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Presenting a Structural Model of Prolonged Grief Based on Attachment Styles with the Mediating Role of Cognitive Flexibility in Survivors of the COVID-19 Pandemic

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ABSTRACT

The aim of this study was to examine a structural model of prolonged grief disorder based on attachment styles, considering the mediating role of cognitive flexibility, among individuals who lost first-degree relatives during the COVID-19 pandemic. This research employed a correlational design using structural equation modeling. The study population consisted of bereaved survivors in Alborz Province who had lost a first-degree family member due to COVID-19. A total of 420 individuals participated through convenience sampling using online questionnaires, of which 361 valid responses were analyzed. Data were collected between June and December 2024. Instruments included the Prolonged Grief Disorder-13-Revised scale (PG-13-R), the Revised Adult Attachment Scale (RAAS), and the Cognitive Flexibility Inventory (CFI). Descriptive statistics, Pearson correlation, multiple regression, and SEM were used for data analysis. Results showed that anxious and avoidant attachment styles were positively associated with prolonged grief, while secure attachment negatively predicted grief symptoms. Cognitive flexibility demonstrated a significant protective role, negatively predicting prolonged grief. Regression analysis indicated that components of cognitive flexibility (perception of alternatives, perceived controllability, and justification of behavior) accounted for 51% of the variance in grief. Attachment styles together explained 33% of the variance in grief outcomes. Structural equation modeling confirmed the adequacy of the final model with acceptable fit indices (χ^2/df = 2.34, CFI = 0.94, TLI = 0.92, RMSEA = 0.059, SRMR = 0.047). Bootstrap analysis further supported the significant mediating role of cognitive flexibility in the relationships between attachment styles and prolonged grief. The study highlights that insecure attachment styles increase vulnerability to prolonged grief, whereas secure attachment and cognitive flexibility serve as protective factors. Cognitive flexibility functions as a mediator, offering a promising target for interventions aimed at reducing prolonged grief among COVID-19 bereaved survivors.

Keywords: *Prolonged grief disorder; Attachment styles; Cognitive flexibility; Structural equation modeling; COVID-19 survivors*

1. Introduction

The outbreak of the coronavirus (COVID-19) pandemic has been one of the most significant global crises of the 21st century, not only in terms of public health but also in its psychological and social repercussions. Among the many psychological consequences that have emerged, prolonged grief disorder (PGD) has become a major area of concern, particularly for individuals who lost loved ones under the highly stressful, isolating, and traumatic conditions of the pandemic (Eisma et al., 2020). Unlike normative grief reactions that gradually diminish with time, PGD is characterized by persistent, intense, and disabling symptoms of yearning, emotional pain, and functional impairment, which continue well beyond the culturally expected period of mourning (Mauro et al., 2019). The World Health Organization (WHO) and the American Psychiatric Association have recognized PGD in diagnostic classifications, such as ICD-11 and DSM-5-TR, reflecting growing awareness of its clinical significance (Boelen et al., 2019).

Although grief is a universal experience, the COVID-19 pandemic created unique conditions that exacerbated grief reactions. Restricted funeral practices, enforced physical distancing, and the inability to say goodbye to loved ones disrupted traditional mourning rituals and hindered the natural adaptation to loss (Friedland et al., 2024). This has led to a surge in research examining the prevalence, risk factors, and interventions for PGD in the context of the pandemic (Martínez-Medina & Rodríguez-Orozco, 2023). One key finding has been that attachment styles, as enduring patterns of relating to others, play a critical role in how individuals process grief and adapt to bereavement (Maccallum & Bryant, 2018). Individuals with insecure attachment styles, such as anxious or avoidant attachment, may be more vulnerable to experiencing prolonged and complicated grief responses, while secure attachment often serves as a protective factor (Eisma & Lenferink, 2023).

Attachment theory provides a useful framework for understanding the mechanisms underlying individual differences in grief outcomes. People with anxious attachment tend to exhibit hyperactivating strategies, such as heightened worry about abandonment, which can intensify longing and distress after the loss of a loved one. Conversely, individuals with avoidant attachment may engage in deactivating strategies, such as emotional suppression or distancing, which can prevent adequate processing of grief and thereby maintain prolonged distress (Sękowski & Prigerson, 2022). Studies have shown that disorganized attachment patterns are strongly associated with severe grief symptoms, suggesting that maladaptive attachment schemas interfere with the capacity to integrate loss experiences (Sękowski & Prigerson, 2022). In contrast, secure attachment fosters adaptive emotional regulation, acceptance of reality, and constructive coping strategies, all of which are crucial for recovery from grief (Maccallum & Bryant, 2018).

The link between attachment and PGD has been supported by multiple empirical investigations. For example, a systematic review and meta-analysis found consistent evidence that insecure attachment is a significant predictor of prolonged grief, with anxious attachment showing the strongest effects (Eisma & Lenferink, 2023). Similarly, latent class analyses revealed that individuals with lower attachment security tend to cluster in groups with higher grief severity (Maccallum & Bryant, 2018). Other studies have emphasized the role of attachment-related cognitive and emotional processes, such as experiential avoidance, in moderating grief outcomes (Williams et al., 2019). These findings collectively underscore the importance of considering attachment styles in understanding and predicting PGD.

Beyond attachment, cognitive flexibility has recently gained attention as a psychological construct that may mediate the relationship between attachment and grief. Cognitive flexibility refers to the ability to adapt one's thinking and behavior to changing situations, generate alternative perspectives, and regulate emotions effectively (Fathi-Ashtiani & Sheikholeslami, 2019). Individuals with high cognitive flexibility are more likely to reframe their loss, engage in adaptive problem-solving, and integrate the bereavement into their life narratives. In contrast, cognitive rigidity may lead to persistent rumination, maladaptive interpretations, and difficulties in adjusting to the new reality of life without the deceased (Roshan Chesli et al., 2023). Research has demonstrated that cognitive flexibility mediates the relationship between attachment styles and psychological well-being, suggesting that it may act as a key mechanism linking early relational patterns to grief adaptation (Aghaei & Mousavi, 2020).

The importance of cognitive flexibility in bereavement contexts has been highlighted in studies showing that individuals with higher flexibility report lower grief intensity and better overall functioning (Roshan Chesli et al., 2023). Furthermore, interventions aimed at enhancing flexibility, such as Acceptance and Commitment Therapy

(ACT), have been effective in alleviating grief-related distress (Abtahi Foroshani & Rakhshan, 2022). This line of evidence suggests that fostering cognitive flexibility could be an important therapeutic target for individuals with PGD, especially those with insecure attachment backgrounds.

The prevalence of PGD varies across different populations and cultural contexts, but it is estimated to affect approximately 10% of bereaved individuals under normal conditions (Mauro et al., 2019). However, rates have been reported to be significantly higher in populations affected by COVID-19-related losses (Eisma et al., 2020). In a diverse college student sample, PGD symptoms were found to be common, highlighting the need to investigate younger populations as well as older adults (Glickman, 2021). Among adults over 65, the prevalence of PGD has raised concerns about vulnerability in later life, especially in light of the pandemic (Friedland et al., 2024). Clinical research further suggests that PGD not only impacts emotional well-being but is also associated with physical health risks, including sleep disruption, cardiovascular issues, and compromised immune functioning (Yoshiike, 2025). These health implications reinforce the urgency of developing models that capture the complexity of PGD and its determinants.

In terms of diagnosis and clinical assessment, debates have emerged regarding the relative merits of DSM-5 versus ICD-11 criteria for PGD. Comparative studies have revealed some discrepancies in case identification, but both systems agree on the centrality of persistent yearning and functional impairment (Boelen et al., 2019). While diagnostic clarity is essential, research also emphasizes the importance of tailoring interventions to individual needs and contexts (Rueger et al., 2024). For example, web-based therapist-assisted interventions have shown promise in improving access to PGD treatment for those bereaved by cancer (Kaiser et al., 2022), while cognitive-behavioral therapy (CBT) and mindfulness-based approaches are being compared for their effectiveness in treating PGD (Bryant, 2024). Moreover, PGD-specific CBT protocols are being tested in randomized controlled trials, further contributing to evidence-based treatment development (Rosner et al., 2018).

Intervention studies have also underscored the necessity of considering cultural and contextual factors in treatment design. For instance, ACT has been applied in Iranian nursing populations with positive outcomes (Abtahi Foroshani & Rakhshan, 2022), while structured CBT protocols are being adapted internationally (Rosner et al., 2018). The diversity of intervention approaches reflects the complex and multifaceted nature of PGD, which involves interactions between attachment, cognitive processes, cultural practices, and situational stressors (Martínez-Medina & Rodríguez-Orozco, 2023).

Furthermore, case studies highlight the comorbidity of PGD with other conditions such as post-traumatic stress disorder (PTSD) and adjustment disorders, reinforcing the need for comprehensive assessments in clinical practice (Trivedi & Thakore, 2025). Prolonged grief often overlaps with depressive and anxiety symptoms, complicating diagnosis and treatment (Wenn et al., 2019). However, studies also demonstrate that metacognitive therapy and other innovative approaches can be effective in addressing the unique features of grief-related distress (Wenn et al., 2019).

The significance of this research lies in advancing theoretical and clinical understanding of how attachment styles and cognitive flexibility interact to influence prolonged grief, particularly in populations impacted by the COVID-19 pandemic. By focusing on attachment-related vulnerabilities and cognitive flexibility as a mediator, this study contributes to the growing body of literature that seeks to clarify risk and resilience factors in PGD (Eisma et al., 2023; Roshan Chesli et al., 2023). Ultimately, developing structural models of grief responses can guide the creation of tailored interventions that address both relational patterns and cognitive processes, thereby enhancing therapeutic outcomes for bereaved individuals.

The present study therefore aims to test a structural model of prolonged grief based on attachment styles with the mediating role of cognitive flexibility among survivors of the COVID-19 pandemic.

2. Methods and Materials

2.1. Study Design and Participants

This study employed a correlational design using structural equation modeling (SEM), which is considered an appropriate method when the goal is to test a specific model of relationships among variables. In this approach, data are transformed into covariance or correlation matrices, and a set of regression equations is constructed to explain the interrelations between the studied variables. The target population consisted of all individuals in Alborz Province who had lost at least one immediate family member due to COVID-19 and were considered survivors of the pandemic. Based on the recommendation of Jöreskog and Sörbom regarding sample adequacy in SEM, a sample size of 420

participants was initially determined. Data were collected through convenience sampling using an online survey method. The questionnaires, along with explanations of the research purpose, were distributed electronically via various websites and social media platforms. Data collection took place between June and December 2024. After screening the returned questionnaires, 40 were excluded due to incomplete or distorted responses, resulting in a final sample of 361 participants. Inclusion criteria were defined as being a COVID-19 survivor who had lost a first-degree family member to the disease, providing informed consent, and agreeing to complete the survey. Exclusion criteria were failure to meet the inclusion conditions or unwillingness to participate in the study.

2.2. Measures

To measure prolonged grief disorder, the Prolonged Grief Disorder-13-Revised scale (PG-13-R), developed by Prigerson and colleagues (2021), was used. This instrument consists of 13 items aligned with the DSM-5-TR criteria. It begins with two screening questions that assess whether the respondent has lost a significant person within the past 12 to 24 months. If the answer is affirmative, participants indicate the duration since the loss and then proceed to answer 11 Likert-type items ranging from 0 (not at all) to 4 (very severely). Previous studies reported Cronbach's alpha coefficients ranging from 0.83 to 0.93, as well as test–retest reliability with an intraclass correlation of 0.86. In Iran, Ashouri and colleagues (2024) reported high reliability ($\alpha = 0.93$) and strong test–retest validity ($r = 0.89$).

Attachment styles were assessed using the Revised Adult Attachment Scale (RAAS) developed by Collins and Read (1990, revised 1996). The instrument consists of 18 items scored on a five-point Likert scale ranging from "not at all characteristic of me" to "very characteristic of me." It comprises three subscales: anxious/ambivalent attachment, secure attachment, and avoidant attachment. Several items are reverse scored to ensure accuracy. Previous studies have reported Cronbach's alpha values at or above 0.80, indicating high internal consistency. In Iranian contexts, test–retest reliability has been confirmed, and local validation studies have supported its applicability.

Cognitive flexibility was measured using the Cognitive Flexibility Inventory (CFI) designed by Dennis and Vander Wal (2010). This scale includes 20 items rated on a seven-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). It is composed of three subscales:

perception of alternatives, perception of controllability, and justification of behavior. The original study reported Cronbach's alpha values of 0.91 for the overall scale and between 0.84 and 0.91 for the subscales, with test–retest reliability coefficients ranging from 0.75 to 0.81. In Iran, Kohnedani and Abolmaali (2017) validated the scale through factor analysis, identifying two main components labeled problem-solving processing and perceived controllability. They reported Cronbach's alpha values of 0.89 for the full scale and between 0.77 and 0.81 for the subscales, as well as negative correlations with Beck Depression Inventory scores, confirming concurrent validity.

2.3. Data Analysis

For descriptive purposes, frequency distributions, percentages, and charts were used to present the demographic and baseline characteristics of participants. Inferential analyses were carried out to test the proposed research hypotheses. Pearson's correlation coefficient was applied to examine the bivariate relationships between the variables. Multiple regression analysis was conducted to explore the predictive role of attachment styles and cognitive flexibility in prolonged grief. Finally, structural equation modeling was used as the main analytical technique to test the hypothesized structural model, determine direct and indirect paths, and assess the mediating role of cognitive flexibility. Analyses were performed after ensuring that assumptions of normality and adequacy of sample size for SEM were met.

3. Findings and Results

The demographic characteristics of the final sample of 361 participants showed that out of the total respondents, 212 individuals (58.7%) were women and 149 (41.3%) were men. Regarding marital status, 163 participants (45.2%) were single, 132 (36.6%) were married, 30 (8.3%) were divorced, and 36 (10%) had lost their spouse due to COVID-19. In terms of educational attainment, 38 respondents (10.5%) had less than a high school diploma, 129 (35.7%) held a high school diploma, 110 (30.5%) had a bachelor's degree, 64 (17.7%) a master's degree, and 20 (5.5%) a doctoral degree. Analysis of the relationship to the deceased revealed that 96 participants (26.6%) had lost one of their parents, 88 (24.4%) had lost a grandparent, 58 (16.1%) a sibling, 38 (10.5%) a spouse, 34 (9.4%) a friend, 32 (8.9%) another relative, and 15 (4.2%) had lost a child.

Table 1

Descriptive statistics of research variables

Variables	Minimum	Maximum	Mean	Standard Deviation
Prolonged grief	6	42	35.51	8.93
Cognitive flexibility	31	134	96.92	17.49
Attachment styles				
Anxious/ambivalent	6	27	25.24	3.33
Avoidant	6	25	20.09	3.45
Secure	6	22	19.74	3.47

The descriptive findings presented in Table 1 indicate that the participants scored an average of 35.51 (SD = 8.93) on prolonged grief, with scores ranging from 6 to 42, suggesting noticeable variability in grief intensity. Cognitive flexibility scores varied between 31 and 134, with a mean of 96.92 (SD = 17.49), showing a moderate to high level of flexibility in the sample. Among attachment styles, the highest mean belonged to the anxious/ambivalent style (M = 25.24, SD = 3.33), followed by avoidant (M = 20.09, SD = 3.45), and secure attachment (M = 19.74, SD = 3.47). These results illustrate that the participants tended to report higher levels of insecure attachment styles compared to secure attachment, which may have implications for their experiences of prolonged grief and cognitive flexibility.

Table 2

Multiple regression analysis predicting prolonged grief based on dimensions of cognitive flexibility

Predictor Variables	B	SE	Beta	T	P	R	R²
Perception of alternatives	-0.82	0.21	-0.47	-6.01	0.001	0.72	0.51
Perceived controllability	-0.99	0.28	-0.51	-6.40	0.001		
Justification of behavior	-1.05	0.32	-0.56	-7.11	0.001		

Table 3

Multiple regression analysis predicting prolonged grief based on attachment styles

Predictor Variables	B	SE	Beta	T	P	R	R²
Anxious attachment	0.52	0.09	0.33	4.26	0.001	0.58	0.33
Avoidant attachment	0.46	0.14	0.27	3.49	0.001		
Secure attachment	-0.60	0.15	-0.41	-6.49	0.001		

The results of Table 2 indicate that all three components of cognitive flexibility significantly predicted prolonged grief. Specifically, perception of alternatives (β = -0.47, p < 0.001), perceived controllability (β = -0.51, p < 0.001), and justification of behavior (β = -0.56, p < 0.001) each had significant negative effects on prolonged grief. The overall model demonstrated a strong correlation (R = 0.72) and explained 51% of the variance in prolonged grief, suggesting that lower levels of cognitive flexibility dimensions are associated with higher levels of prolonged grief among survivors of COVID-19.

As shown in Table 3, attachment styles significantly contributed to the prediction of prolonged grief. Anxious attachment (β = 0.33, p < 0.001) and avoidant attachment (β = 0.27, p < 0.001) were positively associated with higher levels of prolonged grief, while secure attachment (β = -0.41,

p < 0.001) was negatively associated, indicating a protective role. The regression model revealed a moderate correlation (R = 0.58) and accounted for 33% of the variance in prolonged grief. These results highlight the critical role of insecure attachment styles in intensifying grief symptoms, whereas secure attachment appears to mitigate such outcomes.

Before conducting structural equation modeling (SEM), the required assumptions were examined and confirmed. The univariate normality of the variables was verified through skewness and kurtosis, with all values falling between -1.52 and +1.48, indicating acceptable normality. Multicollinearity was assessed by variance inflation factor (VIF) values, all of which were below 2.5, showing no multicollinearity problems. The adequacy of the sample size was confirmed based on the ratio of cases to estimated

parameters, with 361 participants exceeding the recommended minimum of 200 for SEM. The Kaiser–Meyer–Olkin (KMO) index was 0.89, and Bartlett's test of sphericity was significant ($\chi^2 = 1543.67$, df = 210, p < 0.001), confirming factorability of the correlation matrix. Model fit indices also supported the adequacy of the proposed model: chi-square/df ratio (χ^2/df = 2.34) was below the acceptable threshold of 3, the Comparative Fit Index (CFI = 0.94) and Tucker–Lewis Index (TLI = 0.92) exceeded the minimum acceptable value of 0.90, the Root Mean Square Error of Approximation (RMSEA = 0.059) fell within the good fit range (<0.08), and the Standardized Root Mean Square Residual (SRMR = 0.047) was below 0.05. Collectively, these indices confirmed that the assumptions of SEM were met and that the final structural model provided a good fit to the data.

Table 4

Paths and standardized coefficients in the final research model

Paths	Standardized Coefficients	Unstandardized Coefficients	t	P	Result
Anxious attachment → Cognitive flexibility	-0.76	-0.30	-5.21	0.001	Confirmed
Avoidant attachment → Cognitive flexibility	-1.15	-0.34	-5.32	0.001	Confirmed
Secure attachment → Cognitive flexibility	0.78	0.21	4.09	0.001	Confirmed
Anxious attachment → Prolonged grief	0.76	0.30	5.21	0.001	Confirmed
Avoidant attachment → Prolonged grief	1.10	0.35	5.32	0.001	Confirmed
Secure attachment → Prolonged grief	-0.78	-0.21	-3.09	0.05	Confirmed
Cognitive flexibility → Prolonged grief	-0.34	-0.23	-3.48	0.001	Confirmed

The results in Table 4 demonstrate that all direct paths hypothesized in the model were statistically significant. Insecure attachment styles, including anxious and avoidant, negatively predicted cognitive flexibility, while secure attachment had a positive effect. In turn, anxious and avoidant attachment were directly and positively related to prolonged grief, whereas secure attachment was negatively related to grief intensity. Cognitive flexibility itself showed a significant negative relationship with prolonged grief, highlighting its protective role. Together, these findings indicate that attachment styles directly affect both cognitive flexibility and prolonged grief, while cognitive flexibility mediates part of these effects.

Table 5

Bootstrap results for indirect effects of attachment styles on prolonged grief via cognitive flexibility

Indirect Paths	Indirect Effects	Lower Bound	Upper Bound	Significance
Anxious attachment → Cognitive flexibility → Prolonged grief	-0.22	-0.38	0.001	Significant
Avoidant attachment → Cognitive flexibility → Prolonged grief	-0.13	-0.45	0.001	Significant
Secure attachment → Cognitive flexibility → Prolonged grief	0.09	0.33	0.001	Significant

As shown in Table 5, the bootstrap analysis confirmed the significance of indirect effects. The path from anxious attachment to prolonged grief via cognitive flexibility was significant, with an indirect negative effect (95% CI = -0.38 to -0.22). Similarly, avoidant attachment indirectly increased prolonged grief through its negative association with cognitive flexibility (95% CI = -0.45 to -0.13). Conversely, secure attachment exerted an indirect positive effect on reducing prolonged grief by enhancing cognitive flexibility (95% CI = 0.09 to 0.33). These results validate the mediating role of cognitive flexibility and emphasize its importance as a mechanism linking attachment styles to grief outcomes among survivors of the COVID-19 pandemic.

Figure 1

Model with Beta Coefficients
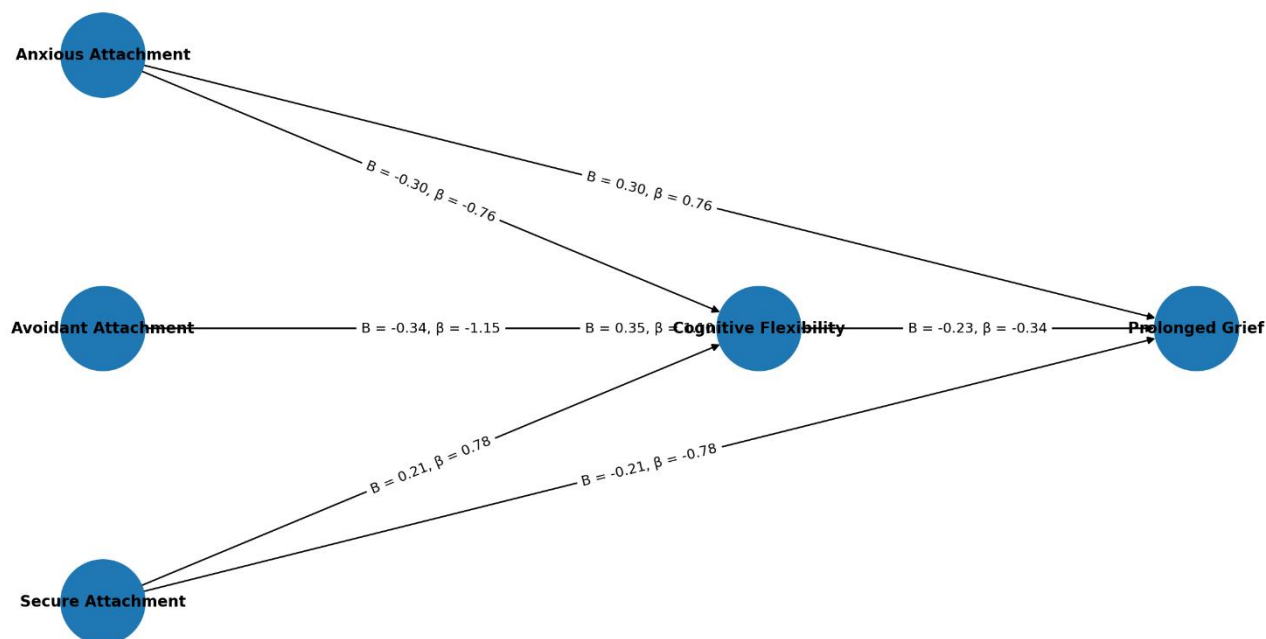
4.   Discussion and Conclusion

The purpose of this study was to develop and test a structural model of prolonged grief disorder (PGD) based on attachment styles with the mediating role of cognitive flexibility among survivors of the COVID-19 pandemic. The results confirmed that attachment styles were significant predictors of prolonged grief, both directly and indirectly through cognitive flexibility. Specifically, anxious and avoidant attachment styles were positively associated with higher levels of PGD, while secure attachment negatively predicted PGD and was associated with higher cognitive flexibility. Cognitive flexibility itself demonstrated a protective role, mediating the effect of attachment styles on grief outcomes. These findings align with a growing body of literature emphasizing the crucial roles of attachment and cognitive processes in the development and persistence of PGD.

The finding that insecure attachment styles significantly increase vulnerability to PGD is consistent with prior research establishing attachment as a central determinant of grief trajectories. In particular, individuals with anxious attachment tend to experience heightened fear of abandonment and exhibit hyperactivating strategies that intensify distress after loss (Sękowski & Prigerson, 2022). This explains why anxious attachment was strongly associated with higher PGD levels in our study. Similarly,

avoidant attachment was a significant predictor of PGD, as individuals with avoidant patterns often rely on deactivating strategies, such as emotional suppression, which hinder the processing of grief and contribute to its prolongation (Maccallum & Bryant, 2018). Our results are in line with findings from systematic reviews and meta-analyses showing that insecure attachment, and especially anxious attachment, is a reliable risk factor for PGD (Eisma & Lenferink, 2023). In contrast, secure attachment was negatively associated with PGD, highlighting its protective role in fostering adaptive coping strategies, acceptance, and emotional regulation, which aid the adjustment to loss (Maccallum & Bryant, 2018).

Another major result of this study was the mediating role of cognitive flexibility. Survivors with higher levels of cognitive flexibility reported significantly lower grief intensity, supporting the hypothesis that flexibility serves as a buffer against the adverse effects of insecure attachment. This is consistent with research indicating that cognitive flexibility enables individuals to adopt alternative perspectives, generate adaptive coping strategies, and integrate the loss into their life narratives more effectively (Fathi-Ashtiani & Sheikholeslami, 2019). Our findings confirm earlier studies in the Iranian context, which showed that cognitive flexibility mediated the relationship between attachment styles and well-being (Aghaei & Mousavi,

2020). Moreover, structural modeling studies on emotional processes have emphasized the central role of flexibility in linking attachment patterns to emotional regulation (Roshan Chesli et al., 2023). This highlights cognitive flexibility as a psychological mechanism that explains how early relational patterns translate into grief-related outcomes.

The direct association between insecure attachment and PGD found in our model is also supported by evidence from large-scale and clinical studies. For example, research in help-seeking children demonstrated that insecure attachment and maladaptive grief symptoms were strongly intertwined (Boelen et al., 2019). Similarly, studies among adults have consistently shown that insecure attachment exacerbates grief severity and increases the likelihood of PGD (Eisma et al., 2023). Our study extends these findings to a unique population of COVID-19 bereaved survivors, underscoring that the extraordinary circumstances of the pandemic—such as restricted funerals, social isolation, and traumatic loss contexts—may have magnified these attachment-related vulnerabilities (Eisma et al., 2020).

Furthermore, the protective role of secure attachment in our study resonates with previous evidence suggesting that security fosters resilience in the face of bereavement. Secure individuals are more likely to rely on adaptive strategies such as meaning-making, openness to social support, and acceptance of the irreversibility of loss (Maccallum & Bryant, 2018). They are also less prone to maladaptive strategies like experiential avoidance, which has been shown to worsen grief outcomes (Williams et al., 2019). These findings strengthen the argument that attachment security acts as a buffer against PGD and that interventions aiming to enhance attachment-related security may mitigate grief complications.

The role of cognitive flexibility as both a predictor and mediator in PGD outcomes is particularly important in light of intervention research. Therapies that emphasize psychological flexibility and acceptance, such as Acceptance and Commitment Therapy (ACT), have been shown to reduce grief-related distress (Abtahi Foroshani & Rakhshan, 2022). Similarly, mindfulness-based interventions and cognitive-behavioral approaches target cognitive rigidity and rumination, fostering adaptive reframing of loss (Bryant, 2024; Rosner et al., 2018). By confirming the mediating role of cognitive flexibility, our study highlights the importance of these intervention approaches and suggests that they could be especially effective for individuals with insecure attachment styles.

The findings also resonate with international research on PGD in the post-COVID era. Studies in older adults highlight how losses under pandemic conditions have amplified PGD prevalence, reinforcing the need for targeted interventions (Friedland et al., 2024). Among college populations, PGD has been found to manifest significantly, especially in diverse samples facing additional stressors (Glickman, 2021). These findings align with our study's emphasis on survivors of COVID-19-related losses and underscore the broader applicability of our structural model across different populations. Moreover, research on comorbid conditions such as PTSD and adjustment disorder further supports the clinical significance of PGD as a distinct but overlapping syndrome (Trivedi & Thakore, 2025).

It is also important to note that diagnostic systems such as DSM-5-TR and ICD-11 provide slightly different but overlapping criteria for PGD, with both emphasizing persistence and impairment as key features (Boelen et al., 2019; Mauro et al., 2019). Our findings are consistent with these conceptualizations, as individuals with insecure attachment and low flexibility exhibited prolonged and disabling symptoms. In addition, evidence from randomized controlled trials supports the utility of interventions tailored specifically to PGD, including PGD-specific CBT protocols (Rosner et al., 2018), therapist-assisted online interventions (Kaiser et al., 2022), and mindfulness-based programs (Bryant, 2024). These align with our results, which point to cognitive flexibility as a therapeutic target.

Moreover, the growing body of literature highlights the importance of culturally adapted interventions. In the Iranian context, ACT-based interventions have been applied successfully in reducing grief symptoms (Abtahi Foroshani & Rakhshan, 2022), while structural models incorporating attachment and cognitive constructs have proven useful for understanding emotional processes (Roshan Chesli et al., 2023). This is consistent with our study, which situates PGD in a cultural setting shaped by pandemic-related losses and relational dynamics.

Taken together, the results of this study provide robust evidence that insecure attachment styles increase vulnerability to PGD, while secure attachment and cognitive flexibility act as protective factors. These findings contribute to the broader theoretical understanding of grief as an interaction between relational schemas and cognitive-emotional processes. They also carry important clinical implications, as they highlight cognitive flexibility as both a mechanism and a target for intervention, particularly for individuals with insecure attachment histories.

Despite its contributions, this study has several limitations. First, the cross-sectional design limits causal inference, as the relationships among attachment, cognitive flexibility, and PGD cannot be established with temporal certainty. Longitudinal studies are needed to confirm the causal pathways implied by our model. Second, the use of self-report measures may introduce response biases such as social desirability or inaccurate recall. Third, the sample was drawn from survivors of COVID-19-related losses in a single province, which may restrict generalizability to other cultural or demographic groups. Finally, the reliance on online data collection may have excluded participants without internet access, potentially biasing the sample toward more educated or technologically literate individuals.

Future studies should employ longitudinal designs to explore how attachment and cognitive flexibility interact over time in predicting grief trajectories. Experimental or intervention-based research could also test whether enhancing cognitive flexibility directly leads to reductions in PGD symptoms, particularly in populations with insecure attachment. Additionally, studies could investigate other potential mediators and moderators, such as social support, resilience, or cultural mourning practices, to provide a more comprehensive understanding of PGD. Cross-cultural research is especially important, as grief expression and adaptation vary significantly across cultural contexts. Finally, integrating neurobiological or psychophysiological measures may shed light on the underlying mechanisms linking attachment and cognitive processes to prolonged grief.

The findings of this study suggest several practical applications. Mental health practitioners should assess attachment styles and cognitive flexibility when working with bereaved individuals, as these factors can provide important insights into risk and resilience profiles. Interventions should aim to enhance cognitive flexibility through techniques such as cognitive restructuring, acceptance-based exercises, and mindfulness practices. For clients with insecure attachment, therapeutic approaches should also focus on fostering secure relational experiences, either within therapy or through strengthening social connections. Given the increased prevalence of PGD in the post-COVID era, public health initiatives should prioritize accessible and culturally sensitive grief support programs that address both cognitive and attachment-related factors.

Authors' Contributions

Authors contributed equally to this article.

Declaration

Transparency Statement

Acknowledgments

Declaration of Interest

Funding

Ethical Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants.

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