

Examining Neurophysiological Responses to Attachment-Related Stimuli in Grieving Individuals

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Background

Grief: A Ubiquitous Phenomenon

Grief is a common reaction after bereavement that has physical, mental, and social consequences (Freed et al., 2009).

Disruptive & Intense:

~persistent sadness
~intrusive preoccupations
~perceived lack of meaning

Psychological & Physical Effects

Associated with greater risk for anxiety, depression, substance abuse, lowered immunity, & disturbed sleep.

Cognitive Deficits:

Decreased performance on cognitive tests; slower info-processing speeds and attentional biases

(Maccallum & Bryant, 2010; Saavedra et al., 2014; Ward, Mathias, & Hitchings, 2007)

Bereavement as a Threat to Attachment

- From birth, relationships mold an **internal working model** about the self in relation to significant others, and can provide a secure base of attachment from which one can explore the world (Bowlby, 1980).
- Perceived threats to this attachment system activate fear modules and elicit proximity-seeking in order to connect to the secure base (Bowlby, 1980).
- Bereavement can be considered a threat to attachment.

Measuring Physiological Indicators of Threat

Electrodermal Responses (EDR): Activation of the sympathetic nervous system creates spikes in skin conductance readings. EDR spikes occur during the presentation of threatening stimuli (Gündel et al., 2003)



Electroencephalography (EEG):

Event Related Potentials: Increased amplitude of P300 waveforms to emotionally threatening stimuli that captures attention (Brown, El-Deredy, & Blanchette, 2012)



Hemispheric Asymmetry: Left hemisphere linked to positive and resting states while right hemisphere linked to negative threat-processing (Rognoni, Galati, Costa, & Crini, 2008)

Grief, Attachment and Threat

- The presentation of emotionally-threatening stimuli to grieving individuals & the presentation of attachment-related stimuli to individuals primed with attachment threats activates attentional biases, elicits physiological responses, and decreases performance on executive functioning tests (Edelstein & Gillath, 2015; Gillath, Giesbrecht, & Shaver, 2009).
- However, no study to date has directly tested whether the presentation of attachment-related information to bereaved individuals activates a threat response and interferes with cognitive performance.

The Current Study

The Big Question

Will grieving individuals demonstrate a threat response to attachment-related stimuli? If so, will this threat response interfere with cognitive control?

Methodology

Sample: ~ 30 English-speaking participants who lost a first-degree relative within the past year.

Participants will complete the following questionnaires:

- Demographics Questionnaire
- The State Trait Anxiety Inventory (STAI-Y1,Y2)
- The Experiences in Close Relationships Revised (ECR-R)
- Connors Adult ADHD Rating Scales (CAARS-S:L)
- Grief Processing/Deliberate Grief Avoidance (GP/DGA)
- Beck Depression Inventory-II (BDI-II)
- Hogan Grief Reaction Checklist (HGRC)

An AREST will be used to present participants with attachment-related stimuli. EEG and EDRs will be used to measure responses to the stimuli. Upon completion of the EST, participants will complete a series of questionnaires to account for possible confounding variables. The effects of these variables will then be assessed through multiple regression analyses.

The Attachment-Related Emotional Stroop Task (AREST)

Participants will indicate the color of each word by pressing a button with their right hand

Neutral	Non-Attachment Positive	Non-Attachment Negative	Attachment-Related Positive	Attachment-Related Negative
Chair	Smile	Revolver	Security	Alone
Coin	Delight	Hardship	Affection	Rejected
Building	Elated	Gloom	Comfort	Neglect
Windshield	Hopeful	Ulcer	Safe	Helpless
Factory	Promotion	Pain	Belong	Isolation



Hypotheses

Three word categories will be perceived as threatening:

- Negative Non-Attachment Word
- Negative Attachment-Related Words
- Positive Attachment-Related Words

Words perceived as threatening will elicit:

- Delayed Reaction Times
- Decreased Performance: worse accuracy
- Increased skin conductance
- Larger P300 amplitude
- Greater right hemisphere asymmetry

Moderation of effects by attachment style and grief coping style:

Anxious attachment and avoidant coping expected to cause greater interference and larger physiological responses

References

- Bowlby, J. (1980). *Attachment and loss* Basic books.
- Brown, C., El-Deredy, W., & Blanchette, I. (2010). Attentional modulation of visual-evoked potentials by threat: Investigating the effect of evolutionary relevance. *Brain and Cognition*, 74(3), 281-287.
- Edelstein, R. S., & Gillath, O. (2008). Avoiding interference: Adult attachment and emotional processing biases. *Personality & Social Psychology Bulletin*, 34(2), 171-181.
- Freed, P. J., Yanagihara, T. K., Hirsch, J., & Mann, J. J. (2009). Neural mechanisms of grief regulation. *Biological Psychiatry*, 66(1), 33-40.
- Gillath, O., Giesbrecht, B., & Shaver, P. R. (2009). Attachment, attention, and cognitive control: Attachment style and performance on general attention tasks. *Journal of Experimental Social Psychology*, 45(4), 647-654.
- Gündel, H., O'connor, M., Littrell, L., Fort, C., & Lane, R. D. (2014). Functional neuroanatomy of grief: An fMRI study.
- Maccallum, F., & Bryant, R. A. (2010). Attentional bias in complicated grief. *Journal of Affective Disorders*, 125(1), 316-322.
- Rognoni, E., Galati, D., Costa, T., & Crini, M. (2008). Relationship between adult attachment patterns, emotional experience and EEG frontal asymmetry. *Personality and Individual Differences*, 44(4), 909-920.
- Saavedra Pérez, H., Ikram, M., Direk, N., Prigerson, H., Freak-Poli, R., Verhaaren, B., . . . Tiemeier, H. (2014). Cognition, structural brain changes and complicated grief: A population-based study. *Psychological Medicine*, 1-11.
- Ward, L., Mathias, J. L., & Hitchings, S. E. (2007). Relationships between bereavement and cognitive functioning in older adults. *Gerontology*, 53(6), 362-372.