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### Creativity under the gun

*How threat features and personal characteristics motivate creative responding*

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## Summary

CREATIVITY UNDER THE GUN:

How Threat Features and Personal Characteristics

Motivate Creative Responding

Humans are sometimes confronted with threats: Environmental events that signal a loss of resources (e.g., property, relationship, health) and have impending negative personal consequences (Marks & Nesse, 1994; Staw et al., 1981). Examples include sharing the elevator with someone that has an infectious disease, being stuck in public transport in the presence of a wrongdoer, or the possibility of being socially rejected in a new work environment. In the face of threats, people may benefit most from creative strategies – strategies that are useful yet less predictable in dealing with the present threat (Amabile, 1983; Runco, 2004). Creative strategies provide effective new ways to solve the problem at hand, and are therefore often needed to successfully diminish or avert the impending negative consequences imposed by threats.

Notwithstanding the value of creative solutions in response to threats, the effects of threat on creativity remain poorly understood. Past work has shown that threats as well as the fear and anxiety that are elicited by threats can both increase and decrease creativity, without providing convincing reasons why (Byron & Khazanchi, 2011; Mehta & Zhu, 2009; De Dreu & Nijstad, 2008). The goal of the present dissertation is to better understand how threats influence creativity. To realize this goal, I integrate the motivated focus account of creativity with theories of human threat responding to examine when, why, and for whom threats enhance or hinder creativity. According to the motivated focus account of creativity, threats increase the motivation to avoid and neutralize the threat at hand, which may result in enhanced creativity, but only in domains that are relevant to manage the threat at hand, but not in domains that are deemed irrelevant to people's current concerns (De Dreu & Nijstad, 2008). Furthermore, theories on human threat responding state that human threat management systems, such as disease avoidance system and self-protection system, are functionally distinct and flexible. They are sensitive to different cues signaling particular threats, are more likely to be engaged when the threatened person is especially vulnerable to the threat, and lead to highly specific cognitions and behaviors that are attuned to the threat (Cosmides & Tooby, 1994; Neuberg et al., 2011; Schaller et al., 2007).

Integrating both theoretical perspectives, I predict that people facing threats can be creative in threat-relevant domains through threat-induced motivated focus, and that creativity under threats is highly specific and responsive to the particular features of threats (e.g. the direction of threat), situational resources (e.g., available time to react), and dispositional variables (e.g., dispositional threat sensitivity). Testable hypotheses that could be derived from this general principle were tested using both intrapersonal (e.g., health threats) and interpersonal threats (e.g., violent assaults) with regards to the full cycle of creative problem solving, from the inclusive processing of information, through the generation of defense tactics, to the evaluation and selection of threat responses for implementation.

### **Threats and Inclusive Information Processing**

Chapter 2 examined whether and when health threats lead to inclusive information processing. Because threat responses are domain-specific and focused, it was predicted that self-relevant health threats motivate the recruitment and allocation of resources onto health-related material and away from material that is deemed irrelevant to people's current concerns, leading to more inclusive processing of health-related information, but less inclusive processing of health-irrelevant information. In two studies I set out to test this prediction. Student participants read information about the negative consequences of alcohol abuse for themselves (high self-relevance) or senior citizens (low self-relevance, Study 2.1), or viewed pictures depicting symptoms of contagious diseases (health threat) or violent aggressors (violence threat, Study 2.2). Cognitive inclusiveness was measured with the adapted category inclusion task, in which participants were asked to rate how representative a given exemplar (e.g., telephone) is for a particular category (e.g., furniture). In addition, individual differences in chronic and current concerns about transmitting diseases were measured to verify that the threat-induced inclusiveness is associated with an increased motivation to deal with the threats (Study 2.2).

Results showed that high rather than low self-relevant health threats led to reduced inclusive information processing of health-irrelevant material (e.g., information related to vehicles and furniture), but not of health-relevant material (e.g., healthcare and stress symptoms; Study 2.1). Moreover, compared to self-relevant violence threats, self-relevant health threats specifically aimed at transmitting diseases led to more inclusive processing of material that pertained to this specific threat (e.g., source of infection and risks of contagion), whereas violence threats tended to induce relatively more inclusive processing

of violence-relevant material (e.g., weaponry), rather than violence-irrelevant material (Study 2.2). Furthermore, Study 2.2 found that the threat-induced inclusive information processing was tied to information about the specific target threat, for example, contagious disease, and did not generalize to other threats or even a broader range of health issues (e.g., mental health). This finding resonates with the idea that threat management systems are functionally distinct systems that promote adaptive responses to specific threats.

According to the motivated focus account, motivation to deal with the threat at hand plays a crucial role in the inclusive processing of threat-relevant information. Accordingly, it was predicted that the inclusive information processing effects would especially occur when people perceived greater vulnerability to the specific threat. Indeed, although participants in Study 2.1 were exposed to the same information about health threats, relatively higher cognitive inclusiveness occurred when the personal relevance of threat was salient. In addition, chronic concerns rather than knowledge about transmitting diseases were associated with higher cognitive inclusiveness ratings for disease- and health-related material (Study 2.2). In short, this chapter provides the evidence that health threats motivate inclusive processing of specific health-related materials, and this effect is associated with an increased motivation to deal with the target threat.

### **Creative Defense Ideation under Threats**

The highly focused and inclusive processing of specific threat-relevant information may facilitate the generation of creative threat responses. Chapter 3 systematically tested the effects of threat exposure, threat features (the direction and nature of threats), and individual threat sensitivity on the generation of creative defense tactics. From the motivated focus account, it follows that threats may lead to increased creativity within threat-relevant domains, for example, when thinking of tactics to deal with threats. However, threats vary in nature, direction, and other features. According to theories on threat management systems, threat-responding is adaptive: It is highly specific and varies as the nature and imminence of the threat changes (Blanchard et al., 2001; Mobbs et al., 2015). For instance, when confronted with imminent and inescapable threats, fight is the most adaptive and likely response. Accordingly, in this chapter the basic hypothesis was tested that threats may differentially influence the generation of creative defensive tactics as a function of (a) exposure to threat or not (Study 3.1-3.3), (b) whether the threats were directed towards oneself or others (Study 3.1 & 3.2), (c) nature (Study 3.2) of the threat, and (d) individual differences in threat sensitivity (Study 3.3).

Chapter 3 includes three studies in which participants generated tactics to deal with possible threats while pictures emerged on the screen depicting either self-directed threats (Study 3.1-3.3), other-directed threats (Study 3.1 & 3.2), or matching neutral control stimuli (Study 3.1-3.3). Results across the three studies showed that rather than a generalized impact on the number of original defense tactics, threat exposure (both self- and other-directed threats as compared to the neutral condition) selectively led to more original fight tactics but less original risk assessment tactics, such as monitoring the immediate environment and being vigilant (Study 3.1-3.3). Moreover, I found a main effect of the nature of threat on the number of original defensive tactics: an exposure to human as opposed to animal threats motivated original cooperative tactics, including apology and negotiation (Study 3.2). Given that fight is the most adaptive and likely response to imminent and inescapable threats (i.e. the threats participants were exposed to in the pictures; Blanchard et al., 2011; Mobbs et al., 2015) and language-based tactics only make sense when people are confronted with human assaults, our findings thus imply that threats selectively promote the originality of certain types of tactics that are the most adaptive given the circumstances that people are in. However, threat direction did not evoke different levels of arousal and perceived self-relevance, and did not differentially influence the number of original defensive tactics in Study 3.1 & 3.2.

Finally, threat exposure (vs. a neutral condition) stimulated more original fight and flight tactics only among individuals who feel especially anxious in response to threats (i.e. those scoring low on self-esteem; Study 3.3). This finding indicates that threats enhanced creativity in adaptive defense categories only for those who are especially vulnerable to threats and are thus strongly motivated to neutralize the threats and regain safety. This suggests that motivational aspects rather than primed conceptual knowledge drive the effects I found in Chapter 3.

### **Imminent Threats and Creative Threat-responding**

Threatening circumstances often require urgent responding. Chapter 4 further sought to uncover under what circumstances and for whom threats associate with creative responding when a single, urgent response is required. In this chapter, I tested the effect of two factors that are highly relevant in urgent threatening situations, threat direction (self- vs. other-directed) and time pressure, as well as individual differences in threat sensitivity (indicated by people's avoidance temperament) on creative threat-responding. Participants completed several trials in which they could only give one threat response to a

presented threat. The threats were either self-directed or other-directed threats and participants had little time or sufficient time to generate and key in their response.

Because the level of avoidance motivation determines the level of threat-induced creativity (Baas et al., 2011; De Dreu & Nijstad, 2008), I predicted that compared to other-directed threats, self-directed threats, which signals higher self-relevance and imminence, would lead to more creative responses. Unlike the null findings of threat direction in Study 3.1 and 3.2 where participants had ample time to generate multiple tactics, the results in this chapter confirmed this prediction and showed that threats directed towards oneself motivated more original threat responses than threats directed to others. Furthermore, this was especially the case for people scoring high on avoidance temperament, which implies motivation plays an important role in explaining the enhancing effect of threat direction on threat-relevant creativity.

Regarding the effect of time pressure, I predicted that high time pressure would undermine original threat responding because time pressure taxes cognitive resources and interferes with the focused and effortful thinking that is essential for creative threat-responding. Supporting this prediction, I observed a detrimental effect of high time pressure on creative responding under threats. In addition, creative threat responding seems to be influenced by time pressure and threat direction in an additive rather than interactive manner: the highest originality of threat responses emerged in people facing self-directed threats under low time pressure. This finding suggests that creative threat responding is more likely to occur when people are more motivated to manage the threat at hand and have sufficient resources at their disposal for creative processing.

### **Imminent Threats and the Selection of Creative Responses**

Chapter 5 focuses on another aspect of the full cycle of creative problem solving: idea selection. Although generating creative threat-responses is important, for successful threat management, the single best response must be identified and selected for further elaboration and implementation. The goal of this chapter was to examine how imminent threats influence the selection of creative threat-responses. Threat direction and time pressure were manipulated as features of imminent threats. Participants facing self-directed or other-directed threats were asked to select one out of two alternative responses that differed on either originality (low vs. high) or usefulness (low vs. high) to deal with the presented threat. They did so under high or low time pressure (Study 5.1 and

5.2) and reported their perceived effectiveness of each alternative response in managing the threats (Study 5.2).

First, I identified a strong tendency of people to select useful rather than original responses under threats. Moreover, time pressure did not exert a significant impact on response selection in Study 5.1 and 5.2. However, results of the two studies revealed that compared to people facing other-directed threats, those confronted with self-directed threats had a greater preference for responses that are truly creative (i.e. both original and useful). This finding is consistent with the idea that threats promote threat-related creativity through motivated focus; the more motivated people are, the more likely the threat-related creativity-effect is to emerge. More important, it provides the first evidence that the motivated focus account pertains not only to the idea generation process but also to the idea selection stage of creative problem solving.

Furthermore, Study 5.2 showed that perceived effectiveness of high-original tactics played an important role in the relation between threat direction and creative response selection. Compared to those facing other-directed threats, participants facing self-directed threats perceived high-original responses to be more effective in dealing with the threat at hand and this increased perceived effectiveness explained their preference for creative responses. This finding highlights the adaptive value of original responses in coping with imminent threats and its role in explaining the selection of creative tactics in response to threats: In case of high (vs. low) self-relevant threats, people are more motivated to search for a way to better protect themselves, and creative responses are selected because of their effectiveness in managing imminent threats.

### **Conclusion**

In this dissertation, I set out to better understand the threat-creativity relation. Although it is commonly assumed that creativity is undermined in the face of threat, the empirical studies presented in this dissertation show that threats do not have a generalized impact on creativity. Rather, they selectively enhance creativity that is relevant and functional in managing the specific threat at hand. Reduced creativity may only occur in domains that are deemed irrelevant in dealing with the threats people are facing.

This dissertation also attests to the crucial role of motivation for the domain-specific threat-relevant creativity effect to occur: threats promote threat-relevant creativity through a motivated focus on coping with the problematic situation at hand. Such



threat-induced motivated focus reveals itself in more original responses and greater preference for creative tactics when threats are more personally relevant, and for people that are especially sensitive and vulnerable to threats. In addition, this motivated focus account of threat-relevant creativity applies not only to creative idea generation but also to inclusive information processing and idea selection. The current work thus implies that creativity is about being motivated to achieve desired goals, and it is such motivated focus that underlies the creative spark in the dark.