

Grief as an Adaptive Emotional Response

Sam Beilenson

University of Portland



Abstract

Evolutionary theories of grief propose that acute bereavement may have adaptive functions despite being intensely painful. The debate centers around whether grief might instead promote changes in cognition and behavior that, while unpleasant, may ultimately be in the evolutionary best interests of the genes. The present study tested whether grief impacts risk taking and altruism, both of which have been identified as outcomes relevant in functional theories of grief. Using an experimental design, participants ($N = 80$) were randomly assigned to read vignettes that asked them to simulate sudden death of a loved one, acquaintance, or stranger, in the hopes that these would produce different grief responses. Participants then completed measures of risk-taking (Weber et al., 2002) and altruism (Rushton et al., 1981). To investigate whether the links between grief and these outcomes were affected by levels of social support, participants also completed a measure on perceived social support. Contrary to predictions, no significant differences were observed between grief conditions on any measure. However, higher social support was associated with greater altruism. Overall, these findings did not align with adaptationist predictions about how grief might calibrate behavior. It is unclear, however, whether the grief induction technique was effective, so these null results should be interpreted with some caution. Future work that utilizes more effective manipulations may therefore be required to evaluate functional theories of grief.

The grief reaction is a complex biopsychosocial experience involving acute suffering that occurs after losing a valued attachment bond. Evolutionary psychology perspectives offer insights into grief by examining why this painful response persists if it impairs individual wellbeing. Some theories propose grief as a non-adaptive byproduct of bonding attachment systems (Archer, 1999). In contrast, other evolutionary frameworks suggest grief serves adaptive functions by recalibrating emotions and goal-directed behaviors in ways that enhanced ancestral fitness despite short-term costs after loss (Hagen, 2003; Keller & Nesse, 2006; Reynolds et al., 2021). This investigation empirically tests predictions from adaptationist theories that grief shifts decision-making specifically by elevating caution about risks and prosocial motivations towards relatives after bereavement. Demonstrating how the grief response modifies emotional and behavioral responses by increasing cautiousness and altruism would provide additional evidence aligning with hypotheses that acute grief represents an evolved functional adaptation rather than purposeless harm arising from attachment rupture. Using experimental grief induction and questionnaire methods, this research examines the debate on whether grief has an adaptive purpose or simply constitutes enduring suffering rooted in severed bonds.

Cognitive Theories of Grief

Studies have found that grief is associated with elevated catecholamine levels, which may limit treatment success in complicated grief by prolonging sympathetic hyperarousal (O'Connor, 2012). Neuroimaging research also reveals that regulating grief involves modulating activity and connectivity between emotion processing regions like the amygdala and regulatory areas like the prefrontal cortex (Freed et al., 2009). Additionally, the brains of grieving individuals show altered responses to reminders of the deceased, such as photographs, in face recognition networks and reward pathways (Leveroni et al., 2000; Kakarala et al., 2021).

At a cognitive level, grief appears to disrupt abilities like concentration, planning, and memory. For instance, grieving spouses demonstrate impaired performance on tests of executive functioning and verbal memory compared to non-bereaved controls (Zhang et al., 2009). Information processing speed also slows during bereavement (O'Connor & Seeley, 2014). Some researchers conceptualize grief as a learning process requiring neuroplasticity and time to resolve conflicting knowledge about the loss (O'Connor & Seeley, 2014).

Overall, emerging cognitive research is elucidating grief's neural underpinnings and consequences for mental capacities like memory, attention, and decision-making. Neurobiological studies will continue elucidating grief's complex effects on emotion processing, reward systems, and higher-order cognition.

Theories of Grief as an Evolutionary Adaptation

The work of Archer (1999) established a connection between grief and Bowlby's prominent attachment theory (1960, 1982). Bowlby centered his framework on attachment mechanisms and their biological purpose of protecting individuals from external harm. Building on these foundations, Archer proposed that the distress of grief is not directly shaped by natural selection but arises as a byproduct of attachment systems that evolved to maintain caring bonds, even when a partner is absent. Though maladaptive in itself, grief persists because the overall benefits of enduring social attachments outweigh the costs of acute mourning when attachments are severed. Lamers (2001) extended this perspective by theorizing that grief behavior is better understood through the lenses of lifespan characteristics, cultural factors, and valuations of inclusive fitness. His model emphasizes the context in which deaths occur, proposing that grief

intensity tracks the potential genetic loss represented by the deceased-- meaning the degree to which the deceased individual could have passed on shared genes to future generations.

Several other evolutionary theories of grief have been proposed (Reynolds et. al., 2020). The Bargaining Model originally proposed by Hagen (2003) argued that outward grief honestly signals the griever's compromised state, eliciting aid from allies. By displaying debilitating symptoms, the bereaved leverage sympathy to garner resources from their social group during a critical period of need (Hagen 2003). Thus, grief may be an evolved bargaining strategy, wherein the griever trades visibility of frailty for support, offsetting the costs of exhibiting grief publicly. This model provides an evolutionary explanation for why acute grief, though painful for individuals, may provide net benefits by inducing investment from others. This model is supported by the findings of lower perceived social support being connect to more intense grief (Schultz et al. 2006; Vanderwerker & Prigerson, 2004).

The Prevention model of grief argues that grief symptoms serve an adaptive function by motivating behaviors that help prevent future loss (Keller & Nesse, 2006). This model proposes that the pain of grief evolved because it motivates strategies to avoid similar losses in the future. According to this view, the symptoms especially prevalent following a loss, like crying, sadness and need for social support, are function because they compel actions minimizing chances of repeat tragedy. For instance, the intense pain of losing a child may unconsciously motivate parents to become more protective and attentive to remaining offspring, enhancing their survival. Supporting this theory, research finds that parental grief is intensified following deaths due to violence or accidents compared to illness (Scholtes & Browne 2015; Wijnaards-de Meije et al. 2008). The prevalence of guilt and self-blame in grief reactions also aligns with the prevention model, as these feelings may motivate learning from one's perceived role in the loss to prevent

recurrence (Stroebe et al., 2014; Zetumer et al., 2015). By this logic, the acute pain of grief is adaptive to the degree it impels corrective actions decreasing the likelihood of another catastrophic future loss.

The Social Signaling theory argues that prolonged, intense grief honestly advertises the griever's capacity for loyalty and enduring bonds (Reynolds et al., 2015). From this view, visible grief displays evolved because they identify highly cooperative social partners. Supporting this theory, research finds that individuals who grieve more acutely after a loss are preferred as allies and rated as more trustworthy (Reynolds et al., 2015). Additionally, a sizable portion of griever's report beliefs that reduced mourning would imply callousness, hinting at social norms enforcing demonstrative grief (Skritskaya et al., 2017). By signaling an ability to form committed relationships that persist beyond a partner's lifetime, costly grief responses may have increased reproductive success in ancestral groups through augmented social status and support. In essence, demonstrative mourning identifies individuals with strong relationship skills, garnering them posthumous benefits from the deceased's relatives. As human social dynamics became more complex, this grief signaling system was evolutionarily honed to broadcast cooperative character.

The Life History model analyzes grief through the evolutionary lens of life history strategies (Reynolds et al., 2015). This perspective argues that slow life history strategists, who invest more in parental effort and social cooperation, will exhibit more intense grief symptoms than faster strategists. Supporting this notion, life history traits related to cooperation and stable bonds predict greater commitment to both mates and offspring (Figueredo et al., 2005). Additionally, parents with especially caring and involved parenting styles prior to a child's death display more severe complicated grief reactions afterwards (Meert et al. 2011). By this logic,

acute grief signals an underlying propensity for durable, high-investment relationships characteristic of slow strategists. Since evolutionary success in humans relied heavily on reciprocal altruism and kin support, pronounced grief may have developed as an indicator of loyal alliance potential. Individuals who sank costs into mourning likely reaped reproductive benefits via augmented status and coalition building. In this way, grief intensity may correlate with other slow life history traits favoring strong social bonds and parental devotion.

Though evolutionary models have deepened our understanding of grief, no consensus has emerged on which framework provides the most compelling adaptive logic. Each theory highlights important facets of grief's possible functions, while challenging aspects of competing perspectives. The Prevention, Bargaining, Social Signaling, and Life History models share some of the foundational attachment-based framework of Archer's model, yet also propose additional adaptive benefits of grief beyond reinforcing attachment bonds. This diverges from Archer's byproduct perspective which views grief as a purely ancillary phenomenon. Aside from Archer's view, evolutionary grief theories underscore how natural selection may have honed grief responses to promote inclusive fitness - whether by safeguarding existing relatives, signaling parental devotion, or identifying committed allies. However, significant debate remains around whether grief is a direct evolutionary adaptation or an ancillary byproduct of attachment systems. Overall, evolutionary grief theories integrate insights from attachment theory, kin selection dynamics, and life history theory to explain this complex phenomenon. While open questions persist, perspectives rooted in our ancestral history have revealed grief's intricate connections to the web of genetic relatedness and social bonds critical for human evolutionary success.

Proposal of Risk Behavior and Altruism as an Output of Grief

Evolutionary grief theories propose that bereavement unconsciously alters complex decision-making behaviors in ways that may have promoted fitness in ancestral environments.

There has been some theoretical and empirical grounding linking grief responses to shifts in complex social decision-making, such as increased altruistic motivations focused on relatives and allies. For example, the bargaining model suggests that visible displays of grief honestly signal vulnerability, relaxing social norms in order to elicit aid from one's support network during a time of critical need (Hagen, 2003). Additionally, according to principles of inclusive fitness, the pain of grief may have evolved to increase altruistic behavior focused specifically on genetic relatives and offspring, as a means of aiding their survival after the loss of a close kin member (Trivers, 1971). Supporting this notion, one study found that grief motivates behaviors such as increased altruism (Berzoff, 2006). Additionally, research indicates that people experiencing depressive symptoms exhibit higher altruistic standards compared to non-depressed controls (Morris & Kanfer, 1983). These findings provide some initial empirical evidence that aligns with the theory that acute grief may function to elevate altruistic motivations aimed at protecting the welfare of remaining social network after a loss. Further research is still needed to demonstrate grief's role more conclusively in prompting complex prosocial behaviors, as proposed by inclusive fitness principles.

Additionally, multiple studies indicate that bereavement increases personal risk aversion. For instance, one study found that mutual fund managers who recently experienced a loss exhibited greater loss aversion and reduced risk-taking in investment choices compared to non-bereaved managers (Shu & Sulaeman et al., 2017). These findings align with predictions from the prevention model of grief, which argues grief evolved to motivate corrective actions which would decrease the chances of another catastrophic loss in the future (Keller & Nesse, 2006).

Additionally, an analysis of population data revealed that people who were recently widowed displayed more conservative financial behavior and stricter risk avoidance in real-world money management compared to continually married individuals (Lim, Oh, et al., 2023). By becoming more risk averse after a significant loss, individuals may have been able to better conserve remaining resources and ensure stable access in times when drawing on the deceased's support became impossible.

By modifying our altruism behavior towards kin and personal risk avoidance, grief reactions may have functioned in ancestral hunter-gatherer societies to improve survival and resource outcomes for remaining genetic relatives following the loss of a close family member or cooperative partner. While more empirical research is certainly needed, initial findings point to intriguing relationships between acute grief and shifts in complex decision-making, hinting at bereavement's deep evolutionary roots in promoting inclusive fitness.

The Role of Social Support

Social support has been hypothesized to play a vital moderating role in coping with bereavement by buffering the distress and disruptive effects of acute grief reactions. Several studies using diverse methods have demonstrated links between higher perceived social support and more favorable grief outcomes.

An investigation by Zhou et al. (2020) found that social acknowledgement of a loved one's passing through expressions of sympathy was associated with reduced symptoms of prolonged grief disorder in bereaved individuals. This suggests that social validation helps alleviate grieving distress over time. Along similar lines, Kho and Kane (2019) reported that attachment anxiety predicted more severe grief responses in older adults, hinting that insecure

relational bonds may offer less of a support buffer during bereavement. Furthermore, a cross-cultural analysis by Rosenblatt, Walsh, and Jackson (1976) revealed that grief practices involving greater community social support, such as funeral ceremonies, correlated with lower grief severity in non-Western cultures. This lends credence to the idea that social resources can aid the grieving process. Additional empirical studies corroborate these findings, showing a consistent link between higher perceived support and attenuated grief symptoms following various types of losses (Bonanno et al., 2002; Burke, Vanderwerker & Prigerson, 2004). Seeking emotional and instrumental support also facilitates declining grief intensity over time for many bereaved individuals (Vanderwerker & Prigerson, 2004).

In summary, substantial evidence indicates that social support can provide a valuable buffering effect during grief reactions, likely by substituting for some of the lost emotional and practical contributions of the deceased. The current study will examine whether individual differences in social support moderate the hypothesized effects of grief induction on risk-taking and altruistic motivations. This may further elucidate the vital role of social resources in facilitating adaptation after bereavement.

The Current Research

This investigation aims to empirically test the evolutionary-functional hypothesis that acute grief cognitions and emotions serve to motivate strategic behavioral changes following the loss of a meaningful attachment relationship. Specifically, this study utilizes an experimental design to examine whether priming that induces feelings of grief cause increased risk aversion and altruistic tendencies compared to control conditions.

The research employs a between-subjects experimental design with participants randomly assigned to one of three priming conditions: affectional loss, affiliative loss, or a control, and then complete measures designed to evaluate altruism and risk-sensitivity. Bereavement is simulated using an immersive writing task in which participants are instructed to write a detailed journal entry reflecting on the hypothetical sudden death of either a close loved one (affectional loss), an acquaintance (affiliative loss), or a stranger (control) (Weiss, R. S. 2001; Archer 1999). This priming task aims to ethically elicit acute grief reactions analogous to those experienced in real-world bereavement situations, in a more controlled context. The affectional loss condition centered on the death of a close attachment figure is predicted to provoke the strongest grief responses based on evolutionary frameworks.

After the grief priming task, participants complete a battery of validated scale measures assessing current risk tolerance across domains like financial, ethical, and social risks; altruistic motivations focused on intentions to benefit others in the near future; and perceived availability of social support resources.

It is predicted that, compared to the affiliative and non-close loss conditions, the affectional loss condition will exhibit increased risk aversion and higher altruism. Furthermore, perceived social support is measured for all participants as a potential protective factor that may moderate the anticipated grief effects on cognition and behavior.

Method

Participants. Participants were 80 adults over age 18 recruited from undergraduate psychology courses and individuals recruited through social media. Inclusion criteria are being an adult over 18 and able to complete the writing tasks and surveys. Exclusion criteria include

being under 18 years old or unable to complete the study procedures. Demographic information including race/ethnicity, gender identity, age, and education level will be collected.

Procedure. Participants will complete the study measures using an online Qualtrics survey. Informed consent will be obtained per institutional ethics regulations before initiating study participation. In the online session, participants will first fill out a demographic questionnaire including items about age, gender identity, ethnicity, and education level. Next, levels of social support will be assessed using the 12-item Multidimensional Scale of Perceived Social Support (Zimet et al., 1988). This validated measure asks participants to rate statements like “My family tries to help me” and “I have a special person who cares about my feelings” on a scale from 1 (strongly disagree) to 5 (strongly agree). After completing baseline measures, participants will be randomly assigned in a between-groups experimental design to one of three imagined grief scenario conditions that was generated for this study reflecting either sudden loss of a close family member (affectional loss), casual acquaintance (affiliative loss), or previously unknown individual (non-close loss). For example, the affectional loss category was asked to “Please write about the sudden loss of a close family member or friend with whom you have an emotionally significant relationship...” These primes are designed to simulate differential grief reactions based on attachment closeness.

Following the experimental induction procedure, two outcome measures will assess the dependent variables. The 40-item Domain Specific Risk Taking scale (Weber et al., 2002) will measure self-reported likelihood of engaging in future risky behaviors across ethical, financial, health/safety, recreational, and social domains using items like “Admitting that your tastes are different from your friends” on a 5-point scale. The 20-item Self-Report Altruism scale (Rushton et al., 1981) was modified in tense to index participants’ willingness to carry out various

prosocial behaviors in the near future, such as “I would offer to help a handicapped or elderly stranger across a street” on a 5-point frequency scale. After completing the measures, participants will read a debriefing statement and indicate if they consent to use of their data in analysis or wish to withdraw. Comparing scores between experimental groups will test key predictions derived from evolutionary grief theories around shifts in risk tolerance and altruistic motivations.

Results

A two-way ANOVA tested for group differences in risk-taking based on affiliation group (stranger, affiliative, affectional) and social support levels (high or low). As can be seen in figure 1, there was no significant main effect of group assignment on risk-taking scores, $F(2, 73) = 0.065$, $p = .937$. Social support also did not have a significant main effect, $F(1, 73) = 0.348$, $p = .557$. Furthermore, the interaction between factors was non-significant, $F(2, 73) = 0.008$, $p = .992$. Follow-up tests were not conducted due to the lack of significant effects in the overall model. These results suggest that group assignment status and perceived availability of social support did not relate to participants’

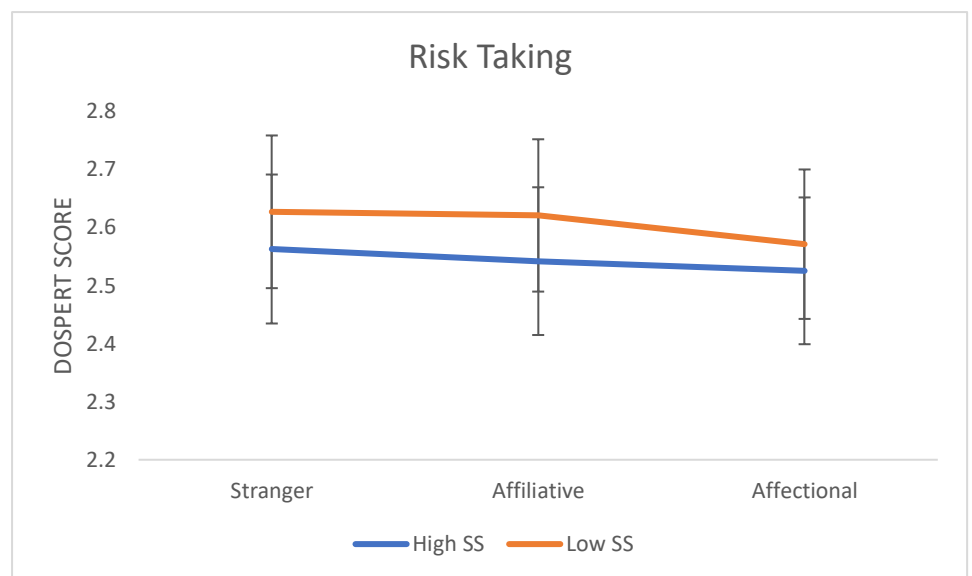


Figure 1 No main effect of social support nor group affiliation in relationship with Risk Taking as measured by the DOSPERT total score. No interaction effect is present.

propensity for risk-taking, as measured by the DOSPERT inventory.

A second two-way ANOVA was conducted to examine differences in altruism based on the between-subjects factors of group affiliation (stranger, affiliative, affectional) and social support level (high or low).

As can be seen in figure 2, there was no significant main effect for group affiliation on DV scores, $F(2, 73) = 0.778, p = .463$. However, the main effect for social support was significant, $F(1, 73) = 7.672, p = .007$.

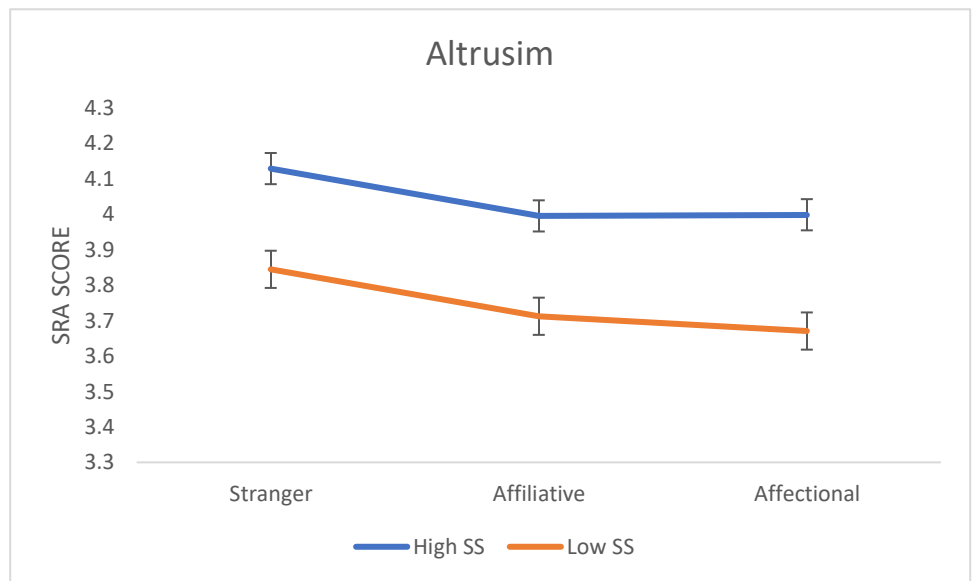


Figure 2 No main effect of group affiliation and SRA score, however main effect for social support is significant. No interaction effect is present.

Furthermore, the interaction effect between factors did not reach statistical significance, $F(2, 73) = 0.018, p = .982$. Follow-up analyses were not conducted given the lack of significant F-test results. These findings indicate that group assignment had negligible impacts on participants' scores on altruism, while social support did have an impact on altruism.

Finally, ANOVA analysis was used to test the five specific domains of the Domain-Specific Risk Taking (DOSPERT) scale: ethical, financial, health/safety, social, and recreational risks (Weber et al., 2002). A separate model was run for each subscale testing whether loss condition or social support impacted risk assessment. No domains showed significant

associations with either variable (all p 's $> .05$), demonstrating the lack of relationship between grief priming, social support, and risk aversion in this study.

Bivariate correlations were conducted to assess associations between perceived social support measured by the Multidimensional Scale of Perceived Social Support (MSPSS) and the dependent variables of domain-specific risk taking and altruism. There was a small positive correlation between MSPSS and SRA scores, $r(79) = .233$, $p = .039$. Higher social support associated with greater self-reported altruism. However, social support did not significantly correlate with domain-specific risk taking, $r(79) = -.099$, $p = .386$.

In summary, the grief priming manipulations did not elicit significant differences in risk taking or altruistic motivations compared to the control condition. However, higher perceived social support mildly associated with increased self-reported altruism, providing some evidence that social resources may relate to altruistic tendencies after loss. Overall, the study hypotheses were not supported by the data. Possible reasons for these null findings are considered in the discussion.

Discussion

The current study hypothesized that experimentally induced grief would increase risk aversion and altruistic motivations, with greater changes expected for imagined loss of closer relationships. However, the results did not support these predictions. Priming different degrees of interpersonal loss did not significantly alter risk-taking or self-reported altruism compared to writing about the death of a stranger. Additionally, no specific domains of risk-taking assessed by the DOSPERT showed significant responsiveness to the grief prime.

Regarding social support, which was predicted to buffer grief's effects, results found social support mildly associated with greater altruism but showed negligible links to overall risk-taking and grief condition. The potential interaction between social support and loss condition on outcomes was not supported. Analyses of domain-specific risks also did not reveal associations with social support. This suggests social factors play a very limited moderating role, partially confirming some prior evidence on support and grief adaptation but not aligned with initial hypotheses.

If grief served strategic emotional functions as proposed by some adaptationist models (Reynolds et al. 2015), the grief induction primes would be expected to elicit increased altruistic motivations and risk aversion in the affectional condition compared to the affiliative, and stranger condition. However, this study found limited effects of grief on either outcome, failing to support grief as strategically motivating specific decision-making changes. In contrast, attachment theories posit acute grief as non-functional distress arising from severed bonds (Bowlby, 1980; Archer 1999). The lack of condition differences in this study provides more evidence aligning with grief as dysfunctional rather than deliberately altering behavior. Though social support weakly predicted altruism, it showed negligible associations with risk-taking.

Overall, findings provide minimal evidence that acute grief adaptively recalibrates decision-making as proposed by some evolutionary models. Rather, results emphasize grief's dysfunctional qualities over strategic utility.

Limitations

The failure to find interactions between loss conditions and social support or any main effect of loss condition may have resulted from several factors. First, the grief primes relying on imagined writing tasks may have lacked sufficient external validity compared to real-world

bereavement grief. Without manipulation checks, it is unclear whether the primes adequately induced cognitive, emotional, and physiological grief responses. This raises questions around experimentally manipulating grief in a controlled lab setting. Although some studies can evoke emotions like fear or happiness using stimuli like images or music (Siedlecka & Denson, 2018), more vivid multidimensional inputs may be necessary to genuinely activate grief circuits, as this represents intense distress rooted in deep attachment bonds.

Second, the predominantly non-bereaved student sample limits generalizability, as ability to engage grief may differ across development. Younger students may struggle simulating grief without lived experience. Older adults with direct grief history may more readily emotionally engage hypothetical scenarios by drawing on recollections of loss. Limited grief exposure in younger samples may constrain induced bereavement effects.

In summary, failure to empirically validate grief manipulation success and reliance on inexperienced students restricts conclusions regarding grief functionality theory predictions. Overcoming these constraints is critical in further probing grief adaptation hypotheses.

Future directions

A key direction involves examining methods for successfully inducing grief in non-bereaved individuals. Certain techniques like immersive virtual reality, realistic photoshopped images of the deceased, or auditory narratives tailored to each participant could more potently target multi-sensory neural inputs known to activate pain circuitry and sympathetic nervous system activity observed in acute grief following real-world death exposure (Rivu & Jiang et al. 2021).

Additionally, further exploration of the relationship between social support and altruistic motivations in grief states is warranted. Possible explanatory factors linking support and altruism

include: a) Social modeling of helping behaviors in supportive networks, b) Emotional capacity enabled by support facilitates outward focus on others' welfare, and c) Resource security from support allows absorbing personal costs of altruism (Kushlev et al. 2021; Chancellor et al. 2018; Brethel-Haurwitz et al. 2019; 120; Baumeister et al 1994). Uncovering mediating processes behind social support's role can elucidate grief adaptations.

Overall, research should prioritize developing validated grief induction methods beyond naturalistic paradigms, while investigating social variables including support that may explain variability in grief functioning. This will provide enhanced internal validity and accounts for contextual factors shaping grief effects on cognition, emotion, and behavior after loss.

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