



Extremism reduces conflict arousal and increases values affirmation in response to meaning violations

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ABSTRACT

In the social psychological threat-compensation literature, there is an apparent contradiction whereby relatively extreme beliefs both decrease markers of physiological arousal following meaning violations, and increase the values affirmation behaviors understood as a palliative responses to this arousal. We hypothesize that this is due to the differential impact of measuring extremism on behavioral inhibition and approach systems following meaning violations, whereby extremism both reduces markers of conflict arousal (BIS) and increases values affirmation (BAS) unrelated to this initial arousal. Using pupil dilation as a proxy for immediate conflict arousal, we found that the same meaning violation (anomalous playing cards) evoked greater pupil dilation, and that this pupillary reaction was diminished in participants who earlier reported extreme beliefs. We also found that reporting extreme beliefs was associated with greater affirmation of an unrelated meaning framework, where this affirmation was unrelated to physiological markers of conflict arousal.

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1. Introduction

In the social psychological threat-compensation literature, there is an apparent contradiction whereby relatively extreme beliefs both decrease arousal following meaning violations, and increase affirmation behaviors understood as palliative responses to this arousal. In this literature, it has been commonly demonstrated that people affirm their values following violations of how they understand themselves and their world (i.e., meaning violations; for a review, see Proulx & Inzlicht, 2012). For example, after being presented with playing cards that violate people's expectations – by reversing the color of the card such as a black two of hearts (Bruner & Postman, 1949) – people show an heightened commitment to beliefs relevant to social equality (Proulx & Major, 2013). These affirmation efforts are understood as palliative responses to a syndrome of negative physiological arousal caused by the meaning violation (Proulx, Inzlicht, & Harmon-Jones, 2012). Although research on the mediating effect of this arousal is limited, studies have shown a link between meaning violations and arousal. For instance, cardiovascular measures indicate a threat response when interacting with partners who violate one's expectations (Mendes, Blascovich, Lickel, & Hunter, 2002; Mendes, Blascovich,

Hunter, Lickel, & Jost, 2007) and when social rejection is unexpected (Moor, Crone, & Van der Molen, 2010). On a neural level, it has been shown that the anterior cingulate cortex (ACC) is active when expectations are violated (Oliveira, McDonald, & Goodman, 2007), and also during other kinds of meaning violations, such as mortality salience (Quirin et al., 2012), cognitive dissonance (Kitayama, Chua, Tompson, & Han, 2013; van Veen, Krug, Schooler, & Carter, 2009), lack of control (Salomons, Johnstone, Backonja, & Davidson, 2004), and social isolation threats (Eisenberger, Lieberman, & Williams, 2003; Nash, Prentice, Hirsh, McGregor, & Inzlicht, 2014).

It has also been demonstrated that the physiological response to meaning violations is affected by the extremity of the beliefs one possesses. People holding relatively extreme beliefs display reduced “distress signals” such as error related negativity (Inzlicht, McGregor, Hirsh, & Nash, 2009; Inzlicht & Tullett, 2010)—an index of ACC activity (Dehaene, Posner, & Tucker, 1994; Gehring, Goss, Coles, Meyer, & Donchin, 1993). Yet they also demonstrate greater affirmation following meaning violations (e.g., mortality reminders (Weise, Arciszewski, & Verhijac, 2012) or anomalous playing cards (Proulx & Major, 2013)). If compensatory affirmation is indeed a palliative response to arousal following meaning violations, how can extreme beliefs both reduce markers of conflict arousal and increase affirmation efforts? In this study, we apply a novel perspective from the threat-compensation literature to aid in the understanding of this apparent contradiction (for an extensive overview of this perspective, see Jonas et al., 2014).

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According to this perspective, any given meaning violation evokes arousal that primarily activates the Behavioral Inhibition System (BIS; Gray & McNaughton, 2003)—a system that produces heightened anxiety, avoidance motivation, and increased vigilance. After a delay, the Behavioral Approach System (BAS) becomes predominantly active and initiates behavior that underlies compensatory efforts such as the affirmation of values (McGregor, Nash, Mann, & Phills, 2010). Each system is associated with distinct physiological substrates. The BIS' neural substrates consists of the septa-hippocampal region and the amygdala, which are innervated by serotonergic projections of the raphe nucleus and noradrenergic projections of the locus coeruleus (LC; Aston-Jones & Cohen, 2005; Amodio, Master, Yee, & Taylor, 2007). Importantly, LC activity can be derived from autonomic measures of arousal such as pupil dilation (Rajkowski, Kubiak, & Aston-Jones, 1993). Indeed, research has shown that task-processing is accompanied by changes in pupil dilation consistent with LC functioning (e.g., Gilzenrat, Nieuwenhuis, Jepma, & Cohen, 2010; Jepma & Nieuwenhuis, 2011; Smallwood et al., 2011). Pupil size has also been linked to increased physiological arousal (Bradley, Miccoli, Escrig, & Lang, 2008; Steenbergen, Band, & Hommel, 2011) and specific BIS-related constructs such as surprise (Preuschoff, 't Hart, & Einhäuser, 2011), fear and avoidance (White & Depue, 1999), and conflict detection (Critchley, Tang, Glaser, Butterworth, & Dolan, 2005; Laeng, Ørbo, Holmlund, & Miozzo, 2010). Conversely, the BAS' main substrate is the dopaminergic neurotransmitter system with projections in the lateral and orbital regions of the prefrontal cortex (Rolls, 2000).

Following from this distinction, we posit that extremism differentially affects these behavioral systems. Intuitively, it could be reasoned that those with extreme values should be well-equipped to deal with violations of meaning, and would not be motivated to display strong compensatory reactions. Nevertheless, the relevant literature leads us to postulate that those who hold extreme beliefs will initially display diminished conflict arousal BIS, in response to meaning violations, even as they subsequently demonstrate heightened BAS induced affirmation. This prediction is consistent with previous theorizing that BIS and BAS are discrete systems (e.g., Gray & McNaughton, 2003; Jonas et al., 2014) that are triggered independently following the experience of violation (Hirsh, Mar, & Peterson, 2012). While BAS-initiated behaviors may serve a palliative function with regards to initial BIS activation, these subsequent BAS behaviors may not be caused by BIS conflict-detection arousal, nor must they vary in any linear manner with the magnitude of this initial arousal—in fact, they likely show an *inverse* linear relationship for those with extreme beliefs, insofar as this extreme disposition differentially impacts distinct BIS and BAS systems as they respond to threat.

To examine this hypothesis, we conducted a single experiment that could demonstrate the extent to which extremism has a dampening effect on initial markers of conflict-detection BIS activation (i.e., pupillary dilation), and an amplifying effect on BAS-activated compensation behaviors (values affirmation) in response to the same meaning violation (visual anomaly). Participants were exposed to repeated meaning violations (anomalous playing cards) during which time their pupil dilation (BIS activation) was measured; followed by several opportunities to affirm moral values (BAS activation). Our first hypothesis was that meaning violations would increase pupil dilation, and that this relationship would be moderated by extremism, such that participants with extreme values would show a *diminished* pupil response compared to those upholding moderate views. Our second hypothesis was that participants with extreme beliefs would demonstrate *greater* affirmation of moral values, which would not be moderated by pupillary dilation.

2. Method

2.1. Participants

Sixty-eight students at Tilburg University in the Netherlands (18–32 years of age; 33 male) participated. We excluded participants on the basis of two criteria. First, we excluded participants with over 20% missing eye tracker data to increase the reliability of our results. Second, we excluded participants who reported seeing the anomalous feature of the anomalous playing cards during the experiment, leaving 22 participants in the experimental condition and 31 participants in the control condition. This latter exclusion criterion is based on previous research using implicit perceptual anomalies (e.g., Proulx & Heine, 2008; Proulx & Major, 2013), and follows from findings demonstrating that the explicit recognition of anomalous perceptual features leads participants to accommodate their relevant schemata and subsequently expect future anomalies (e.g., Bruner & Postman, 1949). As such, explicitly noted and subsequently expected anomalies no longer constitute expectancy violations, and we reasoned that the relatively small number of participants who explicitly noted the anomalies would not be suited to testing the effect of pupillary dilation and compensatory affirmation on expectancy violations. We assessed the explicit anomaly-awareness of participants by means of a typical “funnel debrief”, whereby participants are asked whether they notice anything generally out of the ordinary regarding the cards, and if so, what it is that they believe is out of the ordinary. If they made an explicit mention of the colors of the cards, we excluded them from the analyses.

2.2. Design

The study consisted of a 2 (cards: normal vs. normal+anomalous) between subjects design. We opted for a between subjects design to be able to optimally compare the pupillary response to normal and anomalous playing cards, as the initial presentation of an expectancy-violating stimulus may affect subsequent reactions to the same type of stimulus. To minimize this possibility, we used a task that draws the attention away from the anomalous feature, and we excluded participants who reported noticing the anomalous feature (see Section 2.1 and Footnote 1). Research has shown that conscious awareness of anomalies is not needed for compensatory efforts to be evoked (Proulx & Heine, 2008; Randles, Proulx, & Heine, 2011).

2.3. Procedure

Participants were seated in illuminated cubicles, in front of the eye tracker monitor at a distance of approximately half a meter.

¹ Inclusion of the participants who consciously detected the anomalous cards shows similar results. Extremism moderated the pupillary response to normal and anomalous playing cards, $F(1, 59) = 6.752, p = .012, \eta^2_p = .103$. In the experimental condition, a higher level of extremism was associated with decreased pupil dilation, $B = -.008, t(59) = -1.99, p = .051$. In the control condition higher levels of extremism were associated with greater pupil dilation, but of marginal significance, $B = .005, t(59) = 1.68, p = .099$. Extremism also moderated responses to the positive discrimination items, $F(1, 58) = 4.41, p = .04, \eta^2_p = .071$. In the control condition, extremism was related to less support for positive discrimination, $B = -.103, t(58) = -2.699, p = .009$ and somewhat more support in the experimental condition, although not significant, $B = .014, t(58) = .349, p = .728$. The interaction with extremism and condition on the bond items was found to be of marginal significance in this re-analysis, $F(1, 58) = 3.581, p = .06, \eta^2_p = .058$. In the experimental condition, higher extremism was again marginally associated with a higher bond, $B = 12.20, t(58) = 1.90, p = .062$. The simple slope in the control condition was again not significant, $p = .46$. Again, no significant moderations of pupil dilation were found on the affirmation measures, $ps > .479$.

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