculated to test whether there is evidence for mediation.

For this analysis, ordinary least squares regression (OLS) was used to estimate the paths A, B, and C', where path A is estimated using simple linear regression and both path B and C' is estimated using multiple linear regression. In order to check whether effect sizes are significant, bootstrapping with 5,000 resamples was used. That way, we can investigate the indirect effect of attachment avoidance through lingering attachment on prolonged grief symptoms, but also the

direct effect of attachment avoidance on prolonged grief symptoms with and without controlling

for the effects of lingering attachment. To estimate the effect size of the mediation, the

proportion of the total effect explained by the mediator was calculated using the formula 1 - c'/c,

which was proposed by MacKinnon, Fairchild, and Fritz (2007). Mediation was considered

significant if the 95% confidence interval for the indirect effect does not include zero. The results

of WHOTO were recoded to improve interpretation; this resulted in a scale from 0 to 30. Those

who scored 0 did not include their deceased loved one in their top five, indicating a low lingering

attachment. Similarly, those who scored 30 included their deceased loved one as their number

one, indicating high lingering attachment. This analysis is intended to clarify whether lingering

attachment helps to explain how attachment avoidance contributes to prolonged grief

symptomatology. Figure 1 illustrates the mediation pathways.

Figure 1. *Mediation Model of Attachment Avoidance, Lingering Attachment, and Prolonged Grief Symptoms with Pathways*
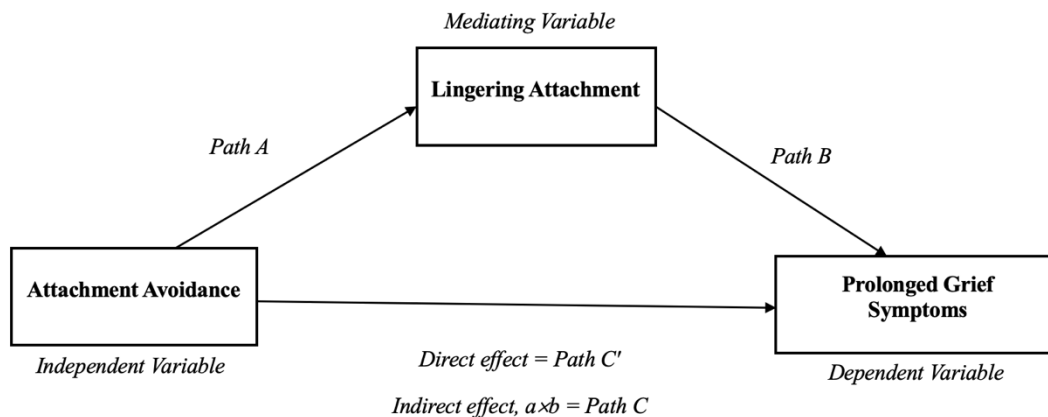
All statistical analyses were conducted using IBM SPSS Statistics 28 (IBM Corp., 2021).

We used one-sided tests with a standard significance level (α = .05) for all analyses. For

correlation analyses, effect sizes were interpreted according to Cohen's (1988) guidelines;

correlations between .10 and .29, .30 and .49, and higher than .50 were respectively considered to indicate small, moderate, and large effects. For the regression analysis, standardized beta coefficients (β), unstandardized beta coefficients (*B*), confidence intervals (CI's), and *p*-values were reported for each predictor. Model fit was evaluated by examining the proportion of explained variance (*R²*) and the significance of the *F*-statistic. *R²* values of .02, .13, and .26 were interpreted as small, medium, and large effect sizes, respectively (Cohen, 1988).

Results

Preliminary Analysis

Regarding the clinical cut-off score for prolonged grief, our results showed that 113 participants (32.2%) scored 33 points or more, suggesting that these individuals may experience clinical levels of prolonged grief symptoms (Lenferink et al., 2022).

Assumption Checks for Correlation

To assess for linearity, a scatterplot matrix was created between both attachment dimensions and prolonged grief symptoms. The scatterplot shows a positive directional pattern therefore the assumption for linearity seems to be met. A histogram was used to check for the normality assumption; the distribution followed a roughly bell-shaped curve, suggestion no significant visual violations or deviations for attachment avoidance. However, the Shapiro Wilk test shows significant results with *p<.001* for both attachment anxiety and prolonged grief symptoms, which indicates that the data deviates from a normal distribution. Lastly, a box plot was created to test for the assumption of outliers. The boxplot revealed no outliers for prolonged grief symptoms; one outlier was identified for attachment avoidance and two outliers for attachment anxiety. Upon further inspection of the trimmed means, these outliers do not

significantly influence our data. In addition, Cook's distance values remained < *1*, this suggests there the outliers are not influential observations.

Assumption Checks for Regression

A Durbin Watson test yielded a value of 1.948. Since the value is close to 2, this indicates no autocorrelation of the residuals with independence of residuals. For the assumption of linearity, the scatterplot matrix of standardized residuals demonstrated no systematic pattern and held a rectangular shape. A probability plot was created to check if the residuals follow a normal distribution, the data points fall closely to the fitted distributed line which suggests there is no violation of normality. To assess homogeneity of variance, a scatterplot matrix of standardized residuals was constructed, the spread of the errors appears to be scattered evenly across the horizontal axis, indicating homoscedasticity and a constant variance. Information regarding multicollinearity was found under collinearity statistics on the coefficients table, since both attachment dimensions demonstrated high tolerance and low VIF values, this indicates independent variables are not highly correlated with each other. In addition, Pearson's correlation between attachment anxiety and attachment avoidance was significant but weak *(r=.290, p<.001)*, resulting in no multicollinearity. There were also two outliers, however Cook's distance was less than 1 implying that these were not influential observations.

Correlation and Regression Analysis of Attachment Dimensions on PGS

Based on the Pearson correlation matrix, we found a significant positive small to moderate relationship between attachment dimensions and PGS, with attachment anxiety and PGS resulting in moderate effect *(r=.357, p<.001)*, and attachment avoidance and PG symptoms resulting in small effect *(r=.233, p<.001)*. Moreover, the model fit was evaluated through a multiple linear regression analysis, we obtained an R^2 value of *0.146* indicating that *14.6%* of the

proportion of variance in prolonged grief symptoms can be explained by the attachment dimensions, reflecting a moderate effect size. F-statistic output of *F(2, 348)= 29.7, p<.001* shows that our model reached statistical significance.

In addition, we found that both attachment dimensions obtained a significant p-value, showing they hold a statistically significant contribution to the model as predictors of prolonged grief symptoms; attachment anxiety *(β=.316, B=.452, t(348)=6.103, p<.001, 95% CI [0.306, 0.597])* and attachment avoidance *(β=.142 B=.225, t(348)=2.737, p=.007, 95% CI [0.063, 0.387]).* The *beta* coefficient of 0.316 for attachment anxiety reflects a strong unique contribution to explaining prolonged grief symptoms, while controlling for attachment avoidance. Meanwhile attachment avoidance had beta value of 0.142, indicating less contribution. Through examining the semi-partial variance *(sr²)*, we found that attachment anxiety accounted for 9.1% of variance in PG symptoms *(sr²=0.302²)* while attachment avoidance explained only 1.9% *(sr²=0.136²)*. Although both dimensions are relevant in explaining PG symptoms, these findings indicate that attachment anxiety is a relatively stronger predictor of PG symptoms in the model.

Assumption Check for Mediation Analysis

To check for the assumption of homoscedasticity for mediation analysis, a regression analysis for path a and path b was conducted and plotted using scatterplot of residuals vs. predicted values. After a visual inspection of the residual scatterplots for both path a and path b, the residuals appear to be randomly dispersed with no clear pattern around the horizontal axis, indicating that the assumption of homoscedasticity was met.

Mediation Analysis of Lingering Attachment

A mediation analysis was conducted to investigate if lingering attachment has a mediating influence on the relationship between attachment avoidance and prolonged grief symptoms. Hayes Process Macro Model 5 was used to run the analysis on SPSS, the following variables were placed; accordingly, prolonged grief symptoms as Y (response variable), attachment avoidance as X (predictor variable) and Lingering Attachment as M (mediator). Not all participants completed the WHOTO, this resulted in a smaller sample for mediation analysis ($n=344$). The regression of attachment avoidance on lingering attachment (path a) showed that attachment avoidance does not have a significant impact on lingering attachment ($b= .139, t= 1.842, p=.066$). For the regression of lingering attachment on prolonged grief symptoms (path b), the direct effect was significant ($b= .544, t= 10.5, p<.001$). The direct effect of attachment avoidance on prolonged grief symptoms while accounting for lingering attachment (Path c') was significant (c'=.288, t=3.96, p<0.001, 95% CI [0.145, 0.431]). Moreover, the total effect of X on Y (path c) was found to also have a significant effect ($effect=.364, t= 4.38, p<0.001$). However, the indirect effect (path A x path B) of attachment avoidance on prolonged grief through lingering attachment was not significant *(ab=.076, 95% CI[-0.002, 0.154])*, as the 95% bootstrap confidence interval included zero. This means that there is insufficient evidence to conclude that lingering attachment explains the relationship between attachment avoidance and prolonged grief symptoms. In addition, the total proportion of the effect of X on Y accounted for by the indirect path was 20.88%. Due to the lack of statistical significance, lingering attachment cannot be considered a reliable explanatory variable linking attachment avoidance and prolonged grief symptoms in the present sample. Figure 2 illustrates the mediation results.

Figure 2. *Mediation Model of Attachment Avoidance, Lingering Attachment, and*

Prolonged Grief Symptoms with Results (n=344)
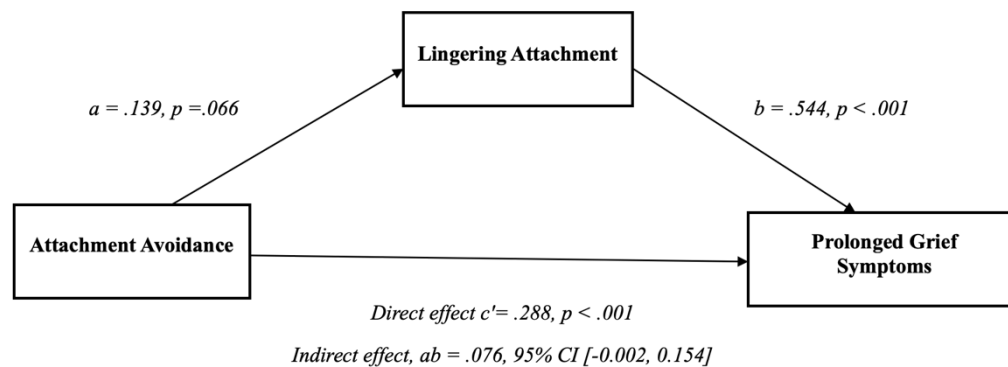
Discussion

The objective of this cross-sectional survey study was to explore the role of adult attachment dimensions – attachment anxiety and attachment avoidance – in relation to prolonged grief symptoms. There were three primary hypotheses that guided this research. First, we hypothesized that attachment anxiety would be positively correlated with prolonged grief symptoms. Second, we wanted to assess whether attachment avoidance would also show a positive correlation with prolonged grief symptoms. Third, we predicted that attachment anxiety would be a relatively stronger predictor of prolonged grief symptoms compared to attachment avoidance. Additionally, the study investigated whether lingering attachment mediated the relationship between attachment avoidance and prolonged grief symptoms.

Our findings for the first hypothesis indicated a positive correlation between attachment anxiety and PGS, with a moderate effect and strong unique contribution to explaining PGS. This supports the notion that higher levels of attachment anxiety are associated with more intense grief responses. The findings from the current study are consistent with attachment theory, as the severe grief response from highly scored attachment anxiety can be understood as a consequence of a hyperactive attachment system (Mikulincer & Shaver, 2003; Russ et al., 2022). The results

show a positive correlation between attachment anxiety and PGS. For anxiously attached individuals, undergoing a stressful event such as loss can trigger this hyperactivity, which can be characterized by maladaptive behaviors; difficulty accepting the loss, heightened emotional responses, intense fear of abandonment, and heightened dependence (Mikulincer & Shaver, 2003b). Our findings correspond with a meta-analysis conducted by Eisma et al. (2023) who found small to moderate effect sizes between attachment anxiety and prolonged grief symptoms in twenty studies Similarly, Russ et al. (2022) systematic review examines twenty-two cross-sectional and longitudinal studies, which revealed high levels of attachment anxiety is positively correlated with PGS. The findings from this current study are theoretically grounded and empirically align with previous research, supporting the notion that anxious attachment is a risk factor for maladaptive response in bereavement (Stroebe et al., 2005).

For our second and third hypotheses, findings showed a positive correlation between attachment avoidance on PGS; however, the effect size and unique contribution was smaller compared to attachment anxiety. This aligned with results from Eisma et al. (2023), who reported small effect sizes between attachment avoidance and PGS but also found that attachment avoidance was more weakly associated with PGS compared to attachment anxiety. Previous research conducted by Currier et al (2014) also found a significant main effect for avoidance on PGS, further supporting that individuals with high attachment avoidance experience intense grief responses. Linking our result to attachment theory, maladaptive behaviors displayed by avoidantly attached individuals can be explained by a deactivation of the attachment system (Mikulincer & Shaver, 2003). This deactivation strategy may be characterized by suppression of emotions and downplay of attachment needs (Mikulincer & Shaver, 2003). Although this suppression of emotions may initially serve as a helpful coping strategy, it can

severely inhibit a healthy emotional processing of grief, thereby prolonging distress (Fraley & Bonnanno, 2004; Mikulincer & Shaver, 2003)

An additional analysis was conducted to assess the mediating role of lingering attachment on the relationship between attachment avoidance and PGS. As referenced by the results, the mediation analysis did not yield a statistically significant indirect effect which does not support the fourth hypothesis and the role of lingering attachment as a mediator variable. A possible reasoning for these results is that avoidantly attached individuals tend to downplay and suppress attachment needs, resulting in a low score on self-reported lingering attachment (Mikulincer & Shaver, 2021). In addition, this suppression of emotional connection may also neglect lingering bonds and resort to overprotective and self-reliant behavior (Mikulincer & Shaver, 2003). In turn, this makes it difficult for these individuals to reorganize their attachment hierarchy and create new bonds (LeRoy et al., 2019). Although the mediation was not significant, attachment avoidance still had a significant direct effect on PGS, indicating its unique contribution to grief severity. Moreover, there was a significant direct effect and positive association between lingering attachment and PGS, suggesting that individuals with high lingering attachment report more PGS.

Previous research by Eisma et al. (2025) found that both lingering attachment and prolonged grief symptoms predict approach behaviors towards the deceased, this tells us that both lingering attachment and attachment avoidance are individually associated with prolonged grief symptoms. Our finding highlights the importance of considering lingering attachment as a risk factor, as it may complicate the grieving process and inhibit adaptive attachment reorganization (Eisma et al. 2025). Individuals who struggle to reorganize their attachment hierarchy may continue to long for reconnection with the deceased, experience grief-rumination,

and feel distress because they are unable to reunite (Eisma et al., 2025). This could be further explained by attachment theory's IWMs, as the IWM of the deceased may not immediately adapt after the loss of an attachment figure, resulting in difficulty reorganizing attachment priorities, which may lead to behaviors like persistent yearning, rumination, and proximity seeking, thereby prolonging grief (Bowlby, 1982; Eisma et al. 2025). Moreover, our finding aligns with previous research from Eisma et al. (2025), who reported that lingering attachment to the deceased may influence behavioural responses to loss and make it difficult for the individual to recover from grief. Interventions that are grief-focused or attachment-based may help individuals with PGS reorganize their attachment hierarchies and help them process this lingering attachment rather than avoid reminders of separation from the deceased (Eisma et al., 2025) . More specifically, exposure therapy may help reduce PGS by targeting unresolved approach behaviors such as rumination, yearning, and proximity seeking, as well as avoidance behaviors, to reorganize attachment hierarchy (Eisma et al., 2025; Eisma & Lenferink, 2023).

From theoretical and clinical perspectives, these findings highlight how differently individuals respond to grief based on their attachment orientation. These results contribute to the existing findings that attachment-specific strategies may shape our reactions to loss and in turn, reinforce hyperactivating and deactivating responses alongside the disruption to healthy adaptation to grief (Mikulincer & Shaver, 2002). The identification of individuals who score high on attachment anxiety and attachment avoidance helps to build a strategy for interventions with those at risk of prolonged grief. Previously stated interventions like cognitive behavioural therapy may be implemented to help individuals with intense emotional responses to grief have healthier adaptive responses to loss and also help reform their attachment orientation into a more secure one. (Boelen, 2021; Shear & Shair, 2005). Some clinical considerations for those with high lingering attachment, it would be beneficial for the individual to understand the interplay

between avoidance and approach behaviors (Eisma & Lenferink, 2023). For those who display lingering attachment but not avoidance, it would be important for them to increase engagement in life by learning how to re-engage in social relationships and set new life goals (Eisma & Lenferink, 2023).

Limitations and Future Research

Several limitations must be considered when interpreting the findings of this investigation. First, a cross-sectional design limits the ability to draw causal conclusions. In order to determine whether attachment dimensions are reliable predictors of PGS over time or function as early risk factors, a longitudinal design that examines attachment dimensions and PGS pre and post loss would be necessary (Eisma et al., 2023). Second, the sample reflected nonclinical to clinical levels of PGS, which may limit the representativeness of the findings for those clinically diagnosed with PGD, potentially affecting the generalizability of the results. The findings are still valuable as they offer a broader understanding of grief beyond formally diagnosed cases, however using clinical samples may allow for a more accurate identification of symptoms and refinement of theoretical foundations. Thirdly, our sample had a higher ratio of females compared to males, this has been reported to be a common observation in grief research (Eisma & Stroebe, 2020; Eisma et al., 2023). Fourth, our sample predominantly consisted of individuals with higher levels of education. Both of these sample characteristics may impact the generalizability of the results, further research with more diverse sample characteristics is needed to better assess the applicability of these findings (Eisma & Lenferink, 2023; Djelantik et al., 2020). Fifth, the translation of the questionnaires. Both WHOTO and ECR-SF are validated only in their English versions, while TGI-SR+ is validated in its Dutch and German versions but not in English. Translation without validation limits the applicability of the findings to other

linguistic groups, therefore research with validated instruments is important to ensure accurate measures.

Conclusion

This cross-sectional correlational study provides findings that contribute to existing research and sheds light on valuable insights that may guide future investigations into the relationship between attachment dimensions, lingering attachment, and PGS. Our findings reveal positive associations between both attachment dimensions - attachment anxiety and attachment avoidance - and PGS, consistent with the meta-analytic results from Eisma et al., 2023. We found that lingering attachment does not explain the relationship between attachment avoidance and PGS. However, lingering attachment demonstrated an independent association with PGS, highlighting its contribution as a risk factor for severe grief response. Future research should continue to explore the interplay between approach and avoidance mechanisms, and the characteristics of lingering attachment to better inform existing interventions. Lastly, future studies that investigate pre loss and post loss measures of attachment dimensions and PGS through a longitudinal design could provide insights into the progression of PGS and evolving dynamics of attachment over time (Eisma et al., 2023).

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