Creativity under the gun

How threat features and personal characteristics motivate creative responding

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Publication date
2017
Document Version
Other version
License
Other

CHAPTER 1

Introduction and Overview

In a world characterized by crises and competition, people are sometimes confronted with threats to one's property, relationships, and well-being. In extreme cases, these threats can manifest themselves as violent conflicts, life-threatening diseases, natural disasters, financial hardship, or terrorist attacks. To successfully avoid or neutralize threats, people sometimes employ quite creative strategies. In fact, history is rife with telling examples of people deploying quite creative strategies in response to threats. For instance, in warfare, defenders came up with the Empty Fort Strategy, an ingenious deceptive strategy to convince opponents to retreat while in fact the opponents were superior in numbers and the defender's position was uncertain and disadvantageous. Another example is the famous "Miracle on the Hudson." Captain Sullenberger quickly decided and successfully executed an unprecedented water landing on Hudson River when the aircraft unexpectedly lost all power above one of the most densely populated cities on earth. The lives of all 155 people on board were saved and New York was undamaged. Creative strategies and solutions involve useful yet less predictable ways of dealing with the threat at hand (Amabile, 1983; Runco, 2004). They are therefore often needed and valued to successfully diminish or avert the impending negative consequences imposed by threats.

The goal of the present dissertation is to examine how threats influence creativity. Notwithstanding the value of creative solutions in response to threats, the effect of threats on creativity is poorly understood. Past work has shown threats and concomitant fear and anxiety can both increase and decrease creativity, without providing convincing reasons (Byron & Khazanchi, 2011; Mehta & Zhu, 2009; De Dreu & Nijstad, 2008). In this dissertation, it is proposed that creativity is about being motivated to realize goals that matter. People are motivated to avoid danger and create safety in response to threats, and these security-related goals may lead to enhanced creativity, but only in domains that are relevant to achieve the desired outcomes (ways to deal with the threat at hand), and not in domains that are irrelevant to the threat at hand (the motivated focus account, De Dreu & Nijstad, 2008). In addition, to better understand the effects of threat on creativity, the full cycle of creative problem solving will be addressed: from the inclusive processing of information, through the generation of defensive tactics, to the evaluation and selection of threat responses for implementation. Accordingly, I will present four empirical chapters in which the motivated focus account of threat-relevant creativity is tested with regards to the inclusive processing of information, idea generation, and idea selection using both intrapersonal (e.g., health threats) and interpersonal threats (e.g., violent assaults).

In the remainder of this introduction, I will first give a brief overview of the full cycle of creative problem solving. Second, I will discuss the human threat management systems to explain how affective, cognitive, and behavioral processes work together to help people cope with intrapersonal and interpersonal threats. Then, I present and develop the motivated focus account of creativity, predicting when and how threat-exposure, particular threats features, and certain personality traits influence creativity. I end this introduction with a brief overview of the subsequent chapters in this dissertation.

Creativity

Creativity is commonly defined as the development of ideas, products, or problem solutions that are both novel and potentially useful (Amabile, 1983; Runco & Jaeger, 2012; Sternberg & Lubart, 1999; Runco, 2004). This definition indicates two criteria that determine whether a given product or behavior can be considered creative. First, something should be new, original, and uncommon; habitual and mundane threat-responses therefore are not creative. However, being uncommon is not enough for something to be classified as creative. In addition, the idea, response, or product must also be appropriate and relevant to the given circumstances. For instance, when someone starts singing a beautiful aria to confuse an attacker in a dark alley, this quite original response maybe futile if this person ends up being robbed nevertheless.

Before responding with a useful yet uncommon solution to successfully diminish or avert the negative consequences of the threat, people first process relevant information, generate candidate solutions, and evaluate and choose a solution to implement. These processes are captured in stage-based models of the creative process (Mumford & Gustafson, 1988; Reiter-Palmon & Illies, 2004). Each of these processes are influenced by situational factors (e.g., threat features) and personality characteristics (Kaufman, 2009; Nijstad, De Dreu, Rietzschel, & Baas, 2010).

Creative process

The creative process refers to the cognitive operations and actions that are involved in creative problem solving (Lubart, 2001). During the past century, creativity psychologists have proposed diverse models of the cognitive process underlying creative problem solving (Basadur, 1995; Guilford, 1950; Runco, 1994; Wallas, 1926), and they have identified a set of core processes that are central to creative problem solving (Mumford, Mobley, Uhlman, Reiter-Palmon, & Doares, 1991; Reiter-Palmon & Illies, 2004; Runco &

Chand, 1995). Although these models may differ in the specific stages that are included, they all converge on three main stages in creative problem solving. In the first step, information is processed to identify the problem at hand and to facilitate creative problem solving; in the second step, alternative solutions are generated; these initial solutions were then evaluated in the third step, and the optimal solution is identified for further implementation. Those processes are interacted and combined in a cyclical approach that leads to the creative outcome. In this dissertation, I focused on the information processing, idea generation, and idea selection phases of the creative processes. These processes are discussed in more detail in the following section, as well as in the empirical chapters.

Information searching and processing. Domain-relevant knowledge is the basis of later creative problem solving efforts (Amabile, 1983; Runco & Chand, 1995). Knowledge is stored in long-term memory and activated by cues in the environment (Nijstad & Stroebe, 2006). When facing a problem, information that is deemed relevant to the problem will be retrieved and used to understand the problem and later for creative production. People who invest more effort in searching for relevant rather than irrelevant information generate more creative ideas (Mumford, Baughman, Supinski, & Maher, 1996). Note, however, that simply retrieving previously stored information is not enough for creative production (Finke, Ward, & Smith, 1992); rather, it is the way in which individuals use the extant knowledge that leads to creativity. Information, once retrieved, must be connected, organized, and encoded in a way that facilitates creative idea generation (Bink & Marsh, 2000; Weisberg, 1993). Information is represented in semantic categories, and creative ideas result from combining elements of diverse categories that are remotely related, or from extending a category by including additional (atypical) features (Baughman & Mumford, 1995). The combination and elaboration of categories requires people to see potential relatedness among information elements, to process information in a more integrated way, and even to create some original linkages. The more non-typical yet plausible ways individuals can uniquely discover to relate disparate materials, the more likely they are to generate creative ideas (Chi, 1997; Isen, Daubman, & Nowicki, 1987), the subsequent stage in creative problem solving.

Idea generation. Idea generation involves the process in which people think of multiple alternative ideas or solutions and has been a key topic in the creativity literature (Guilford, 1967; Osborn, 1953). Most research has relied on divergent thinking tests and ideation tasks to assess idea generation. In those tasks, participants are asked to provide a variety of

solutions to open-ended questions. For instance, the Unusual Use Task in which participants list as many uses for a common object (such as a brick) as possible (Torrance, 1974). Performance on these tasks is typically scored in three indexes – ideation fluency, flexibility, and originality (Guilford, 1967; Torrance, 1966). Fluency refers to the number of non-redundant ideas given and reflects the ability to produce a great number of ideas. Flexibility refers to how many different types of ideas people generate (the variety of ideas) and reflects the ability to use alternative modes of processing and to break set (Runco, 1999). Originality is the most widely acknowledged characteristic of creative ideas (Guilford, 1967). It refers to the uniqueness or uncommonness of ideas, and it is usually operationalized as ideas with infrequent occurrence.

Idea evaluation and selection. The evaluative and selection process of creative problem solving is often overlooked (Rietzschel, Nijstad, & Stroebe, 2010; Runco, 1991). However, for successful creative problem solving this stage is of no less importance than the generative process. Real-life creativity requires people to not only generate many ideas but also select the most promising idea for further elaboration and actual implementation (Nijstad & De Dreu, 2002; Rietzschel, Nijstad, & Stroebe, 2006). In the idea evaluation and selection stage, people appraise the previously generated ideas according to various criteria, such as workability, originality, and relevance, and identify a limited number of ideas that are deemed the most suitable to solve the problem at hand (Cropley, 2006; Runco, 2008). From the scarce work on idea selection, we know that people are poor in selecting ideas that are both useful and original, with selection performance rarely exceeding the level of chance (Faure, 2004; Rietzschel et al., 2006). People tend to select feasible ideas at the cost of originality (Putman & Paulus, 2009; Rietzschel et al., 2010).

The full cycle of creative problem solving. In the empirical chapters, I focus on the ways threats influence inclusive information processing (Chapter 2), idea generation (Chapter 3 and 4), and idea selection (Chapter 5). Previous work has firmly established that situational factors influence creativity (Nijstad et al., 2010). In addition, these situational factors often interact with personality characteristics to influence coping behaviors and creativity (Oldham & Cummings, 1996; Parkes, 1986). Therefore, I study effects of characteristics of the threatening situation, including the personal relevance of the threat (Chapter 2 to 5), the nature of the threat (Chapter 3), and the time available to come up with a response (Chapter 4 and 5). In addition, I study the interaction of these factors with personality characteristics (Chapter 3 and 4) to understand people's creative performance in the

different stages of creative problem solving in response to threats. In the next paragraph, I will introduce human threat management systems, key threat features, and relevant personality characteristics, and then develop predictions about whether, when, and how threats influence creativity.

Human Threat Responses

The principles of evolution dictate that individuals that are best adapted to the demands of their environments are more likely to survive and reproduce (Darwin, 1871). For successful reproduction, a set of functional mechanisms has been developed in response to fitness-relevant threats in complex ecological and social environments. These mechanisms include fast detection of threat-signaling cues, focused gathering of relevant information, and adaptive decision making. As a result, humans evolved cognitive and behavioral systems designed to defend against recurring and novel threats. Threats refer to environmental events that signal a loss of resources (e.g., property, relationship, health) and have impending negative personal consequences (Marks & Nesse, 1994; Staw, Sandelands, & Dutton, 1981). Once triggered by cues signaling a threat, threat management systems facilitate a coordinated suite of affective and cognitive processes geared at facilitating threat-responding (Neuberg, Kenrick, & Schaller, 2011): Anxious feelings are aroused, avoidance motivation is triggered, attentional and cognitive resources are recruited to vigilantly scrutinize the environment, threat-relevant cognitive associations are activated into working memory, and the body is mobilized to escape or neutralize the threat (Bar-Haim, Lamy, Pergamin, Bakermans-Kranenburg, & Van IJzendoorn, 2007; Dixon, 1998; Elliot, 2008; Ioannou, Mogg, & Bradley, 2004; Robinson, Letkiewicz, Overstreet, Ernst, & Grillon, 2011; Woody & Szechtman, 2011).

It is unlikely that any singular system could respond functionally to every possible threat that humans encountered, such as aggressive attacks from animals or conspecifics, infectious pathogens, hunger, or social exclusion. For this reason, human threat management is characterized by a set of functionally distinct domain-specific systems (Neuberg et al., 2011). These systems are sensitive to different cues signaling particular threats, and respond to the perceived threats in distinct forms of affect, cognition, and behavior (Cosmides & Tooby, 1994; Neuberg et al., 2011; Rozin & Kalat, 1971). Neuberg et al. (2011) discussed two of those distinct threat management systems – one geared at disease avoidance and the other at self-protection - that evolved to enable humans to effectively manage health threats and threats from animals and conspecifics. The

disease-avoidance system facilitates effective avoidance of infectious risk: it is attuned to cues signaling possible infection, such as poxes or rash on the skin and running noses in the immediate environment, elicits the emotion disgust that elicits action tendencies to avoid contact with the source of infection, and activates disease-relevant cognitions in working memory (Ackerman et al., 2009; Curtis, Aunger, & Rabie, 2004; Schaller & Park, 2011). The self-protection system facilitates effective escape from, or defense against, the danger posed by animals and conspecifics: it detects cues connoting intentional physical harm (e.g., angry faces in the immediate environment), triggers the emotion fear that typically associates with action tendencies to increase the distance from the perceived source of danger, and activates danger-relevant cognitions in working memory (Ackerman et al., 2006; Cottrell & Neuberg, 2005; Nesse, 2005).

In addition to being domain specific, threat responses are shaped by situational demands and available resources (Gawronski & Cesario, 2013; Parkes, 1986). The specific threat-response chosen depends on the particular features of the threat, such as the intensity, ambiguity, and the direction of the threat, as well as the context of the threat, such as the availability to escape and the distance between the source of the threat and the threatened subject (Blanchard et al., 2001). For example, in the face of physical threats, defenders' responses vary systematically as threat imminence increases: the distant and potentially present threat stimulates risk assessment and the preparation for defensive actions; when the detected threat is not attacking, it triggers freezing-like responses (e.g., standing still, making no sounds). Finally, as the threat comes closer and confrontation is inevitable, people engage in flight responses when there is an escape route; otherwise, people engage in defensive attack (R. J. Blanchard, Flannelly, & Blanchard, 1986; Cesario, Plaks, Hagiwara, Navarrete, & Higgins, 2010; Gawronski & Cesario, 2013; Mobbs, Hagan, Dalgleish, Silston, & Prévost, 2015).

While threat-responding is adaptive, it entails some potential cost as well. Preparation and execution of cognitive and behavioral operations consume calories, and the engagement of certain threat management systems interferes with the engagement of other adaptive mechanisms (e.g., looking for food, finding a mating partner). For this reason, threat management systems evolved to be functionally flexible: they are especially likely to be activated and thus lead to especially strong responses when the circumstances imply great vulnerability to particular threats (Schaller, Park, & Kenrick, 2007). This feeling of vulnerability can be elicited by both dispositional and situational cues and by the

interaction of these two. For example, people who feel more chronically vulnerable to infectious diseases are especially sensitive to the presence of cues signaling the presence of potential pathogens, and show an especially strong cognitive bias against people who are obese, disabled, or elderly (Duncan & Schaller, 2009; Park, Faulkner, & Schaller, 2003; Park, Schaller, & Crandall, 2007). Moreover, strong defensive attack responses are more likely to be elicited when the threat stimulus is directed toward (rather than away from) the observer, and is thus more personally relevant, and this effect is especially pronounced for individuals that have been exposed to violent crimes (Fernandes et al., 2013).

Creativity under Threats

A common assumption in research on the threat-creativity link is that threat states narrow the attentional scope (Derryberry & Reed, 1998; Easterbrook, 1959), consume processing resources that are otherwise needed for complex cognitive functions (Lindstrom & Bohlin, 2012; Shackman et al., 2006), and reduce flexibility of thoughts (Carnevale & Probst, 1998). Therefore, relative to benign states, threats and concomitant affective states such as fear have often been associated with rigid thinking and reduced creativity (Byron & Khazanchi, 2011; Mehta & Zhu, 2009; Probst, Stewart, Gruys, & Tierney, 2007; Staw et al., 1981). However, when coping with threatening situations, individuals actually benefit from creative solutions: they provide novel ways to solve problems (Sternberg & Lubart, 1991) and decrease the predictability of threat responses, thereby increasing the likelihood of escaping or mitigating the threats (Humphries & Driver, 1967). Furthermore, recent work demonstrates that relative to benign and pleasant states, social threat states, such as conflict and distrust, may lead to increased cognitive flexibility and creativity under certain conditions (De Dreu & Nijstad, 2008; Mayer & Mussweiler, 2011). Likewise, people primed with avoidance motivation (e.g., motivation to avoid potential losses) can be as creative as approach-motivated people when their creativity helps them to avoid losses (Roskes, De Dreu, & Nijstad, 2012). In an attempt to understand these seemly incompatible findings, the motivated focus account was proposed (De Dreu & Nijstad, 2008), explaining when threats may enhance or hinder creativity.

Motivated focus account of creativity

In the motivated focus account of creativity, it is proposed that threats may enhance creative thinking when creativity is relevant and functional to deal with the threats (De Dreu & Nijstad, 2008). Because threatened people are motivated to improve the aversive situation, they devote their cognitive resources to attend to, monitor, and manage the

threats at hand (Elliot, 2008; Lang, Davis, & Öhman, 2000; Woody & Szechtman, 2011), leaving less resources for issues of lesser relevance and importance (Chajut & Algom, 2003). When people find an angry elephant on their path, they usually skip the opportunity to scrutinize the behavior of a rare bird nearby. This selective mobilization and focus of cognitive resources increases the accessibility of threat-relevant knowledge from memory (Ferguson & Bargh, 2004) and facilitates threat-information processing (Reinecke, Becker, & Rinck, 2009). Through this focused effort within threat-relevant domains of thoughts, threatened individuals will ultimately come up with creative ideas and problem solutions, but only in domains that are relevant to the threats they are facing, and not in domains that are threat-irrelevant. Importantly, these effects occur especially when people are motivated to deal with and think about the threat (cf. De Dreu & Nijstad, 2008). Initial support for the idea of the motivated focus account of creativity was provided by De Dreu and Nijstad (2008). In their study on conflict vs. cooperation mental sets, they reported that when anticipating a conflictive rather than cooperative negotiation, people showed more inclusive processing of conflict-related rather than other material, and generated more novel competitive rather than cooperative tactics to deal with the conflict.

The Present Dissertation: Functional Specificity

In this dissertation, I integrate the motivated focus account of creativity with theories of human threat responses to examine the ways in which threats influence creativity. A key idea derived from this theoretical integration is 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, situational resources, and dispositional variables. This functional specificity is outlined in the following aspects.

First, as described earlier, threat management systems are functionally distinct. Each system is attuned to specific signaling cues. For example, whereas the self-protection system is particularly sensitive to angry faces, the disease-avoidance system is particularly sensitive to poxed faces (Ackerman et al., 2006, 2009). Once activated by threat cues, each system motivates a suite of adaptive responses that help to monitor, avoid, or resolve the target threat (Neuberg et al., 2011). It activates domain-specific cognitive associations in working memory and triggers the narrow allocation of cognitive resources to process information that is most relevant to the specific threat, and away from other information that is deemed irrelevant (Chajut & Algom, 2003), including other types of threats.

Therefore, I propose that threat-induced creativity is domain-specific and focused, in other words, creative thinking will only occur in the domains that are specifically tied to the threat that is salient. This domain-specificity hypothesis is examined in Chapter 2. Focusing on the inclusive information processing stage of creative problem solving, this chapter provides the evidence that threats motivate inclusive processing of threat-specific material, and this effect is associated with motivation to deal with the target threat.

Because threat responses are adaptive yet metabolically costly, threat management systems evolved to be functionally flexible. Threat-managing cognitions and behaviors are especially likely to be engaged when the immediate environment suggests they are needed – when the benefits offered by the avoidance system outweigh its cost (Schaller et al., 2007). Following this principle, I propose that when dealing with threats, to be optimally adaptive, finite cognitive resources will only be invested in certain types of defensive tactics that are more adaptive in the given circumstance, and not in the types of tactics that are less adaptive, leading to more creative tactics that are adaptive and usually favored in the given circumstances. As discussed before, threat responses are determined by situational and contextual factors (Blanchard et al., 2001; Gawronski & Cesario, 2013). For instance, fight is the most adaptive and likely response when the situation is highly threatening and inescapable (Blanchard et al, 2001; Mobbs et al., 2015); language based defense tactics, such as negotiation only make sense when the attack origin is human (Perkins & Corr, 2006). Accordingly, I predicted that threats may differentially influence the generation of creative defensive tactics as a function of the features of the circumstance. Chapter 3 tested this principle and showed that threats selectively promote certain types of tactics that are the most adaptive and usually adopted given the nature of the threat.

Furthermore, creative threat-responding is influenced not only by the situational features but also by the resources available to the individuals (Gawronski & Cesario, 2013; Parkes, 1986). On the one hand, threat management systems are more likely to be engaged under circumstances in which individuals perceive themselves to be especially vulnerable to the danger, for example, when the threat is more self-relevant. On the other hand, creative threat-responding requires sufficient situational and cognitive resources that allow avoidance-motivated people to engage in effortful thinking. From this perspective, it follows that creative threat responding is more likely to occur and to be favored when the people are more motivated to manage the threat and more resources are available for creative processing. This idea was tested in Chapter 4 by addressing how threats influence

creative responding when a single, urgent response is required, and in Chapter 5 in which I focused on the idea selection phase of creative problem solving.

Lastly, in addition to situational and contextual features, threat management systems are also responsive to dispositional cues that indicate greater vulnerability to threats, and are more likely to be engaged among people who are more sensitive and susceptible to threats (Neuberg et al., 2011). As a result, people with high sensitivity to threats are highly vigilant to the danger in the environment, are especially likely to perceive stronger threats and arousal, and thus are strongly motivated to manage the threats (Carver & White, 1994; Elliot & Thrash, 2010; Heimpel, Elliot, & Wood, 2006). Given that the strength of avoidance motivation is crucial in driving the effect of threats on creativity, it is expected to see greater threat-relevant creativity among people who are high in threat sensitivity. The effect of dispositional variables that representing threat sensitivity on threat-relevant creativity was examined in Chapter 2, 3, and 4.

Overview of the Chapters

Chapter 2: The effect of threat on cognitive inclusiveness: Generic narrowing or domain-specific broadening?

Chapter 2 aims to examine the role of threat in information processing. It is usually assumed that threat exposure leads to black-and-white thinking and rigid information processing. However, other research has shown that threats have no impact or even positive impact on information processing. To integrate the inconsistent findings in previous work, I propose a motivated focus account of threats' impact on information processing: threats motivate the recruitment and allocation of resources onto the threat-related material and away from the irrelevant material, leading to more inclusive processing of threat-related information, but less inclusive processing of threat-irrelevant information. This proposition was tested in two studies focusing on health threats. 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). Following threat manipulations, participants performed the category inclusion task, in which participants were asked to rate how representative a given exemplar is for a particular category. I discovered relatively higher levels of cognitive inclusiveness in functional health-related (vs. irrelevant) domains only when health threats were highly self-relevant (Study 2.1) or when self-relevant health (vs.

conflict) threats were induced (Study 2.2). These results suggest that rather than a generic narrowing in information processing, threats can motivate inclusive processing of threat-specific material.

Chapter 3: Creative defense ideation under threat: The role of threat features and threat sensitivity

Chapter 3 systematically tests the effects of threat exposure, threat features, and individual threat sensitivity on the generation of creative defensive tactics. In accordance with the motivated focus account of creativity, I propose that threats may lead to increased creativity within threat-relevant rather than threat-irrelevant domains. However, creative threat responding may be more specific and contextual than was previously assumed. To better understand whether, when, and for whom threat influences threat-relevant creativity, I integrated the motivated focus account of creativity with insights from literature on ecological threat management, predicting that threats may differentially influence the generation of creative defensive tactics as a function of exposure to threat or not (Study 3.1-3.3), the direction (Study 3.1 & 3.2) and nature (Study 3.2) of the threat, and individual differences in threat sensitivity (Study 3.3). Predictions were tested in 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). Original threat-responding was coded in seven broad categories that represent distinct ways to regulate threats: flight, fight, freeze, risk assessment, cooperative approach, non-functional avoidance, and unspecified tactics that could not be coded into the formal six. I found that threat exposure led to more original fight tactics but less original risk assessment tactics (Study 3.1-3.3). Moreover, threat direction did not differentially influence originality of defensive tactics (Study 3.1 & 3.2), but the nature of threat did, as human threats promoted original cooperative approach tactics while animal threats promoted original freeze and risk assessment tactics (Study 3.2). Finally, threat exposure motivated original fight and flight tactics especially for people who are especially sensitive to threats (Study 3.3). These findings thus suggest that through motivated focus threatened people come up with specific original defense tactics that are appropriate and adaptive in the particular circumstances.

Chapter 4: Threat direction and time pressure affect creative threat-responding

Chapter 4 further seeks to uncover under what circumstances and for whom threats associate with creative responding when threat-responding is urgent. While a series of studies in Chapter 3 and earlier work offered valuable evidence that threats can promote creative threat-relevant thinking through heightened motivation to cope with the threats, they typically employed research designs lacking the urgency that often characterizes threatening circumstances. This leaves open the question whether people are still creative when facing an imminent threat that requires immediate responding? In Chapter 4, I examined threat-relevant creativity in a more realistic design and tested the role of threat direction, time pressure, and individual sensitivity to threat in creative threat-responding. Participants saw a series of threatening situations that were either self-directed or not and then generated a single response to the presented threat. They had to generate and record their response quickly (high time pressure) or with sufficient time (low time pressure). I found that self-directed compared to other-directed threats motivated more original defensive responses, and especially in people scoring high on threat sensitivity. Furthermore, time pressure decreased creativity of defensive responses; the most creative threat-tactics were seen in response to self-directed threats under low time pressure, indicating that when threats require creative solutions, individuals should perform better by buying time to expand their time horizon.

Chapter 5: Imminent threat and the selection of creative responses: The mediating role of perceived effectiveness

Whereas Chapter 3 and 4 focus on how threats influence the generation of threat 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. In two studies, I explored the effect of imminent threats on the selection of threat responses. Participants facing self-directed or other-directed threats were asked to select one out of two alternative responses that differed on either originality or usefulness to deal with the displayed situation. 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). I identified a strong tendency of people to select useful responses rather than original responses under threats across two studies. Moreover, time pressure did not exert a significant impact on response selection in the present study (Study 5.1 & 5.2). However, threat direction impacted the selection of

threat responses in that self-directed threats, compared to other-directed threats, led to a higher preference for creative responses (Study 5.1 & 5.2), and this effect was driven by the perceived effectiveness of high original responses (Study 5.2).

Chapter 6: General discussion

Finally, in Chapter 6, the findings from the previous chapters will be integrated. I will discuss how these findings may improve our understanding of the ways threats, motivated focus, and certain situational and dispositional factors, alone or in combination, influence different stages of creative problem solving. Moreover, I will address limitations of the current work and provide directions for future research.[1]

[1] Chapter 2-5 were written as independent research articles and there is overlap in theoretical introductions. Yujie Cheng, Matthijs Baas, and Carsten K. W. de Dreu conceived of the studies in Chapter 2-5 and wrote the research articles; Yujie Cheng collected and analyzed the data.