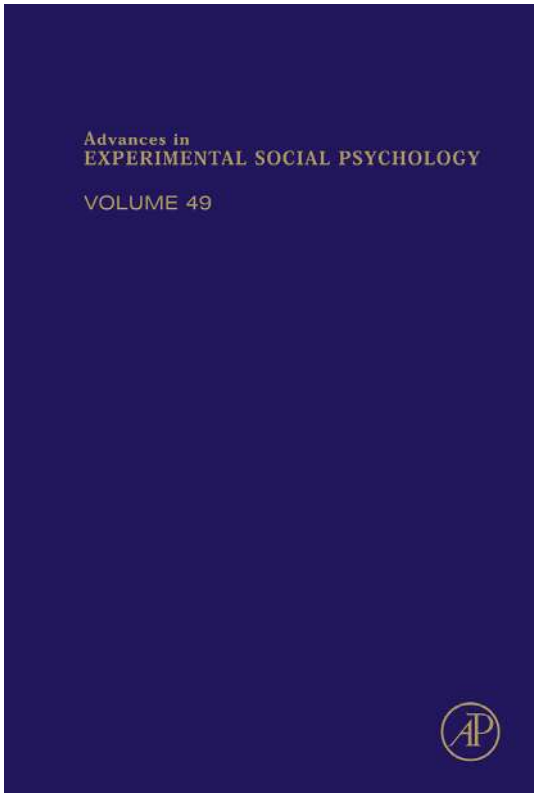

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CHAPTER FOUR

Threat and Defense: From Anxiety to Approach

Eva Jonas[1,*], Ian McGregor[†,1], Johannes Klackl[*], Dmitrij Agroskin[*], Immo Fritsche[‡], Colin Holbrook[§], Kyle Nash[¶], Travis Proulx[||], Markus Quirin[#]

[*]Department of Psychology, University of Salzburg, Salzburg, Austria
[†]Department of Psychology, York University, Toronto, Ontario, Canada
[‡]Institute of Psychology, University of Leipzig, Leipzig, Germany
[§]Department of Anthropology, University of California, Los Angeles, California, USA
[¶]Social and Affective Neuroscience, University of Basel, Basel, Switzerland
[||]Department of Social Psychology, Tilburg University, Tilburg, The Netherlands
[#]Institute of Psychology, University of Osnabrueck, Osnabrueck, Germany

Contents

[1] Shared first authorship. Eva Jonas, Department of Psychology, University of Salzburg, Salzburg, Austria; Ian McGregor, Department of Psychology, York University, Toronto, Ontario, Canada; Johannes Klackl, Department of Psychology, University of Salzburg, Salzburg, Austria; Dmitrij Agroskin, Department of Psychology, University of Salzburg, Salzburg, Austria; Immo Fritsche, Institute of Psychology, University of Leipzig, Leipzig, Germany; Colin Holbrook, Department of Anthropology, University of California, Los Angeles; Kyle Nash, Social and Affective Neuroscience, University of Basel, Basel, Switzerland; Travis Proulx, Department of Social Psychology, Tilburg University, Tilburg, The Netherlands; Markus Quirin, Institute of Psychology, University of Osnabrueck, Osnabrueck, Germany. This paper was inspired by an Expert Meeting on "The motivational foundations of in-group support and worldview defense" (June 12–15, 2012, in Salzburg, Austria), which was financially supported by the European Social Cognition Network (ESCON). Dmitrij Agroskin has been financed by the Doctoral College "Imaging the Mind" of the Austrian Science Fund (FWF-W1233) and Johannes Klackl by the Austrian Science Fund (FWF-I654). Ian McGregor and Kyle Nash were supported by grants from the Social Sciences and Humanities Research Council of Canada.

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Abstract

The social psychological literature on threat and defense is fragmented. Groups of researchers have focused on distinct threats, such as mortality, uncertainty, uncontrollability, or meaninglessness, and have developed separate theoretical frameworks for explaining the observed reactions. In the current chapter, we attempt to integrate old and new research, proposing both a taxonomy of variation and a common motivational process underlying people's reactions to threats. Following various kinds of threats, people often turn to abstract conceptions of reality—they invest more extremely in belief systems and worldviews, social identities, goals, and ideals. We suggest that there are common motivational processes that underlie the similar reactions to all of these diverse kinds of threats. We propose that (1) all of the threats present people with discrepancies that immediately activate basic neural processes related to anxiety. (2) Some categories of defenses are more proximal and symptom-focused, and result directly from anxious arousal and heightened attentional vigilance associated with anxious states. (3) Other kinds of defenses operate more distally and mute anxiety by activating approach-oriented states. (4) Depending on the salient dispositional and situational affordances, these distal, approach-oriented reactions vary in the extent to which they (a) resolve the original discrepancy or are merely palliative; (b) are concrete or abstract; (c) are personal or social. We present results from social neuroscience and standard social psychological experiments that converge on a general process model of threat and defense.

Various "threats," such as personal uncertainty, mortality salience, loss of control, perceptual surprises, and goal conflicts, cause people to heighten commitment to their goals, ideals, social relations, identifications, ideologies, and worldviews. Why do such seemingly unrelated threats lead to this similar set of diverse reactions? We and others have investigated phenomena such as the ones listed above for many years under different theories of threat and defense. In this chapter, we describe how our various research programs converge to provide an integrative general model of threat and defense processes. Although different approaches have offered different conceptual frameworks to understand threat and defense, a shared process model seems possible if we look at these phenomena from both social psychological and neural perspectives. Defensive reactions to threat follow a specific time course and can be mapped onto neural, experiential, and behavioral correlates.

We propose that all threats involve the experience of a discrepancy. This discrepancy subsequently activates neural processes related to anxiety, driving a variety of proximal defenses related to attentional vigilance and avoidance motivation. Subsequent distal defenses then serve to activate neural processes related to approach motivation that downregulate the neural processes related to anxiety. We argue that depending on individual traits and salient associations and norms, people use an array of defensive strategies to activate these sanguine, approach-oriented states. In this chapter, we temporarily set aside the long-standing debate about the way different threats might affect different psychological needs (symbolic immortality, control, self-worth, certainty, self-integrity, meaning, etc.) and how different kinds of defenses might restore them. Instead, we build on the simple hypothesis that discrepancies arouse anxiety and thereby motivate diverse phenomena that activate approach-related states that relieve the anxiety.

1. THEORIES EXPLAINING PEOPLE'S DEFENSIVE REACTIONS TO THREAT

Social psychological research on threat and defense first proliferated with cognitive dissonance theory (CDT; Festinger, 1957), which focused on the aversive arousal arising from discrepant experiences that conflict with relevant cognitions (e.g., smoking despite knowledge of its dangers; engaging in counter-attitudinal behavior). Conflicting thoughts and actions are still considered the basis of dissonance arousal (Gawronski, 2012; Harmon-Jones & Mills, 1999). In the current threat and defense literature, cognitive dissonance themes persist across the various theoretical perspectives and form a central element in our integrative model. Specifically, we hold that any experience that is discrepant with prevailing cognitions or motivations arouses anxious vigilance and motivates efforts to reduce this arousal by means of reactive thoughts and behaviors. In the first part of this chapter, before explicating our general process model, we will provide perspective by reviewing some prominent theories that have tried to account for diverse defensive reactions to threats.

1.1. Theories focusing on need for certainty, self-esteem, and social identity

A variety of social psychological theories evolved from CDT to focus on uncertainty-related threats. Like CDT, these certainty theories emphasize the need to supplant aversive, "nonfitting cognitions" with consonant ones,

and focus on need for cognitive clarity and consistency. Lay epistemic theory (Kruglanski & Webster, 1996), self-verification theory (Swann & Read, 1981), and theories of uncertainty management (Van den Bos, Poortvliet, Maas, Miedema, & Van den Ham, 2005), compensatory conviction (McGregor, Zanna, Holmes, & Spencer, 2001), and uncertainty reduction (Hogg, 2007) emphasize that this need for self-relevant clarity and cognitive closure is bolstered by consensual social validation and identification. When faced with uncertainty about themselves or their environment, people defensively restore certainty, often in unrelated domains with the confidence-inducing help of social consensus and group identification (Hogg, 2007; Kruglanski, Pierro, Mannetti, & De Grada, 2006). For example, personal uncertainty threats increase in-group identification, in-group bias, defense of cultural worldviews, and exaggerated consensus estimates (Hogg, Sherman, Dierselhuis, Maitner, & Moffitt, 2007; McGregor, Nail, Marigold, & Kang, 2005; McGregor et al., 2001; Van den Bos, 2009).

At around the same time as consistency theories were proliferating, another family of theories, rooted in neo-analytic ideas of ego-defense (Freud, 1967; Horney, 1945), gained popularity. These theories focus on self-worth and ego-needs. They emphasize self-esteem as the fundamental resource that people protect with compensatory defenses and include theories of egocentricity (Beauregard & Dunning, 1998; Dunning & Hayes, 1996; Tesser, 2000), self-evaluation maintenance (Sedikides, 1993; Tesser, 1988), and the totalitarian ego (Greenwald, 1980). Consensual social validation and identification was also often viewed as playing an important role in the maintenance of self-esteem through others, for example, basking in reflected glory (Cialdini et al., 1976), or being part of a winning team (Sherman & Kim, 2005).

The close linkage (Baumgardner, 1990; Campbell, 1990) and substitutability of self-clarity and self-esteem was taken by self-affirmation theory (Steele, 1988) as evidence for a more general motive for self-integrity—a sense of the "moral and adaptive adequacy of the self." If an experience undermines self-viability for whatever reason, then defensive compensatory efforts will be recruited in any available domain of clarity or worth, even relating to group memberships (Fein & Spencer, 1997), to restore a positive self-image.

This emphasis on cognitive clarity, positive self-evaluation, and superior in-group identification as a support for both is shared by prominent theories of defensive motivation that focus on consensual groups. According to social

identity theory (Tajfel & Turner, 1979), self-categorization theory (Turner, Hogg, Oakes, Reicher, & Wetherell, 1987), and self-affirmation theory (Sherman, Kinias, Major, Kim, & Prenovost, 2007), threat to personal or collective self-esteem or certainty elicits defensive responses on both the personal and the collective level of identity.

1.2. Terror management theory (TMT)

TMT similarly proposes that cues of death cause both personal and social defenses (Greenberg, Solomon, & Pyszczynski, 1997). When reminded of their own mortality (e.g., by answering questions about death, walking close to a funeral home or cemetery, or experiencing subliminal death primes), people react on a personal level, enhancing their self-clarity (Landau, Greenberg, Sullivan, Routledge, & Arndt, 2009) and self-esteem (Pyszczynski, Greenberg, Solomon, Arndt, & Schimel, 2004; Schmeichel et al., 2009), as well as on a social level (i.e., defending cultural worldviews and in-groups, Burke, Martens, & Faucher, 2010). TMT posits that the juxtaposition of the awareness that death is inevitable with the desire for survival is the most fundamental threat to the human self. Investment in groups and shared worldviews buffers the anxiety associated with the inevitability of death. Any threat to the group, or to the self's value within the group, therefore causes anxiety by weakening this buffer.

Research on TMT can be organized into three main hypotheses: First, the *mortality salience hypothesis* posits that death reminders increase the importance of the cultural anxiety buffer (i.e., cultural worldviews and self-esteem). Support for this hypothesis comes from research showing that personal death reminders cause a wide range of human activities related to investment in cultural worldviews or self-esteem, including aggression against those who hold contrary worldviews, nationalism, prejudice, group identification, perceived social consensus, prosocial behavior, creativity, self-serving attributions, and risk-taking (for a review, see Burke et al., 2010). Second, the *anxiety buffer hypothesis* holds that bolstering self-esteem or affirmation of cultural worldviews reduces defensive reactions to death reminders. Support for this hypothesis comes from evidence that positive personality feedback (Harmon-Jones et al., 1997), personal value affirmation (Schmeichel & Martens, 2005), and the affirmation of intrinsic religiosity (Jonas & Fischer, 2006) prevent worldview defense following death reminders. Third, the *death-thought accessibility hypothesis* posits that threats to the anxiety buffer arising from insults to self-esteem or worldviews increase

the accessibility of death-related thoughts (evidence reviewed in Hayes, Schimel, Arndt, & Faucher, 2010).

The dual-process model of TMT furthermore distinguishes between proximal and distal reactions to death reminders (Pyszczynski, Greenberg, & Solomon, 1999). Proximal defenses immediately suppress death awareness. They are only temporarily successful, however, and death thoughts typically reemerge after some delay, at which point the distal defenses occur (Greenberg, Pyszczynski, Solomon, Simon, & Breus, 1994). Distal defenses involve self-esteem and worldview defenses that, according to TMT theorizing, quell anxiety by providing a sense of symbolic immortality. TMT proposes that due to these proximal and distal defenses, death reminders do not elicit a full-blown anxiety response, but rather only a *potential for anxiety*, so long as proximal or distal defenses are properly functioning.

1.3. Theories focusing on the need for control

The need for control is the basis for another prominent perspective in the threat and defense literature. Personal effectance (White, 1959) and control are assumed to be highly rewarding, whereas lack of control is viewed as aversive, motivating efforts to restore a generalized feeling of control (Rothbaum, Weisz, & Snyder, 1982; Kay, Whitson, Gaucher, & Galinsky, 2009; Kay, Gaucher, Napier, Callan, & Laurin, 2008). Research on compensatory control has found that experiencing low control leads people to exaggerate belief either in some other aspect of personal control or in any external agent of control, such as gods or governments, because people want to perceive order and prevent perceptions of randomness in the environment (Kay, Gaucher, McGregor, & Nash, 2010; Kay et al., 2008).

The model of group-based control (GBC; Fritsche et al., 2013; Fritsche, Jonas, & Kessler, 2011) focuses more exclusively on controlling the environment through the *self* (vs. being controlled by some external agent) by defining the self as a group member and acting collectively. Thus, when *personal* control seems blocked, turning to a collective definition of the self may restore a sense of personal control because groups are perceived as homogeneous agents ("entitativity": Brewer, Hong, & Li, 2004). Thinking and acting collectively, in terms of "we" instead of "I," thereby restores a sense of controlling the environment through the (social) self (Tajfel & Turner, 1979; Turner et al., 1987). From this GBC perspective, threats to personal control heighten identification with and commitment to various in-groups, in-group biases, conformity with in-group norms, and more specific

collective action intentions because doing so restores a sense of personal control through the social self (Fritsche, Jonas, Ablasser, et al., 2013; Fritsche, Jonas, & Fankhänel, 2008). GBC research has found that threats to personal control cause adherence to in-groups independently from threats to personal uncertainty or thoughts of death. These defensive reactions are most pronounced in people with strong in-group identification, or when group control is simultaneously threatened (Fritsche, Jonas, Ablasser, et al., 2013), indicating their motivated and group-based (vs. cognitive or merely personal) nature. Processes of GBC may help explain effects of various threats on social defensiveness: Mortality salience, for example, heightens in-group defenses only when death is framed as uncontrollable, but not when partial control over one's own death is made salient (Fritsche, Jonas, Ablasser, et al., 2013; Fritsche et al., 2008, Talati et al., 2013).

1.4. The meaning maintenance model (MMM)

The theories described so far interpret a number of threats (uncertainty, mortality, uncontrollability) as undermining a theoretically specific resource (such as certainty, self-esteem, self-preservation, or control), and diverse defenses as indirectly restoring that resource. The broadest and most inclusive of such theories is the MMM. Building on dissonance theory, the MMM proposes that the general resource that people defend is their *meaning framework*, or networks of expected associations. Meaning frameworks allow people to understand their experiences and act with purpose in their environment. Whenever people experience violations of meaning (i.e., have experiences that are inconsistent with their meaning frameworks), an aversive arousal state arises—*disanxiousuncertlibrium* (Proulx & Inzlicht, 2012, p. 387)—that motivates one or more typical meaning maintenance behaviors. The violation of expectations is construed as aversive, in and of itself, irrespective of implications for other needs, intentions, or goals. Proulx and colleagues have demonstrated, for example, that exposure to mere discrepancies like absurd humor (Proulx, Heine, & Vohs, 2010), subliminally presented nonsense word pairs (Randles, Proulx, & Heine, 2011), reverse-colored playing cards (Proulx & Major, 2013), or the implicit awareness of secretly switched experimenters (i.e., change blindness; Proulx & Heine, 2008) causes similar defensive reactions as threats to self-concept, control, or mortality.

The MMM offers a descriptive taxonomy of meaning maintenance responses to violated expectancies (Proulx & Inzlicht, 2012). The first

two responses are called assimilation and accommodation. They both restore meaning by resolving the inconsistency, either by bringing the violation into an existing meaning framework (assimilation), or altering a meaning framework to account for the violation (accommodation). The remaining three responses—affirmation, abstraction, and assembly—primarily serve a palliative function by reducing the aversive arousal following from the meaning violation, whether the behavior resolves the inconsistency or not. For example, affirmation of in-group ideologies following threats to identity or reminders of mortality can be construed as efforts to resolve the source of the violation, either through restoring a sense of identity or providing a sense of symbolic immortality. However, people engage in the same ideological affirmation following unrelated meaning violations, such as, for example, perceptual anomalies (Proulx & Heine, 2008). In these situations, the affirmation would not directly resolve the threat. Rather, it appears to serve a palliative function in reducing aversive arousal following these or any other meaning violation. According to the MMM, the defensive reactions need not share any content with a violated framework to serve this generally palliative function. Differences among palliative behaviors following from different threats are understood in terms of different *moderating* factors associated with these threats, rather than as distinct threat-defense mechanisms for each defensive response (Proulx & Inzlicht, 2012).

1.5. The unconscious vigilance model (UVM)

"Unconscious vigilance" is a proposed state of heightened sensitivity to affective stimuli that is initiated by discrepancies, including nonaversive opportunity cues, processed below the threshold of conscious awareness (Holbrook, Sousa, & Hahn-Holbrook, 2011). In a world of frequently shifting circumstances, such an alerting capacity mobilizes responsiveness to both hazards and rewards by intensifying the acuity with which emotionally relevant stimuli are perceived and evaluated. Unconscious vigilance research replicated in the United States, Europe, and Tibet indicates that subtle threat and reward cues (angry faces, subliminal threat words like "pain", or reward primes related to opportunities such as employment, money, or dessert) can cause exaggerated liking/disliking judgments of mundane targets (e.g., bursts of static noise[1]) as well as of worldviews

[1] Participants were asked to rate two 6-s sounds, one intended to be pleasant, and one intended to be aversive (counterbalanced). The two sounds were selected through pilot ratings of sounds created by the researchers using audio software. The aversive sound was a burst of pink noise; the pleasant sound consisted of a tone with reverb.

and ideologies (Holbrook, 2013; Holbrook & Sousa, 2013). These findings suggest that an open range of motivationally relevant cues can potentially accentuate reactions to emotional targets, and thereby exacerbate prejudicial reactions (e.g., intergroup bias). Consistent with this premise, stimuli such as background blinking lights (Van den Bos et al., 2008), absurdist literature, or unrealistically flattering pictures of oneself (Proulx, 2013; Proulx et al., 2010) have also been shown to evoke reactions akin to worldview defense.

The UVM account does not characterize accentuated reactions to emotional stimuli as necessarily originating in a system designed to serve a "defensive" or "compensatory" anxiety relief function. Although such palliative effects may indeed follow exaggerated reactions to emotional cues, from the UVM perspective, their most plausible primary function is to enhance behavioral responses to relevant environmental stimuli.

1.6. The reactive approach-motivation (RAM) model

The RAM model similarly proposes no psychological resource that is diminished by threats and restored by defenses. It posits that threats are cues of immanent goal conflict that cause anxious uncertainty. People mount defenses to activate approach-motivated states that automatically downregulate anxiety and conflict (McGregor, Nash, Mann, & Phills, 2010). Threats related to romantic uncertainty, academic uncertainty, mortality salience, dissonance, economic worry, dilemmas, insecurity, implicit goal conflict, or temporal discontinuity can interchangeably cause a range of personal and worldview defenses related to approach-motivated states (reviewed in McGregor, Prentice, & Nash, 2013b; e.g., eager determination in personal goals; exaggeration of personal values, ideals, identifications, and meanings; conviction about value-laden social issues; hostile derogation of out-groups; religious extremism; risk-taking; impulsivity; revenge). Several of the threats that cause these defensive reactions also cause approach motivation as assessed with neural indicators, and with measures of implicit self-association with approach motivation (McGregor, Nash, Mann, et al., 2010; McGregor, Nash, & Inzlicht, 2009; Nash, Inzlicht, & McGregor, 2012). According to the RAM view, the active ingredient in all threats is the perception of potential for personal goal impedance that the threat cues impose. Accordingly, defensive reactions to failure, rejection, and mortality threats are amplified when the threats are preceded by relevant personal goal primes (McGregor, Prentice, & Nash, 2013a; Nash, McGregor, & Prentice, 2011).

The RAM model proposes no psychological needs beyond the need to cope with anxiety. Approach motivation powerfully relieves anxiety, thus anything that can reliably catalyze approach motivation in anxious circumstances will become habitual. People can activate palliative approach-motivated states by pursuing concrete incentives (e.g., chocolate, or gambling for money). However, pursuing abstract incentives such as ideals and ideologies may be more reliably palliative because they can be effortlessly engaged in the privacy of one's own mind, free from exertion, conflict, risk of failure, or aversive consequences. Imagined ideals, values, and meaningful convictions activate approach-motivated states (Harmon-Jones, 2004; Urry et al., 2004) and their ease of mobilization may account for the relief from anxiety with which they are associated (Creswell et al., 2005; Inzlicht, McGregor, Hirsh, & Nash, 2009; McGregor, 2006b; Nash et al., 2011).

1.7. Synopsis

The reviewed theories vary in the extent to which particular psychological resources are viewed as being undermined by threats and restored or compensated for by defensive responses. Self-consistency, self-worth, terror management, and control restoration theories view threats as undermining some core psychological need that certain types of defenses are able to restore. The MMM, arguing that violating any meaning framework constitutes a threat, and that affirming any meaning framework constitutes a defense, is the most encompassing of the compensation theories. The UVM attributes vigilance and evaluative extremity following threats to a psychological alarm system that promotes orientation and response to external stimuli, and is not concerned with anxiety palliation as a goal in itself. The RAM view proposes that threats are anxiogenic signals of possible goal conflict or impedance, and that defenses need not serve any specific need other than anxiety relief.

The conceptions of threat in the reviewed theories also differ in the extent to which they emphasize perceptual, epistemic, or motivational discrepancies. For example, the MMM (Heine, Proulx, & Vohs, 2006) follows from classic dissonance theory (Festinger, 1957) and current cognitive consistency perspectives (Gawronski, 2012) in conceiving of threatening discrepancies as primarily propositional, simply violating the expectations we hold for ourselves and our environments. Although these expectations are a precondition for goal-directed behavior, the violation of these

expectations is construed as aversive in and of itself, irrespective of any implications for other needs, intentions, or goals. The UVM model similarly maintains that any self-relevant alarm cue might sensitize individuals to any subsequent evaluation. Conversely, other perspectives, such as the RAM model, TMT, and the GBC model, construe these discrepancies as aversive insofar as they imply that one's cherished needs, intentions, and goals will not be satisfied (e.g., Paterson & Neufeld, 1987). In the current chapter, we remain agnostic as to whether discrepancies must reflect a particular need or goal conflict to trigger our proposed threat-defense process, or whether any propositional expectancy mismatch is sufficient to arouse palliative approach behaviors.

Despite differing perspectives on the nature of threat and the function of defense, all theories agree that threats result from some experience of discrepancy between an expectation or desire and the current circumstances. The concept of discrepancy is therefore the basis for our integrative efforts. In the following sections, we will focus on this and other commonalities, and propose a general model of threat and defense that incorporates insights derived from all of these theoretical orientations: Threats essentially involve discrepancies that activate alarm cues that can culminate in anxious arousal to which people immediately respond with a variety of proximal reactions related to attentional vigilance and avoidance motivation. Then, often after some delay, distal defenses emerge that involve heightened commitment to actions, thoughts, goals, or groups. Many of these distal reactions seem to activate approach-oriented states that serve to mute anxiety and restore subsequent equanimity. It is our impression that in the past, more effort has been devoted to debating differences between various threat and defense approaches than to exploring commonalities (e.g., Kirkpatrick & Navarrete, 2006; Pyszczynski, Greenberg, Solomon, & Maxfield, 2006). Here, our goal is to focus on commonalities with regard to structural and temporal aspects.

2. A GENERAL PROCESS MODEL OF THREAT AND DEFENSE

We suggest that the process from threat to defense in all the theories we have presented follows the process model illustrated in Figure 4.1: Threat highlights a discrepancy that can be perceptual, epistemic, or motivational in nature, and leads to heightened attention and anxiety. According to a biopsychological perspective, anxiety is produced by the Behavioral Inhibition

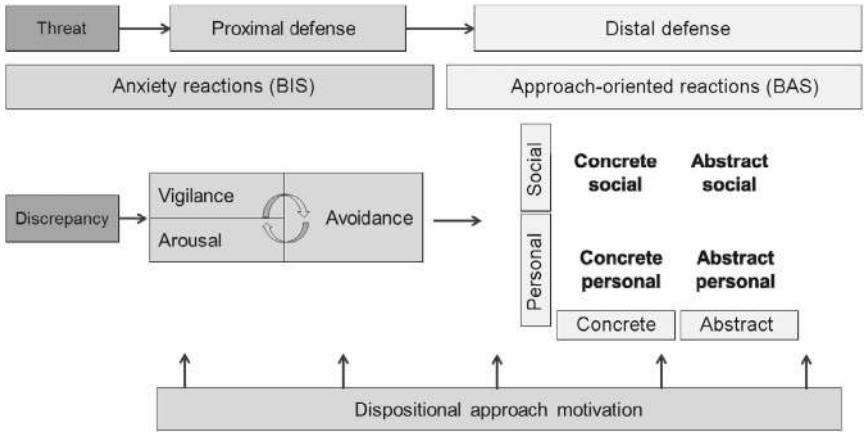

Figure 4.1 A schematic illustration of the anxiety-to-approach model of threat and defense. Threat first leads to proximal, threat-related processing mediated by the Behavioral Inhibition System (BIS). Subsequently, dispositional levels of approach motivation moderate how quickly people flip to approach-oriented reactions, mediated by the Behavioral Approach System (BAS). These reactions can be concrete or abstract and personal or social in nature. They also vary along a continuum from direct threat resolution to mere palliation.

System (BIS; Gray & McNaughton, 2000; McNaughton & Corr, 2004), which responds to the discrepancies with a suite of symptoms, including hypervigilance, anxious arousal, avoidance motivation, and inhibition of all ongoing behaviors (Corr, DeYoung, & McNaughton, 2013). This can be adaptive because it orients the organism to either resolve the discrepancy at hand or disengage from current commitments and switch to other goals or contexts that are less fraught with discrepancy. We propose that this state of BIS activation underlies what have been referred to as various proximal defenses, involving avoidance of potentially threatening stimuli (objects and situations; Corr, 2011; Pyszczynski et al., 1999). The basic processes associated with proximal defenses involve a combination of increased vigilance for new information plus efforts to suppress or distract and distance oneself from identified anxious thoughts and circumstances.

A second antidote to BIS activation is approach motivation through eager and unequivocal engagement with an incentive or commitment. This kind of response to BIS activation is produced by the Behavioral Approach System (BAS), and involves moving toward some alternative focus that is less fraught with discrepancy than the threatened goal or domain (Corr et al., 2013). These responses can be referred to as distal defenses (as elaborated below). Once they have restored unconflicted engagement,

unmitigated approach motivation resumes and BIS activation automatically decreases, as approach-motivated states mute anxiety and conflict (Harmon-Jones, Amodio, & Harmon-Jones, 2009; Jackson et al., 2003; Nash et al., 2012).

These approach-motivated states can be restored by striving for an effective solution to the problem at hand if the discrepancy appears manageable. If direct solutions are obvious, people will approach them immediately, thereby supplanting or shortening the anxious and vigilant BIS stage. If solutions are not available (e.g., in the case of "looming" threats such as death), or if people are unaware of the source of the threat (and, hence, are unable to resolve it), they may turn to distal reactions that indirectly resolve the threat or that are merely palliative. We suggest that these distal reactions range across concrete-to-abstract and personal-to-social spectrums. Concrete defenses focus on immediate experiences and incentives in the physical environment, whereas abstract defenses refer to conceptual or idealistic commitments. Concrete and abstract defenses may be either personal (i.e., idiosyncratic commitments) or social (i.e., depending on others). All of these defenses mute BIS activation and anxiety to the extent that they restore approach motivation.

Summing up, we conclude that all of the theoretical threat and defense perspectives begin with the detection of motivationally relevant discrepancies. These discrepancies activate the BIS, leading to heightened vigilance, increased anxious arousal, and avoidance. This state accounts for some kinds of reactions that have been referred to as proximal defenses in the threat and defense literature. Over time, however, most people eventually manage to mute the BIS by engaging in approach-oriented distal reactions that restore unmitigated approach motivation (see Figure 4.1).

3. COMPONENTS OF THE PROCESS MODEL OF THREAT AND DEFENSE

3.1. Threat as BIS activation: Discrepancy detection, unconscious vigilance, avoidance motivation, and implicit anxiety

Our proposition that the active ingredient in threat is detection of a motivationally relevant discrepancy fits with the definition of threat as "is-ought discrepancies with an aversive character" (Greve & Strobl, 2004, p. 194). As examples for such discrepancies, imagine a person who is at risk of losing her job while wanting to pursue a career or someone who anticipates rejection from a prospective romantic partner but nonetheless wants to flirt. Mortality

salience similarly entails discrepancy between the desire to survive and the finitude of life. Importantly, our conception of threat encompasses both positive and negative discrepant cues. For example, a person who is presented with an unusually good-looking photograph of herself will produce defensive reactions (Proulx, 2013).

Our assumption that all motivationally relevant discrepancies activate neural processes related to anxiety derives from a theory of anxiety that postulates tandem systems evolved for goal regulation (Gray & McNaughton, 2000).[2] Hundreds of lesion, neurophysiological, and pharmacological studies led Gray and McNaughton to propose that these distributed neural systems function to detect and regulate conflict-induced anxiety. The subsystem that has received their greatest attention is the BIS which is comprised of the septohippocampal system.[3] The BIS is most active when the Behavioral Approach System (BAS, i.e., the other subsystem) is still engaged in a goal pursuit, but cues signifying the possibility of goal impedance have been detected (e.g., a foraging mouse smelling but not seeing a cat). In other words, the BIS is activated when approach (BAS) and avoidance motivations are simultaneously active. BIS-activated hungry mice, for example, continue to approach food but with frequent rearing and scanning behaviors indicative of co-active anxious vigilance. Evidence that the BIS is critical for the detection and resolution of conflict and the experience of anxiety comes from animal research showing that lesions to this brain structure produce the best match to the effects of anxiolytic drugs, and also prevent goal conflict resolution. Other structures apart from the septohippocampal system are also important to the experience of anxiety. The amygdala mediates the "increase arousal" output of the BIS and the anterior cingulate cortex (ACC) is also related to BIS activation in humans (see Figure 4.2).

[2] Gray and McNaughton (2000) draw a clear distinction between anxiety (septo-hippocampal system, the amygdala, and the ACC, among other regions; Corr, 2011) and fear or panic (periaqueductal gray). Fear and panic—mediated by the fight-flight-freeze system (FFFS)—allow the animal to prevent punishment (away from threat), whereas anxiety—mediated by the BIS—allows the animal to cautiously approach the reward while assessing the threat of punishment (McNaughton & Corr, 2004).

[3] Gray and McNaughton (2000) speak of the "septo-hippocampal system" as a combination of septal and hippocampal areas because lesions to both structures are needed in nonhuman animals to provide the best match to anxiolytic drug action. It is unclear whether the same is true for humans, because, to our knowledge, independent septal and hippocampal lesion data are not available. There is, however, evidence for a functional dissociation within the hippocampal formation in humans: lesions to ventral aspects of the hippocampus have anxiolytic effects, whereas dorsal hippocampal damage affects learning and memory (Bannerman et al., 2004).

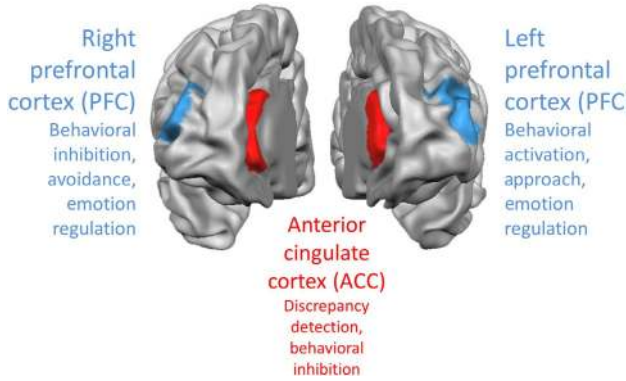

Figure 4.2 The core brain regions that our model assumes to underlie threat and defense. The anterior cingulate cortex (ACC; marked in red) is involved in discrepancy detection. Together with the right prefrontal cortex, the ACC also mediates Behavioral inhibition (anxiety reactions) after threat. Activation of left prefrontal cortex is associated with approach-oriented reactions. In addition, both left- and right-hemispheric prefrontal cortices play central roles in emotion regulation, which is essential for proximal defenses.

Most theories of threat and defense posit, with varying degrees of explicitness, some kind of discrepancy detection as the active ingredient in threat, and some version of anxious vigilance as the immediate reaction. The UVM (Holbrook et al., 2011) focuses on this proximal aspect of our model, and the MMM explicitly proposes that discrepancy detection and the resulting *disanxiousuncertlibrium* (Proulx & Inzlicht, 2012) arise from violated expectancies, even if merely perceptual. Other theories postulate that threats elicit BIS-related phenomena such as *potential for anxiety* (Greenberg et al., 2003), a sense of lacking control (Fritsche et al., 2011), personal uncertainty (Van den Bos et al., 2005), or *anxious uncertainty* (McGregor, Nash, Mann, et al., 2010). An empirical challenge for these proposed BIS-related states is that they are difficult to detect directly with self-report measures of affect. General measures of pleasant and unpleasant affect usually fail to show any mediation of the effect of threat on defense (Fein & Spencer, 1997; Greenberg et al., 1990; Harmon-Jones, 2000; Rosenblatt, Greenberg, Solomon, Pyszcynski, & Lyon, 1989; Sherman, Nelson, & Steele, 2000). However, neural evidence and research with more targeted emotions has begun to accrue that directly implicates BIS activity immediately after threats. Below, we describe neural, behavioral, and self-report markers of BIS activity, and present evidence for BIS activation after threats.

3.1.1 Neural, behavioral, and self-report markers of BIS activity

According to Gray and McNaughton (2000), upon detecting a goal conflict or uncertainty, the BIS initiates three separate outputs: (i) inhibition of the current approach goal, (ii) anxious arousal, and (iii) increased attention. This state has been termed *passive avoidance* (in contrast to active, fear-related avoidance) because it is characterized by the motivation to avoid threat without necessarily engaging in active fight or flight reactions (Corr et al., 2013). It functions to enable cautious scanning of the environment for further discrepancy cues and alternative goals less fraught with potential impedance. With regard to the model of threat and defense put forward in this chapter (see Figure 4.1), the BIS detects our presumed "active ingredient" common to perceptual, epistemic, and motivational discrepancies—i.e., a motivationally relevant conflict—and initiates a proximal response, characterized by heightened vigilance, aversive arousal, and passive avoidance of threat-related stimuli.

In humans, the BIS is closely linked with the ACC (Amodio, Master, Yee, & Taylor, 2008; Corr, 2011; Hirsh, Mar, & Peterson, 2012; see Figure 4.2). The ACC is positioned in the medial or inner part of the frontal lobe of the brain surrounding the anterior corpus callosum.[4] The ACC is activated by various discrepancies, such as errors, conflicts, surprises (Botvinick, Braver, Barch, Carter, & Cohen, 2001; Egner, 2011; Oliveira, McDonald, & Goodman, 2007; Ridderinkhof, Ullsperger, Crone, & Nieuwenhuis, 2004; Shackman et al., 2011; Stevens, Hurley, & Taber, 2011), and various other threats (as will be discussed below), and interacts with other brain areas to monitor and manage those conflicts and discrepancies (e.g., Botvinick et al., 2001; Bush, Luu, & Posner, 2000; Carter et al., 1998; Ridderinkhof et al., 2004; Shackman et al., 2011).

In the threat and defense literature, ACC activation may be inferred using event-related potentials (ERPs), i.e., phasic brain responses to stimuli measured with EEG. The most common index of ACC activity is error-related negativity (ERN), an ERP observed after participants make mistakes in timed performance tasks (Dehaene, Posner, & Tucker, 1994). In

[4] Notably, along with the insula, the ACC harbors a special type of neurons, so-called *spindle* (or *von Economo*) neurons, which enable faster and potentially more extended transmission of information (see Stevens, Hurley, & Taber, 2011). It is believed that they provide a basis for quickly and intuitively adapting one's behavior in social interactions (Allman, Hakeem, Erwin, Nimchinsky, & Hof, 2001) or in response to salient events ("salience network"; Craig, 2009; Menon & Uddin, 2010), which includes the appearance of threats.

functional terms, the ERN has been proposed to signal discrepancy between a chosen response and awareness of an alternative response (Yeung, Botvinick, & Cohen, 2004) or expectancy violations that involve discrepancies between expected and observed stimuli (Holroyd & Coles, 2002). In support of the link between the ERN and BIS, the ERN has been associated with dispositional BIS sensitivity (Amodio et al., 2008; Boksem, Tops, Wester, Meijman, & Lorist, 2006). Research also demonstrates that the ERN is influenced by anxiety—prompting some to suggest that this wave reflects a neural "distress signal" to conflict (Bartholow et al., 2005; Luu, Collins, & Tucker, 2000). For example, ERN amplitude has been associated with anxiety-related personality traits and the defensive startle response, and is muted by anxiolytics (Hajcak & Foti, 2008; Hajcak, McDonald, & Simons, 2003; Johannes, Wieringa, Nager, Dengler, & Munte, 2001). Although there is still controversy about the exact role(s) of the ACC (Shackman et al., 2011), there is growing consensus that the ERN arising from the ACC can reliably indicate BIS activation. If so, and if there is a common process underlying the ostensibly diverse threat and defense effects, then all of the threats that arouse defenses should show evidence of causing ACC activation, as revealed by the ERN. EEG studies using source localization and phase-locking analyses reveal the ERN to be produced by ACC-generated frontal midline theta-band activity (4–7 Hz; Luu & Tucker, 2001; Luu, Tucker, Derryberry, Reed, & Poulsen, 2003; Luu, Tucker, & Makeig, 2004), suggesting that frontal midline theta activity can also be used as an indicator of ACC activation. Indeed, frontal midline theta activity has been linked with discrepancy detection (see below).

A related neural marker of BIS activity is relative right prefrontal cortex (PFC) EEG activity (see Figure 4.2), which has been linked to heightened ERN amplitude and anxious and avoidant emotions and expressions (Davidson, Ekman, Saron, Senulis, & Friesen, 1990; Nash et al., 2012).

Another marker that has proven useful to index discrepancy-induced BIS activation is the orienting reflex or response (OR; Sokolov, 1963, 1990, 2002). In fact, it was noted early on that lesions to the septohippocampal system disrupt the OR (Vinogradova, 1975). The OR has been put forward as a reaction aimed at extracting information from the environment (Sokolov, 1990). It often involves eye and/or head motion and a cascade of physiological and neurophysiological reactions, such as changes in skin conductance, heart rate, and neural activity. Today, the OR is regarded as reflecting a heightened deployment of attentional resources to survival-relevant stimuli (Bradley, 2009). This suggests a great

deal of overlap with BIS activation, which is assumed to increase "attention to the environment and especially novel elements in the environment" (Gray, 1985, p. 4). A robust neurophysiological correlate of the OR is the late positive potential (LPP), an ERP that emerges around half a second after stimulus presentation. Its amplitude is usually greater in response to both positively and negatively arousing affective stimuli (Hajcak, MacNamara, & Olvet, 2010; Lang, Bradley, & Cuthbert, 1997). Hence, the amplitude of the LPP might provide useful information about the current attentional and motivational status of individuals, and also whether they are in a state of BIS activation in response to threat (see below).

Along with ACC activation, relative right PFC EEG activity, and LPP amplitude as neural markers of BIS activation, there should be some specificity in the kind and timing of self-reported affect that discrepancy-induced BIS activation arouses. BIS activation should be specific to anxiety-related emotions that entail conflict, ambivalence, and uncertainty, such as insecurity or discomfort, but not univalent emotions such as anger, sadness, or disgust. Moreover, threats should be able to arouse BIS activity without conscious awareness due to the avoidant tendency against dwelling on anxious stimuli that do flicker into awareness. Anxious thoughts and feelings might therefore be delayed from emerging into awareness. This process of proximal suppression and distal recurrence of threat-related thoughts after a few minutes delay has been explicitly addressed by TMT research on death-thought accessibility, and the same pattern emerges after uncertainty-related threats (Wichman, Brunner, & Weary, 2008). Indeed, mortality salience leads to a proximal/immediate suppression of death-related thoughts and a distal recurrence of death cognition (Hayes et al., 2010). From our perspective, the proximal suppression corresponds to a BIS-mediated avoidance of the threat. The distal recurrence corresponds to the limit of BIS-mediated threat avoidance, and the transition from BIS-related avoidance to BAS-related approach reactions.

3.1.2 Evidence for BIS activation after threats

We next review neural evidence for BIS activation after dissonance, personal uncertainty, failure, mortality salience, control deprivation, attachment threats, and goal conflict, all of which cause various defensive reactions.

Dissonance theory was founded on the premise that aversive arousal mediates the effects of cognitive conflict on defensively exaggerated opinions. For the first 20 years of dissonance research, evidence for this premise remained elusive and could only be demonstrated indirectly by showing that misattributing the anxious arousal to a benign source eliminated the

defensive reaction (Zanna & Cooper, 1974). It was only when researchers began to zero in on BIS-specific anxious arousal as indexed by "dissonance thermometer" adjectives like "bothered," "uneasy," and "uncomfortable" that the consciously reportable affective consequences became clear (Elliot & Devine, 1994; Harmon-Jones, 2000). At the neural level, cognitive dissonance threats activate the ACC component of the BIS (Kitayama, Chua, Tompson, & Han, 2013; Van Veen, Krug, Schooler, & Carter, 2009). Perceiving inconsistencies when interacting with stereotype-inconsistent individuals can also produce aversive arousal, as assessed with impedance cardiography (Mendes, Blascovich, Hunter, Lickel, & Jost, 2007; Townsend, Major, Sawyer, & Mendes, 2010). Building on these findings, it has been suggested that any perceived discrepancy will evoke ACC activation and subsequent BIS arousal (Proulx, Inzlicht, & Harmon-Jones, 2012). From this perspective, brain areas that evolved to detect concrete goal conflicts also respond to conflicts that are primarily epistemic in nature (see also Peterson, 1999).

Other cognitive consistency threats known to cause defensive reactions have shown BIS-related affective responses. Manipulations of personal uncertainty that confront participants with personal dilemma-related discrepancies do not affect general positive or negative affect (as measured by the PANAS, Watson, Clark, & Tellegen, 1988), but they do cause changes on the Felt Uncertainty Scale, including dissonance thermometer words and similar discrepancy-related adjectives (McGregor et al., 2001). Threats that confront participants with insecurities about identity, love, or work heighten ERN amplitude (Nash, Prentice, McGregor, Phills, & Inzlicht, 2013) and endorsement of BIS-related terms such as confusion, frustration, uncertainty, anxiety, and insecurity, but not more generic positive or negative adjectives (Nash et al., 2013; Nash et al., 2011; McGregor, Haji, Nash, & Teper, 2008).

Mortality salience primes are hypothesized by TMT theorists to cause only a "potential for anxiety" because manifest changes in anxiety do not appear on self-report measures of general affect (Greenberg et al., 1995). After a delay, however, participants typically show hyper-accessibility of death-related words, which could be taken as evidence of anxious arousal (i.e., spreading activation to anxious thoughts related to the primed topic of death; Hayes et al., 2010). We suggest that in addition to using an overly general measure of emotion, the standard practice in TMT research of placing the affect measures directly after the mortality salience threat works against detecting self-reported anxious arousal. In the immediate aftermath

of threat, the passive avoidance associated with BIS inhibition keeps anxious thoughts and feelings about the threat out of awareness (reviewed in Hayes et al., 2010; Wichman et al., 2008). Instead, when affect measures are positioned several minutes after various threats to allow anxious awareness to emerge, mortality salience heightens the same BIS-related adjectives as are heightened by uncertainty, goal conflict, relationship dissolution, and failure threats (McGregor et al., 2001; Nash et al., 2011; Schumann, McGregor, Nash, & Ross, 2013). This is consistent with research showing proximally heightened avoidance motivation (indicated by right frontal brain asymmetry) immediately following reminders of mortality or political fraud (Agroskin, Klackl, McGregor, & Jonas, 2013). Furthermore, an fMRI study showed the ACC to be proximally activated following a mortality salience prime compared to a dental pain control prime (Quirin et al., 2012). Reading death-related words also increased the frontal midline theta power (indicating ACC activation; Agroskin, Klackl, Lechinger, Speitel, & Jonas, 2013) and the LPP amplitude (an index of motivated attention in response to emotional stimuli; Klackl, Jonas, & Kronbichler, 2013a) relative to "just unpleasant" words.

Control threats and goal conflicts probably provide the most direct mapping onto animal research-based theorizing about causes of BIS activation (Leotti, Iyengar, & Ochsner, 2010). The BIS evolved to regulate effective responses to impeded goals. Goals can be impeded by blocked control or progress or by disturbances to the environment that render goal pursuit uncertain. It is not surprising, then, that control threats and goal conflicts not only cause similar defensive reactions as the threats already discussed, but also activate the BIS. For instance, becoming unemployed increases blood pressure (Kasl & Cobb, 1970) and norepinephrine levels (Cobb, 1974), indicating anxiety-related activity. Losing control over the delivery of electric shocks also causes heightened vigilance and self-reported unpleasantness of the pain experience (Crombez, Eccleston, De Vlieger, Van Damme, & De Clercq, 2008). Furthermore, the ACC responds more strongly to uncontrollable than to controllable pain (Salomons, Johnstone, Backonja, & Davidson, 2004).

Relationship goal threats (e.g., exclusion, ostracism) also induce BIS-related emotions, elevate perceptions of pain and stress (Blackhart, Nelson, Knowles, & Baumeister, 2009), and heighten ACC activation (Eisenberger, Lieberman, & Williams, 2003). Moreover, relationship threat-induced activity in the ACC and hippocampus (another BIS-related region; Gray & McNaughton, 2000) is highest among the insecurely

attached (Nash, Prentice, Hirsh, McGregor, & Inzlicht, in press), who have a history of frustrated relationships.

The conflict-detecting character of BIS activation is underlined by the finding that academic or relationship uncertainty threats cause anxious uncertainty and defensive reactions only when relevant but not irrelevant goals are primed (McGregor, Prentice, & Nash, 2013a; Nash et al., 2011). The goal regulation basis of the BIS activation is further demonstrated by findings that vocational, relationship, and mortality threats do not cause defensiveness when framed in a way that preserves unconflicted personal control (Fritsche et al., 2008, 2011; Fritsche, Jonas, Klackl, & Decker, 2013).

3.2. Proximal defenses arising from BIS processes

3.2.1 Proximal defenses related to avoidance motivation

In the preceding section, we were primarily concerned with basic BIS-related processes activated by threat. We now discuss how these reactions might translate to proximal defensive reactions that are inhibitory in nature, involving anxious efforts to keep threat-related preoccupations out of awareness. Various defensive strategies, such as rationalization or biased information processing, minimize threat-related thoughts (Pyszczynski et al., 1999). For example, after mortality salience, people bias their self-descriptions to appear less liable to die young (Greenberg, Arndt, Simon, Pyszczynski, & Solomon, 2000). Similarly, control threats heighten the denial of randomness and chance in participants' lives (Kay et al., 2008; Study 2), and health threats promote avoidance of medical risk information (Sweeny, Melnyk, Miller, & Shepperd, 2010). Evidence that such proximal reactions are avoidance-motivated comes from studies showing that relationship threats decrease response latencies when identifying avoidance-related compared to approach-related words (Cavallo, Fitzsimons, & Holmes, 2010), and that subliminal death primes reduce gaze duration toward pictures of physical injury but not neutral pictures (Hirschberger, Ein-Dor, Caspi, Arzouan, & Zivotfsky, 2010). A related proximal defense strategy is the tendency to move death into the distant future. Thinking about death causes both overestimation of brief time intervals (Martens & Schmeichel, 2011) and commitment to healthier lifestyles which make death seem more remote (Arndt, Schimel, & Goldenberg, 2003; Bozo, Tunca, & Simsek, 2009; Routledge, Arndt, & Goldenberg, 2004). Mortality salience also promotes selective attention to and use of positive emotional information in judgment (DeWall & Baumeister, 2007).

Avoiding self-focus may be another proximal defense. Participants spend less time contemplating their mortality in cubicles that contain mirrors (Arndt, Greenberg, Simon, Pyszczynski, & Solomon, 1998), and the insula (related to body awareness; Craig, 2002, 2009) shows reduced activity after participants read death-related compared to generically unpleasant words and sentences (Han, Qin, & Ma, 2010; Klackl, Jonas, & Kronbichler, 2013b; Shi & Han, 2013).

Such proximal defenses appear to be largely implemented in higher-level cortical regions such as the PFC (see Figure 4.2). The PFC regulates emotional responses generated in the subcortical amygdala (Hooker & Knight, 2006; Kanske, Heissler, Schonfelder, Bongers, & Wessa, 2011; Ohira et al., 2006; Öhman, 2005; Phan et al., 2005), peripheral physiological responses (Ohira et al., 2006), and emotional states (Lévesque et al., 2003). Furthermore, the PFC and the ACC form a network whereby the ACC signals to the PFC the presence of conflict, and the PFC subsequently exerts cognitive control and behavioral adjustments (Kerns et al., 2004). Recent neuroimaging studies suggest an important role for the PFC not only in the context of emotion regulation, but also in threat regulation. For example, right ventral PFC activity is negatively correlated with amygdala activity while viewing subliminally presented angry faces (Nomura et al., 2004), and activity in the lateral PFC is negatively related to anxiety while viewing fearful faces (Bishop, Duncan, Brett, & Lawrence, 2004). Consistent with this threat-regulating capacity, the PFC (see Figure 4.2) is more active after subliminal death than pain primes (Yanagisawa et al., 2013). Similarly, low self-esteem participants (who tend toward use of proximal defenses due to weaker capacity for distal defenses; Greenberg et al., 1992; Greenberg et al., 1993) responded with heightened medial orbitofrontal and bilateral ventrolateral PFC activation after mortality-related stimuli (Klackl et al., 2013b).

3.2.2 Proximal defenses related to attentional vigilance

In addition to causing avoidance of information directly related to already identified threats, threats can also cause heightened attentional vigilance for possible solutions and other motivationally relevant information. Attentional vigilance after threats may sometimes promote accuracy in information processing, by taking into account more details when making inferences (Pittman, 1998). Indeed, lexical discrepancies and self-threats enhance accurate detection of complex patterns in letter strings (e.g., VXTTMV; Proulx & Heine, 2009; Randles et al., 2011). Mortality salience similarly enhances recall in incidental as well as intentional memory tasks (Hart & Burns, 2012). Ostracism increases vigilance toward and memory of social

information (Gardner, Pickett, & Brewer, 2000) and leads to faster detection of and more attention to smiling faces in a crowd (DeWall, Maner, & Rouby, 2009). These findings suggest that threats enhance general vigilance as well as vigilance related to possible resolution of specific threats (e.g., detecting smiling faces to re-establish social inclusion).

Threat-induced vigilance can also increase bias, however. It can cause exaggeratedly positive evaluations of pleasant stimuli and negative evaluations of aversive stimuli (Holbrook & Sousa, 2013; Holbrook et al., 2011), as well as illusory perception of nonexisting objects and conspiracies (Whitson & Galinsky, 2008). Threats also sometimes cause closed-minded aversion to uncertain or unstable phenomena (Jost et al., 2007; Kruglanski, 2004) and devotion to stability-conferring political or religious systems (Kay et al., 2008; Kay, Shepherd, Blatz, Chua, & Galinsky, 2010) or scientific theories (Rutjens, Van der Pligt, & Van Harreveld, 2010; Rutjens, Van Haneveld, Van der Pligt, Kreemers, & Noordewier, 2013).

Overall, it seems that whereas threats cause avoidance of continued exposure to the specifically identified threat (previous section), it also heightens general vigilance for motivationally relevant information, especially if that information can provide order and structure. The preference for order and structure may help people cope with the dilated flow of information arising from the vigilance. Need for structure can be satisfied by orienting toward familiar structure but may also be met by heightened detection of novel structure, either real (Proulx & Heine, 2009; Randles et al., 2011) or imagined (Whitson & Galinsky, 2008). If no opportunities to detect structure-conferring regularities exist, then people may resort to closed-mindedness and avoidance of uncertain phenomena (e.g., Jost et al., 2007; Kay et al., 2008; Rutjens et al., 2010; Rutjens et al., 2013; Kay, Shepherd, et al., 2010; Sullivan, Landau, & Rothschild, 2010). Future research is needed to more clearly specify the boundaries and dynamics of the co-active avoidance and vigilance processes.

3.3. Distal defenses: Muting BIS activation with approach motivation

If there is no opportunity to engage in distal defenses, BIS-related proximal processes can persist (Randles et al., 2011). For example, individuals with low self-esteem or high need for structure tend to prefer simple, comprehensible, and clearly structured information even after a delay (Agroskin & Jonas, 2013; Landau et al., 2004; Landau, Greenberg, Solomon, Pyszczynski, & Martens, 2006). Prolonged BIS activation can have deleterious effects for these individuals, such as decreased life satisfaction, vitality, and perceived

meaning, as well as increased negative affect, state anxiety, and social avoidance (Routledge et al., 2010).

Persistence in the BIS phase of proximal defenses after threat may undermine the pursuit of everyday goals (Pyszczynski et al., 1999; see also Pyszczynski & Kesebir, 2011). Accordingly, most people do not react with persistent anxious arousal or behavioral inhibition following threat cues. Rather, after a few minutes, they downregulate BIS activity by engaging in a diverse array of distal defenses that, at first glance, appear to have little in common. Despite their manifest diversity, however, we propose that all of the distal defenses share a common motivational feature (see Figure 4.1): they involve clear commitment to some incentive, activity, goal, ideal, or group. The commitment activates an approach-motivated state that mutes the BIS and relieves anxiety (Harmon-Jones et al., 2009; McGregor, Nash, Mann, et al., 2010).

Evidence for this process comes from recent EEG and line bisection task data (see Nash, McGregor, & Inzlicht, 2010, for cross-validation of these EEG and behavioral neuroscience measures of approach motivation).[5] Recall that the ERN is an ERP originating from the ACC and is sensitive to BIS activation. If measured immediately after threat, the ERN is amplified; if measured after threat and a few minutes, however, the ERN is decreased (Nash et al., in press). Correspondingly, the usual proximal reaction to threat is right frontal asymmetry indicating avoidance motivation (which is part of BIS activation), and the distal reaction is left frontal asymmetry characteristic of approach motivation and BAS (Agroskin, Klackl, McGregor, et al., 2013; Deppe & Fritsche, 2013; McGregor, Nash, Mann, et al., 2010; McGregor et al., 2009). BIS-mediated anxious avoidance following threat appears to be supplanted by approach motivation (Corr, 2008; Nash et al., 2011). Indeed, left frontal asymmetry predicts reduced ERN amplitude (Nash et al., 2012, 2013) and a muted startle response (Jackson et al., 2003). The ERN is also muted in dispositionally approach-motivated people who tend to be sensitive to reward, high in impulsivity, and open to risk (Boksem, Tops, Kostermans, & De Cremer, 2008; Corr, 2002; Potts, George, Martin, & Barratt, 2006; Santesso et al., 2008).

Additional evidence for spontaneous approach orientation after threats comes from research with subtle measures of approach motivation. In three

[5] The line bisection task is widely used as a behavioral measure of relative cerebral hemisphericity (Jewell & McCourt, 2000). Participants are asked to indicate the perceived midpoint of a number of horizontal lines, whereby rightward versus leftward errors in estimating the actual midpoints are interpreted as indications of relative primacy of right versus left visual fields, respectively, and neural activity in the contralateral hemisphere (Milner, Brechmann, & Pagliarini, 1992).

experiments with academic and relationship threats that cause various idealistic, vengeful, and ideological defenses, participants' implicit association of the self with approach (vs. avoidance) was heightened after threat and delay (Mann et al., 2013, Study 2; McGregor, Nash, Mann, et al., 2010, Studies 1 and 4). These results are consistent with findings that exposure to relationship threats and conflicts involving inhibition of prepotent impulses heightens approach motivation (Cavallo, Fitzsimons, & Holmes, 2009; Schmeichel, Harmon-Jones, & Harmon-Jones, 2010).

How do people manage to activate approach motivation right after being exposed to BIS-related threats? As discussed below in the section on the four kinds of distal defenses, angry, self-serving, extreme, idealistic, ideological, relationship, group-based, and meaning-seeking reactions have all been linked to phenomena related to approach motivation (Amodio, Shah, Sigelman, Brazy, & Harmon-Jones, 2004; Carver & Harmon-Jones, 2009; Deppe & Fritsche, 2013; Higgins, Roney, Crowe, & Hymes, 1994; Keltner, Gruenfeld, & Anderson, 2003; Urry et al., 2004). We propose that people use these various defenses as levers for supplanting anxious BIS states with more sanguine approach-motivated states.

Approach-oriented reactions can in some cases be practical solutions that directly resolve the discrepancy at the heart of the threat. They may also indirectly satisfy more global psychological needs that are diminished by the threat and restored by the defense (e.g., when a personal control threat causes people to seek control restoration or compensation by cleaving to powerful in-groups or systems; Fritsche et al., 2008; Kay et al., 2008). As described in the next section, however, they may also be merely palliative. Regardless, we refer to them as approach-oriented reactions because at the point of engagement, they are oriented toward approaching a desired incentive to spur approach motivation. An important distinction in our model is the distinction between the approach-*oriented* defenses that people use to activate approach-*motivated* states.

The capacity to engage approach-oriented reactions following threat appears to vary across individuals. Park (2010) reviews evidence that individuals with weak approach-motivated temperaments languish and struggle to leave the BIS phase after threat, and individuals with strong approach-motivated temperaments only have a flicker of BIS activation before an almost immediate surge in approach motivation (see Figure 4.1). In line with this reasoning, only individuals with high levels of trait self-esteem, which is highly correlated with approach motivation (Baumeister, Tice, & Hutton, 1989; Heimpel, Elliot, & Wood, 2006), respond to threats with both increased defensiveness (reviewed in McGregor, 2006a; Park, 2010) and

increased approach motivation after a short delay (McGregor, Gailliot, Vasquez, & Nash, 2007; McGregor et al., 2009). These findings are consistent with the anxiety-buffering role ascribed to self-esteem by TMT (Pyszczynski et al., 2004). Whereas high self-esteem people have an arsenal of tactics for dealing with threats, low self-esteem people remain stuck in BIS states. People with traits related to low self-esteem are more cautious, inhibited, and restrained during social interactions (Vohs & Heatherton, 2001) and focus more on avoiding failure than approaching success, which further increases anxiety in a vicious cycle of anxiety and avoidance (Elliot & McGregor, 1999; see also Routledge et al., 2010).

Individuals who are high in self-esteem seem more liable to automatically generate positive self-thoughts following threat (Dodgson & Wood, 1998), suggesting a rapid move from anxiety to approach. Indeed, high self-esteem individuals espouse approach goals after threat, whereas low self-esteem people prioritize avoidance goals (Cavallo et al., 2009; Tice, 1991). This might be due to the "offensive" self-regulatory strategies related to high self-esteem (McGregor, 2006a; Tangney, Baumeister, & Boone, 2004), as these effects disappear when executive resources are depleted (Cavallo, Holmes, Fitzsimons, Murray, & Wood, 2012). Finally, neuropsychological evidence also suggests that whereas individuals with low self-esteem tend to react to mortality salience or academic failure with right frontal asymmetry (i.e., avoidance motivation, see Figure 4.2), people with high self-esteem tend to react with left frontal asymmetry (i.e., approach motivation; Agroskin, Klackl, McGregor, et al., 2013; McGregor et al., 2009; see Figure 4.2). These effects have been observed following temporal delays of a few minutes, suggesting that low self-esteem people may require more time or some kind of external help to leave the BIS phase (e.g., see social category of defenses, below).

3.4. Varieties of threat reactions, from direct resolution to indirect resolution or palliation

Threat reactions can directly address the eliciting discrepancy (e.g., preparing for a test to reduce test anxiety) or merely attempt to palliate threat anxiety. The BIS and the BAS co-evolved to motivate direct problem solving. Animals with lesions to the BIS are unable to solve problems or change course, and are unable to disengage from blocked goals (Gray & McNaughton, 2000). When the intact BIS detects goal impedance, it inhibits ongoing goal-related behavior and arouses anxious vigilance to orient the animal toward achieving the goal, or pursuing substitute goals if need

be. For example, imagine that you are looking for a cupcake in your fridge, but find it missing (discrepancy). The resultant BIS state discourages persistent staring into the empty fridge; vigilant scanning for the cupcake also orients you to other snack possibilities; you eventually find satisfaction in the cookie cupboard. If the cookie cupboard is near the fridge, this flip from anxious BIS to cookie approach could happen quite quickly.

Immediate responses to mortality reminders (Pyszczynski et al., 1999) often similarly focus on solutions specific to the problem of early death, such as resolving to use more sunscreen or check for breast lumps (Cooper, Goldenberg, & Arndt, 2011; Routledge et al., 2004). TMT research has shown that such reactions are related to approach-oriented personality traits (e.g., adaptive coping styles, health optimism), lending support to the assumption that these reactions are approach-oriented attempts to address the problem at hand rather than palliative defenses (Arndt, Routledge, & Goldenberg, 2006). These functional reactions occur only with overt but not with subliminal mortality salience inductions (see also Cooper, Goldenberg, & Arndt, 2010), presumably because with subliminal and subtle manipulations of threat, it is more difficult to attribute the resulting anxiety to its proper source. Direct discrepancy resolutions can happen quickly only if the solution is apparent and feasible (otherwise, it may happen after a more prolonged proximal period of what appears to be dithering and procrastination).

Direct resolution efforts can also manifest in the alteration of beliefs to reduce discrepancy. In cognitive dissonance research, such efforts involve temporarily adjusting one's attitudes to agree with a discrepant behavior (e.g., "I'm a student and just argued in favor of a tuition increase? I must favor tuition increases after all"). Participants will usually prefer to approach the most obviously available resolution if doing so is not threatening (Cooper et al., 1997, Stone, Wiegand, Cooper, & Aronson, 1997). Indeed, dissonance-induced discomfort predicts interest in information relevant (but not irrelevant) to resolving the inconsistency (Amodio, Devine, & Harmon-Jones, 2007, Stone et al., 1997). In some cases, however, people will prefer to defend against a threat indirectly to avoid facing the discomfort (Aronson, Cooper, & Blanton, 1995). The appeal of indirect defenses may be why hundreds of studies from a variety of theoretical perspectives conducted over the past 30 years (following Steele, 1988; Steele & Liu, 1983) demonstrate seemingly unrelated defensive reactions to a variety of threats (Proulx & Inzlicht, 2012).

Many theorists have concluded that the seemingly unrelated defenses must somehow meet a central global need that is aroused by the threat, even

if abstractly. For example, the spectrum of defensive reactions after dissonance, self-esteem, mortality, relational, or control threats has been variously interpreted as serving to bolster the aroused global need for symbolic immortality, self-integrity, self-worth, or control (Fritsche et al., 2008; Greenberg et al., 1997; Kay et al., 2008; Steele, 1988; Tesser, 1988).

But from another perspective, such reactions can be interpreted as merely palliative insofar as any eager commitment can restore approach motivation and thereby relieve distress (Harmon-Jones et al., 2009; McGregor, Prentice, & Nash, 2013a; Nash et al., 2011; Proulx et al., 2012). The tendency of defenses to sometimes adhere to the domain of the threat (Shepherd, Kay, Landau, & Keefer, 2011) may simply arise from threats containing primes that cue palliative defenses in a related domain. Accordingly, most defenses can be interchangeably interpreted from the perspective of indirect resolution or palliative perspectives, and it is often difficult to categorize a specific defense either way.

What is clear is that defenses can occur in domains radically removed from that of the threat, as is strikingly revealed in studies showing heightened commitment to moral or group values upon exposure to unrelated subliminal cues, reverse-colored playing cards, or nonsense word pairings (Holbrook et al., 2011; Proulx, 2013; Proulx & Major, 2013; Randles et al., 2011). Whether such responses are viewed as satisfying some general need (e.g., for meaning) or as being merely palliative, it appears that they share a common approach orientation (see next section). The palliative interpretation is more parsimonious, but the indirect resolution view offers a differentiated analysis of human motivation consistent with a rich tradition of interest in a core set of human motives, e.g., for cognitive consistency, self-esteem, control, and belonging (Baumeister & Leary, 1995; Fiske, 2002; Pittman & Zeigler, 2007).

3.5. Concrete versus abstract X personal versus social defenses

The diverse variety of defensive reactions reported in the threat and defense literature involves topics ranging from consumer choice and risk-taking to relationship striving, investment in personal values, and intergroup bias. Here, we organize the array of defensive reactions into a two-dimensional space defined by investment in (a) concrete vs. abstract and (b) personal vs. social commitments. The concrete pole refers to the extent to which individuals respond to threats by focusing on concrete and immediate experiences and incentives in their physical environment. In contrast, the abstract pole refers to conceptual, identity-based, or idealistic commitments.

Turning to the other dimension, concrete or abstract defenses can be personal or social. The personal pole refers to idiosyncratic commitments that are relatively independent of the social environment; the social pole refers to commitments that are nested within social contexts, involve social support in interpersonal relations, or rely on social identities in group-related contexts. This produces a 2 x 2 taxonomy of approach-oriented, distal defense reactions with four categories: (a) concrete personal, (b) concrete social, (c) abstract personal, and (d) abstract social defenses (see Figure 4.1).

3.5.1 Concrete personal defenses

Concrete personal defenses involve heightened commitment to tangible rewards, such as eating, drinking, being pleasantly stimulated, or displaying power or aggression. Such defenses may be akin to displacement behaviors that anxious nonhuman animals fervently engage in, such as compulsive tail-chasing, vocalizing, grooming, eating, or running, as eager commitment to any incentive can be rewarding to the extent that commitment spurs approach motivation and relieves conflict (McGregor, Nash, Mann, et al., 2010). Concrete defenses may not be particularly effective, however, as their appeal may quickly fade, allowing anxious thoughts to reemerge (cf. Wegner, 1994; Wenzlaff & Bates, 1998). Such compulsive reactions may also conflict with other goals and values, and typically lose their appeal once consummated (Klinger, 1977), thus being less sustainable compared with abstract defenses (see below). Nevertheless, people do engage in various concrete defenses after threats. Mortality salience increases indulgent consumer choices (Ferraro, Shiv, & Bettman, 2005), spending intentions on entertainment and food (Fransen, Fennis, Pruyn, & Das, 2008), materialism (Heine, Harihara, & Niiya, 2002), and greedy consumption of scarce resources (Kasser & Sheldon, 2000). Other sources of anxious arousal similarly predict extremes of eating, alcohol, and drug use (Heine et al., 2013a; McGregor, Prentice, & Nash, 2013a). People typically turn to such consumptive concrete personal defenses only if they do not conflict with other salient priorities and values (e.g., Ferraro et al., 2005), suggesting that relatively abstract personal commitments related to values and ideals may take priority.

A mode of concrete personal defense that may be somewhat more effective than consumption is indulgence in personal control or efficacy. Perceptions of personal control provide a vision of clear and decisive goal pursuit, thereby facilitating approach motivation. Uncertainty, academic performance, relationship, and mortality threats cause participants to rate

their pursuit of everyday personal projects in life (e.g., "do well in school," "lose 5 pounds") as higher in determination, confidence, efficacy, and control, and also as more approach-motivated and promotion-focused. In those experiments, participants' ratings of personal project control and approach motivation are always highly correlated (McGregor, Nash, Mann, et al., 2010; McGregor, Prentice, & Nash, 2013a; McGregor et al., 2007; McGregor et al., 2001; Nash et al., 2011). Similarly, mortality salience engenders proactive health decisions if the health-related behavior is framed as empowering the self (Cooper et al., 2011). Threat-accentuated desire for control also increases illusory personal control over random events and personal goals among individuals high in dispositional approach motivation (McGregor et al., 2013). These sorts of positive illusions are associated with successful adjustment to stressful events (Murray, Holmes, & Griffin, 1996; Taylor & Armor, 1996), especially when combined with a promotion focus induction (Langens, 2007).

In addition to increasing feelings of personal control, threat can also lead people to take more concrete risks, however. Several studies show that following various threats (e.g., related to academic failure, relationship trouble, or insecurity), people make more risky investment decisions and take more risky gambles (Cavallo et al., 2009; Nash et al., 2013). Moreover, mortality salience increases risky driving in those who experience driving as rewarding (Jessop, Albery, Rutter, & Garrod, 2008; Taubman Ben-Ari, Florian, & Mikulincer, 1999). The approach-motivation interpretation of heightened risk-taking is also supported by the finding that experimentally manipulated approach motivation heightens risky investment preferences (Nash et al., 2013). Moreover, high self-esteem increases risk-taking following relationship and mortality threats; low self-esteem, by contrast, predicts risk-avoidance (Cavallo et al., 2009; Landau & Greenberg, 2006).

3.5.2 Concrete social defenses

Concrete social defensive reactions to anxiety-inducing threats often appear to be more effective than concrete personal defenses. Social defenses may be particularly compelling because our social nature largely derives from concrete needs to affiliate with and derive support from others (Baumeister & Leary, 1995; Hart, Shaver, & Goldenberg, 2005; Stroebe, Stroebe, & Abakoumkin, 1996). Humans and animals become more affiliative under anxious circumstances, indicating an enhanced approach orientation (Byrne, Mcdonald, & Mikawa, 1963; Hamilton, 1967; Schachter, 1959), possibly mediated by opioid and oxytocinergic reward systems (Nash

et al., in press). Accordingly, dispositional approach motivation predicts positive indicators of social bonding (e.g., less loneliness, more relationship satisfaction), whereas the opposite holds for avoidance motivation (e.g., more relationship insecurity; Gable, 2006; Gable & Gosnell, 2013).

The most basic form of concrete social defense is increased desire for mere affiliation—with anyone—after threats. Ostracism and social exclusion threats increase participants' interest in interaction with others, even strangers (Maner, DeWall, Baumeister, & Schaller, 2007). Mortality salience does the same, even if the interaction involves criticism, idealistic compromise, or worldview threat (Hirschberger, Florian, & Mikulincer, 2003; Nakonezny, Rodgers, & Reddick, 2004; Wisman & Koole, 2003). Similarly, after social exclusion threats, people try harder to "fit in" (Carter-Sowell, Chen, & Williams, 2008; Williams, 2007, 2009).

Beyond such indiscriminate affiliation, mortality and other threats motivate proximity to secure attachment figures (Florian & Mikulincer, 1998; Hart et al., 2005; Mikulincer, Florian, & Hirschberger, 2003), heighten the accessibility of cognitive representations of attachment figures and themes (Mikulincer, Birnbaum, Woddis, & Nachmias, 2000; Mikulincer, Gillath, & Shaver, 2002), and increase desire for parenthood (Fritsche et al., 2007; Wisman & Goldenberg, 2005). Mortality salience similarly improves recall of positive maternal interactions, inhibits recall of negative maternal interactions, and increases attraction to strangers described as similar to one's parent (Cox et al., 2008). Affiliating with and imagining secure attachment relationships may be particularly soothing because secure attachment figures connote a history of reassurance and support. Indeed, holding hands with a stranger mutes ACC activity to some extent, but holding hands with a loved one attenuates ACC activity to a significantly greater extent (Coan, Schaefer, & Davidson, 2006).

Beyond the direct appeal of closeness, affiliation and attachment may activate approach motivation by allowing one to co-opt others' resources and abilities. Using socially leveraged defenses to activate approach motivation may be particularly attractive for meek people with personality traits that orient them away from overt personal agency (e.g., low self-esteem or low approach motivation; McGregor, Nash, et al., 2013; Vohs & Heatherton, 2001). Indeed, threats to goal clarity, academic achievement, relationships, and social structures have caused such dispositionally meek individuals to significantly *decrease* their estimates of personal control, and to significantly *increase* their reported expectation that other people will help them navigate their personal projects in life (McGregor, Nash, et al., 2013).

Mortality salience also causes people with low self-esteem to defensively increase their accommodation of others' opinions that differ from their own (Hayes et al., submitted).

Relationship attachment security is another moderator of concrete social defenses (Mikulincer et al., 2000). Similar to people with high self-esteem, securely attached individuals have approach-motivated temperaments (Park, 2010) that rapidly overcome BIS activation. This may be why an insecurity manipulation caused neural evidence of elevated anxiety among adults with insecure, but not secure, attachment styles (Nash et al., in press). Mortality salience causes insecurely attached individuals to exaggerate how positively their parents regard them, whereas securely attached individuals turn to romantic partners instead (Cox & Arndt, 2012). Similarly, young adults with high self-esteem react to academic uncertainty threats by exaggerating the extent to which their friendships and relationships are likely to endure and to reflect true friendship (Marigold, McGregor, & Zanna, 2010). They also react to threats, conflicts, and uncertainties by turning to positive illusions about their romantic partners, which appear to reflect approach-oriented processes (Cavallo et al., 2009; Impett et al., 2010; Murray et al., 1996).

3.5.3 Abstract personal reactions

In *Meaning and Void*, Eric Klinger (1977) proposed that unattainable abstract incentives such as ideals and values are particularly rewarding for humans because they can never lose their motivational value through habituation. They can also be flexibly promoted in the privacy of one's own mind, free from scrutiny and without expending physical resources. Abstract defenses may accordingly have advantages over concrete defenses for inducing approach motivation to reduce anxiety. Theories of goal regulation posit that ideals and values are abstract goals that humans use to guide lower level, relatively concrete goals (Carver & Scheier, 1998). Humans' enigmatic inclination toward idealism and ideology in anxious circumstances may therefore reflect use of abstract goals and commitments to efficiently activate approach-motivated states for relief.

Following subtle reminders of mortality, participants view hypothetical actions at higher levels of action identification (Landau, Kosloff, & Schmeichel, 2011), indicative of heightened abstract relative to concrete thinking (Vallacher & Wegner, 1989), and perceive their current actions as more strongly connected to personally important long-term goals (Landau et al., 2009; McGregor et al., 2001, Study 4). Furthermore,

mortality and other threats increase the extent to which personal goals in life adhere to idealistic values and convictions. Confronting participants with mortality salience, dilemma-related goal conflict, relationship uncertainties, or an experimentally manipulated goal conflict causes participants to describe their opinions and personal projects in life as being more certain, value congruent, identity-relevant, important, and meaningful (McGregor et al., 2007; McGregor, Nash, Mann, et al., 2010; McGregor, Prentice, & Nash, 2013a; McGregor et al., 2001). The approach-oriented nature of these abstract personal defenses is supported by consistent findings that they are most pronounced among people with high self-esteem and other approach-oriented dispositions (McGregor et al., 2007; McGregor & Marigold, 2003; McGregor et al., 2005). Other evidence for the defensive approach-catalyzing function of idealistic goals comes from the finding that mortality and relationship threats increase idealism in everyday goals, which mediates their increased approach motivation (McGregor et al., 2007; McGregor, Nash, Mann, et al., 2010; McGregor, Prentice, & Nash, 2013a).

Another category of abstract personal defenses is the tendency to promote personal ideals of power, status, or esteem. After mortality threats, people strive in various ways toward more positive self-views (Pyszczynski et al., 2004), for example, through high status products (Mandel & Heine, 1999) or having a star in the galaxy named after them (Greenberg, Kosloff, Solomon, Cohen, & Landau, 2010). Various other threats cause similar effects (e.g., Campbell & Sedikides, 1999; Steele, 1988; Tesser, 1988), even on implicit associations of the self with power and goodness (Gurari, Strube, & Hetts, 2009; Phills, Santelli, Kawakami, Struthers, & Higgins, 2011).

Defensively proud or grandiose reactions to mortality and other threats are most pronounced among people with high self-esteem (Beauregard & Dunning, 2001; Dodgson & Wood, 1998; Vohs & Heatherton, 2001). This appears especially true for individuals with both high explicit and low implicit self-esteem (McGregor & Marigold, 2003; Schmeichel et al., 2009). Given that power, status, and explicit self-esteem are positively correlated with approach motivation, and negatively correlated with anxiety and avoidance (Heimpel et al., 2006; Keltner et al., 2003; Pyszczynski et al., 2004), defensively striving for a positive self-image in the face of threat fits well with our proposed anxiety-to-approach process model (see Figure 4.1).

Beyond ideals of self-worth, threats also increase adherence to personal and moral values. For example, mortality salience can make conservatives

more intolerant and liberals more tolerant of dissimilar others (Greenberg, Simon, Pyszczynski, Solomon, & Chatel, 1992, Study 1); authoritarians more closed to immigrants and low-authoritarians more open (Weise, Arciszewski, Verlhiac, Pyszczynski, & Greenberg, 2012); people supporting German reunification more dismissive of a reunification critic (Jonas & Greenberg, 2004); and more biased in confirmation of personal opinions when searching for new information about a personally relevant topic (Jonas, Greenberg, & Frey, 2003). Other threats have similar effects on adherence to personal values. Along with mortality salience, threats related to moral dilemmas, academic performance, relationships, and goal conflicts all heighten certainty, conviction, and delusions of others' agreement with personal opinions about idealistically charged issues such as capital punishment, abortion, or the US invasion of Iraq (McGregor & Jordan, 2007; McGregor & Marigold, 2003; McGregor et al., 2005; McGregor et al., 2001; Nail & McGregor, 2009).

A diverse array of threats also heighten zeal for idiosyncratic religious ideals and convictions (McGregor, Haji, Nash, et al., 2008; McGregor, Nash, & Prentice, 2010; McGregor, Prentice, & Nash, 2013a, Study 1; Schumann, McGregor, Nash, & Ross, 2013; Vail et al., 2010). Enhanced personal religious conviction after threats is most evident among people who report the most anxious goal conflicts in their lives and who possess the most approach-motivated personality traits (McGregor, Nash, & Prentice, 2010), and after reminders of the link between personal religious beliefs and identity (Schumann et al., 2013).

Although expressions of zeal and conviction can take personal and idiosyncratic forms, the most anxiolytic forms may often involve group identification (see below). As discussed in the concrete social section, dispositionally meek people with low self-esteem or approach motivation may be particularly drawn to socially mediated defenses. Their self-esteem is more contingent on the approval of others (Crocker & Luhtanen, 2003), and whereas high self-esteem people adopt an independent self-construal following threat and focus more on personal than social resources, low self-esteem people become more interdependent and focus more on social than personal resources (McGregor, Nash, et al., 2013; Vohs & Heatherton, 2001). Similarly, threat heightens self-concept clarity among high but not low self-esteem individuals (Boucher, 2011; McGregor & Marigold, 2003, Study 1). It may be that to catalyze approach motivation, high self-esteem individuals tend to become more idealistic and self-enhancing (e.g., McGregor & Marigold, 2003; McGregor et al., 2005 Schmeichel

et al., 2009), whereas low self-esteem people eschew personal ideals and self-enhancement (Blaine & Crocker, 1993; Heimpel, Wood, Marshall, & Brown, 2002), preferring instead to invest in collective commitments either through accommodating themselves to others' views (Hayes et al., submitted) or identifying and defining themselves through relationship and intergroup processes (Blaine & Crocker, 1993; Heimpel et al., 2002; Swann, Griffin, Predmore, & Gaines, 1987).[6] Indeed, jingoism for religious groups[7] following economic or relationship uncertainty threats is most pronounced among participants with low confidence in their personal goals and ideals (Ferriday, McGregor, & Nash, 2011; McGregor, Nash, et al., 2010).

3.5.4 Abstract social reactions

Beyond the concrete social benefits described previously, groups confer abstract benefits, including social identity (Tajfel & Turner, 1979), collective self-definition and meaning (Hogg et al., 2007; Turner et al., 1987), social reality (Echterhoff, Higgins, & Groll, 2005), collective efficacy (Fritsche, Jonas, Ablasser, et al., 2013; Van Zomeren, Spears, Fischer, & Leach, 2004), and social status (Tajfel & Turner, 1979; Wenzel, Mummendey, & Waldzus, 2007). We propose that heightening these aspects of group identification can be a potent way to catalyze approach-motivated states for relief from anxiety after various threats. As introduced in the previous section, group identification may provide a powerful surge in approach motivation even for people who lack personal agency, because it can (a) rationalize approach-oriented states of anger and hostility against the out-group, (b) allow the individual to participate in the approach-oriented power and status of the in-group, and (c) bolster approach-oriented ideas and ideologies that are supported by the in-group's worldview. After a brief review of some evidence for threat-induced group identification and ethnocentric responses, we describe evidence for these three approach-oriented functions.

[6] This is not to say that high self-esteem people invest *only* in personal agency and low self-esteem people invest *only* in collective agency after threat, because high self-esteem people sometimes show increased personal *and* collective-ideological zeal (McGregor et al., 2007; however, see Harmon-Jones et al., 1997, and Du et al., 2013, for evidence that high self-esteem may buffer against the need to defend collective ideals after threat). We rather mean to say that when offered to affirm both forms of agency—personal and collective—high self-esteem individuals may prefer to affirm personal goals, whereas low self-esteem people may prefer to affirm collective ideals.

[7] Jingoism for religious groups was assessed by items such as, "It is wise to keep a wary distance from people who distract me from living according to my religious beliefs," and "My strongest relationships are with those who have the same religious beliefs as I do." These social aspects of religious zeal are highly correlated with the personal aspects, but form an empirically distinguishable factor (I. McGregor, Nash, & Prentice, 2010).

The threats discussed in the present paper reliably heighten expressions of devotion to in-group identities. As the basic finding, experimentally inducing mortality awareness (Castano & Dechesne, 2005; Greenberg et al., 1997), personal uncertainty (Hogg et al., 2007; McGregor et al., 2001; Van den Bos, 2009), a lack of personal control (Fritsche, Jonas, Ablasser, et al., 2013; Fritsche et al., 2008), or expectancy violation (Maher, Van Tilburg, & Van den Tol, 2013) leads people to favor and support in-groups compared to out-groups. Different sorts of groups are defended following threat, ranging from artificial groups created in the lab (Harmon-Jones, Greenberg, Solomon, & Simon, 1996) to various social categories, including national groups (Castano, Yzerbyt, Paladino, & Sacchi, 2002), religious groups (Greenberg et al., 1990), gender groups (Fritsche & Jonas, 2005), one's company (Jonas, Kauffeld, Sullivan, & Fritsche, 2011), and face-to-face groups (Hogg et al., 2007). People also seem to support their group in a direct fashion following threat, for example, by showing increased prosocial attitudes and donation of money to in-group charities (Jonas, Schimel, Greenberg, & Pyszczynski, 2002), collective action intentions (Fritsche, Jonas, Ablasser, et al., 2013, Study 5; Fritsche et al., 2008, Study 6), or promoting in-group symbols and products (e.g., Germans favoring German restaurants, cars, talk shows, cities, or money; Jonas, Fritsche, & Greenberg, 2005).

The same and other threats also cause derogation, hostility, and aggression toward out-groups or critics of in-group ideology (e.g., Jonas & Fritsche, 2013; McGregor et al., 1998; McPherson & Joireman, 2009), ethnocentrism and chauvinism (Castano et al., 2002; Harmon-Jones et al., 1996), group-serving resource allocations (Giannakakis & Fritsche, 2011), biased judgments of pro- and anti-in-group essays (Burke et al., 2010; Greenberg et al., 1990; McGregor et al., 2001; Nakonezny et al., 2004), derogation of group-norm deviants (Burris & Rempel, 2004), greater revenge against moral violators (Schumann et al., 2013), and authoritarian thinking (Fritsche et al., 2013). Other facets of intergroup hostility after threat even include support of military intervention against countries from other cultures (Pyszczynski et al., 2006), harsher noise-blasts to peers who seem to have unfairly rejected participants (Leary, Twenge, & Quinlivan, 2006; Logue, 2006), angrier reactions to organizational unfairness (Van den Bos & Miedema, 2000; Van den Bos et al., 2005), and heightened willingness to kill and die for religious convictions (McGregor, Haji, Nash, et al., 2008; McGregor, Nash, & Prentice, 2010).

Given that anger is an approach-motivated emotion (Carver & Harmon-Jones, 2009; Harmon-Jones & Peterson, 2008), we propose that the hostility element of these various reactions may serve to activate approach-motivated states for relief from threat-induced anxiety. Anger and hostility need not be abstract or social, of course. Indeed, one of our toddlers tried to bite his tricycle after it let him down, and people kick things and slam doors when frustrated. Research on threat and defense tends to highlight the abstract social kinds of hostile defenses, however. People turn to in-group identification and out-group hostility even when the eliciting anxieties having nothing to do with groups. For example, participants become more punitive of normative moral deviants not just after mortality salience or control threats, but also after unconsciously perceived discrepancies and anomalies arising from an experimental session in which the experimenter is switched with a different person wearing the same clothes (Proulx & Heine, 2008), from exposure to flashed word pairs that are semantic anomalies (e.g., quickly blueberry, Randles et al., 2011), or from unexpectedly absurd humor (Proulx et al., 2010) or surreal images (Randles, Heine, & Santos, 2013).

Our contention that abstract social defenses are approach-oriented is partially supported by findings that some are most pronounced among people with highly approach-motivated traits, and that reactive aggression and displaced hostility in general are most pronounced among people with highly approach-motivated traits (Baumeister, Smart, & Boden, 1996; Bushman & Baumeister, 1998; Foster & Trimm, 2008; McGregor et al., 2005).

It is important to emphasize, however, that the effects of threat on in-group bias and out-group derogation are channeled by concepts of social identity and group membership, suggesting that they cannot simply be explained by generalized hostility and aggressiveness following threat. In-group identification mediates the effects of mortality salience on in-group bias (Castano et al., 2002), and salience of meaningful group memberships eliminates anxiety and worldview defense after uncertainty threats (McGregor, Haji, & Kang, 2008; McGregor et al., 2005; Study 4). Control threat also increases in-group bias and out-group derogation only in people highly identified with their in-group (Fritsche, Jonas, Ablasser, et al., 2013). Finally, varying social categorizations moderate biased or hostile responses to threat. Categorizing in- and out-groups as distinct categories is crucial for ethnocentric responses to threat. Common group categorization counteracts these effects and even leads to more favorable reactions to out-groups in response to threat (Giannakakis & Fritsche, 2011; see also Motyl & Pyszczynski, 2009; Pyszczynski et al., 2012). These results demonstrate that

group memberships can exacerbate hostile reaction to threat but can also promote intergroup cooperation.

The approach-oriented nature of group identification reactions to threat is supported by evidence that threats make people particularly attracted to powerful and effective in-groups—power and efficacy are closely linked to approach motivation (Keltner et al., 2003). Mortality salience, for example, increased affiliation with a *successful* sports team but led to disidentification with an unsuccessful one (Dechesne, Greenberg, Arndt, & Schimel, 2000); caused distancing from fellow in group-members tainted by gender or ethnic stereotypes (Arndt, Greenberg, Schimel, Pyszczynski, & Solomon, 2002); increased German participants' world cup confidence when the national team's odds were made to seem high but not low (Jonas & Fritsche, 2012); and caused in-group bias only when the in-group was made to seem more like a cohesive group than a collection of individuals (Giannakakis & Fritsche, 2011, Study 2). In contrast to the heightened appeal of powerful groups, weak groups lose their appeal under conditions of personal threat unless particularly high in personal importance or if leaving the group is not possible (in which case collective action becomes more likely; Fritsche, Jonas, Ablasser, et al., 2013).

Groups also activate approach motivation by bolstering ideals. As described in the previous section, people promote personal ideals for approach-oriented relief from anxiety but these can be difficult to maintain, given that ideals are abstract and difficult to objectively validate, and given the natural diversity of opinion surrounding value-laden topics. As Festinger (1950) noted, humans need social consensus about abstractions for confidence in them (see Hardin & Higgins, 1996). People may therefore be attracted to the power of "we" social identities (Fritsche, Jonas, Ablasser, et al., 2013; Tajfel & Turner, 1986) and become involved in collective movements and actions because doing so fortifies confidence in the empowering ideals that the groups promote and bolster. In this way, abstract social commitments may be a natural and particularly effective catalyst for approach-motivated relief from anxiety.

An important feature of the abstract social commitments that people approach after anxiety-inducing threats is that they can be antisocial and domineering but also prosocial and magnanimous as well. A large body of evidence now indicates that threats heighten compliance with any salient group-related ideal or norm (e.g., Jonas et al., 2008; Motyl et al., 2011). The first evidence for this idea was that experimentally priming tolerance counteracted the

mortality salience-induced negative attitude toward people with dissimilar opinions (Greenberg, Simon, et al., 1992, Study 2; for a recent replication, see Vail, Arndt, Rampy, Pope, & Pinel, 2012). A program of systematic research integrating TMT and norm focus theory (Cialdini, Kallgren, & Reno, 1991) subsequently found that priming specific norms such as pacifism, fairness, prosocial versus proself, or conservatism/security versus benevolence/universalism caused mortality salience effects in the direction of whichever norm had been made salient (Jonas, Sullivan, & Greenberg, 2013; Jonas et al., 2008). Similarly, salient pro-environmental norms cause mortality salience to increase pro-environmental attitudes, information search, and conservation behavior (Fritsche, Jonas, Niesta Kayser, & Koranyi, 2010; see also Gailliot, Stillman, Schmeichel, Maner, & Plant, 2008, for egalitarianism values reducing prejudice following mortality salience; Rothschild, Abdollahi, & Pyszczynski, 2009, for priming compassionate religious values reducing hostile reactions toward out-groups; and Routledge et al., 2004; Cox et al., 2009, for priming of tanned skin values changing interest in sun protection after mortality salience).

Research using different threats complements this picture. A meaning threat (resulting from reverse-colored playing cards) caused people to affirm socially liberal values if relevant social justice beliefs had been activated (i.e., increased support for Affirmative Action, Proulx & Major, 2013). A personal control threat caused factory employees to increase their commitment to organizational change when the consensual value of change had been made salient (Deppe & Fritsche, 2013). In five experiments, achievement or mortality threats caused participants to become either less or more vengeful than usual toward moral transgressors depending on whether magnanimous religious identifications had been primed or not (Schumann et al., 2013).

One might argue that these findings simply suggest that under threat, people respond more strongly to cognitive primes. Counter to this interpretation, several experiments show that, following mortality salience, people do not simply intensify any kind of priming effect (e.g., Greenberg, Schimel, Martens, Solomon, & Pyszcznyski, 2001; Pyszczynski, Abdollahi, et al., 2006; Schimel et al., 1999). Instead, threats make people specifically orient toward their in-groups' worldviews. For example, after mortality salience, a prosocial norm prime caused more helping of children in need but not of culturally less-valued musicians (Jonas et al., 2008; see also Rothschild et al., 2009).

Aside from past evidence that meanings and ideals are approach-motivated (Amodio et al., 2004; Urry et al., 2004), other evidence that these salient ideology effects are approach-oriented comes from the recent finding that people with highly approach-motivated personalities adhere most to primed cultural ideals after threat (Schumann et al., 2013). In addition to motivating adherence to cultural norms, threats (and related arousal) may also increase attention to abstract normative standards (for a similar proposal, see Holbrook et al., 2011). Norm focus experiments find that people are particularly attentive to salient norms when physiologically aroused (Kallgren, Reno, & Cialdini, 2000). Furthermore, as threats cause more abstract and global thinking (Landau et al., 2011; see also Mann et al., 2013), they should make people more inclined to notice idealistic and ideological abstractions.

In sum, abstract social identities may provide powerful leverage for activating approach-oriented states in anxious circumstances. They can legitimize hostility, empower people through identification and action with powerful groups, and promote and bolster ideals.

3.6. BIS mediation of distal defenses

Early models of threat and defense resorted to hypothesizing that defenses were mediated by "potential anxiety" (TMT; Greenberg et al., 1997) or "implicit affect" (Tesser, 2000), because initial attempts at demonstrating mediation by affect were unsuccessful. With the advent of neuroscience techniques, more targeted measures, and exploration of the role of delay, however, there is now ample evidence that various threats that cause defensive reactions also cause BIS-related symptoms of anxiety, vigilance, and avoidance. There is also now considerable evidence that the threats that initially cause BIS-related symptoms also, after a delay, cause approach-oriented defenses, which in turn provide relief from BIS anxiety. The defenses thus seem to spur approach motivation for the purpose of muting anxious arousal triggered by threat (see Figure 4.1). Four categories of evidence support this BIS-mediated process.

The *first* category of evidence pertains to manipulating or measuring the anxiety-related mediator. The opportunity to misattribute anxious arousal eliminates defenses after cognitive dissonance (Zanna & Cooper, 1974), control threats (Kay, Moscovitch, & Laurin, 2010), perceptual discrepancies (Proulx & Heine, 2008), and experimentally engineered goal conflicts (Nash et al., 2011). Muting anxiety with acetaminophen (which acts on the ACC)

eliminates defenses after expectancy violations and mortality salience (Randles et al., 2013). And administering an "anxiety blocker" placebo eliminates worldview defense following mortality salience (Greenberg et al., 2003) and angry reactions after transgressions (Bushman, Baumeister, & Phillips, 2001). More directly, threat-induced anxiety mediated the effect of social rejection on implicit self-esteem striving (Rudman, Dohn, & Fairchild, 2007) and of mortality and uncertainty salience on worldview defense (if the anxiety was measured retrospectively after a delay, in order to circumvent BIS-mediated suppression of anxiety awareness (Echebarria-Echabe, 2013)).

The *second* category of evidence pertains to approach-oriented psychological buffers that mute both defensive and anxious reactions to threats. Like defenses, buffers can also be categorized as personal or social, and concrete or abstract. Tasting one's choice of pleasant food (concrete personal buffer) and secure relationship primes (concrete social buffer) reduce violent action and punishment of a moral transgressor following mortality salience (Hirschberger & Ein-Dor, 2005; Weise et al., 2008). Affirmation of personal values such as intrinsic religiosity, personal values, or positive personality feedback (abstract personal buffers) or reminders of membership in enduring groups or ideologies (abstract social buffer) prevent worldview defense and increase openness to foreign cultures following mortality salience and personal uncertainty threats (Harmon-Jones et al., 1997; Jonas & Fischer, 2006; McGregor et al., 2001, Study 1: McGregor, Haji, & Kang, 2008; Schmeichel & Martens, 2005; Schumann et al., 2013; Routledge & Arndt, 2008; Sullivan, Jonas, & Jodlbauer, 2011).

These four categories of buffers also reduce death thought accessibility after mortality salience (Hayes et al., 2010) and other indicators of BIS-related anxiety after other threats. For example, writing about love of chocolate (concrete personal) and relationship hand-holding (concrete social) decrease ERN amplitude in threatening circumstances (Coan et al., 2006; McGregor, Prentice, & Nash, 2013b), and writing about personal worth or values (abstract personal) or group, ideological, or religious commitments (abstract social) relieve anxious thoughts, cortisol reactions, and ERN amplitude after threats and experimentally engineered conflicts (Inzlicht & Tullett, 2010; Koole, Smeets, Van Knippenberg, & Dijksterhuis, 1999; McGregor, 2006b; McGregor et al., 2005, Study 4; see also Inzlicht et al., 2009, for evidence that trait levels of religious zeal and belief in God are negatively related to the ERN). In two recent studies among people preselected for their love of God (an abstract incentive) and love of chocolate

(a concrete incentive), participants who were randomly assigned to write about their love of God had lower subsequent self-reported anxiety and ERN amplitude than those who wrote about their love of chocolate (McGregor, Prentice, & Nash, 2013b). These findings provide some support for our view that abstraction may be a particularly powerful antidote to BIS anxiety.

The *third* category of evidence pertains to mediation of defensive reactions by phenomena related to anxious vigilance and avoidance. Hypervigilant illusory pattern perception has mediated effects of control deprivation and mortality salience on worldview defense (Agroskin & Jonas, 2013; see also Kay et al., 2008; Kay, Shepherd, et al., 2010; Rutjens et al., 2013). Similarly, the correlations between perceptions of low political/economical control and authoritarianism/ethnocentrism are mediated by heightened need for cognitive closure (Agroskin & Jonas, 2010; see proximal defenses section for explanation of anxious links between vigilance and need for closure).

Finally, the fourth category of evidence that the BIS mediates defensive reactions to threat comes from time course studies designed to detect the transition from the threat-triggered BIS state to the subsequent approach-motivated state. In one study, ACC-based frontal midline theta power increased during the presentation of death-related words (Agroskin, Klackl, Lechinger, et al., 2013), and the longer participants stayed in this BIS-related state (indicative of more anxiety), the more closed-minded they became afterwards. People with low self-esteem remained in the BIS anxiety stage especially long. Moreover, identity-violating threats have similarly caused proximal distress and right frontal asymmetry, and these markers of avoidance motivation predicted not only subsequent defensive identity restoration efforts, but also a transition from right to left frontal asymmetry (Amodio et al., 2007).

Some of us have recently used the line bisection task as an indicator of approach/avoidance motivation (following Nash et al., 2010) to investigate whether threat-induced anxious avoidance triggers distal defenses that in turn catalyze approach motivation (Agroskin, Klackl, McGregor, et al., 2013). In two studies, mortality salience effects on aversion to exploring foreign cultures and derogation of Muslims were mediated by avoidance motivation. These effects occurred after a delay task, and only among people with the relatively anxious and low-approach-motivated traits of low self-esteem and high need for closure. (The more highly approach-motivated

participants presumably turned to their personal resources to more quickly restore approach motivation after threat; McGregor et al., 2009). Critically, one of these time course studies tested the entire motivational process proposed by our model, and found that after the period of threat-induced avoidance motivation for participants with low self-esteem, out-group derogation predicted a subsequent surge in approach motivation (Agroskin, Klackl, McGregor et al., 2013).

In sum, emerging evidence is consistent with the hypothesis that threat causes anxious avoidance, which, in turn, causes people to more eagerly adhere to defenses that catalyze anxiety-soothing, approach-motivated states.

4. OUTLOOK

Our general anxiety-to-approach model temporarily sets aside differences between the various approaches in the threat and defense literature, but it does not rule them out. Specific motivational needs for self-preservation, certainty, control, or self-esteem may guide specific reactions to particular threats under specific circumstances and for specific personality types. Future research isolating processes related to specific motivational differences should now be easier with increased understanding of general process similarities. The neural measures we relied on do not distinguish among specific kinds of discrepancy, but it is still conceivable that threats differ in the extent to which they arouse explicit or implicit accessibility of different threat-related words. These accessibility differences might differentially mediate threat effects on anxiety-related outcomes such as perceptions of randomness (Agroskin & Jonas, 2013) or defensive responses such as worldview defense (Echebarria-Echabe, 2013).

Different threats might also differentially affect the duration of threat-induced BIS activity or the period of time that is required for people to flip from anxious avoidance to approach-oriented defenses. According to a meta-analysis by Martens, Burke, Schimel, and Faucher (2011), significantly longer delays between threat induction and measurement of approach-oriented outcomes are needed for mortality than uncertainty and meaninglessness threats, suggesting that mortality salience may trigger particularly long-lasting and profound BIS activation.

Mortality salience may also affect a qualitatively different kind of anxious arousal than other threats. Whereas defenses after mortality salience have been

eliminated by an anxiety *blocker* placebo (Greenberg et al., 2003), defenses after other threats have been eliminated by anxiety *misattribution* placebos or opportunities (Kay, Moscovitch, et al., 2010; Nash et al., 2011; Proulx & Heine, 2008; see also Inzlicht & Al-Khindi, 2012, for evidence that error-related ACC activation can be mitigated by arousal misattribution). Given that there seem to be multiple types of arousal underlying BIS anxiety (McNaughton & Gray, 2000), it might be the case that different threats produce different types of anxious arousal that are sensitive to different placebo framings. Still, temporal dynamics of threat inhibition, rebound hyperaccessibility, and translation to worldview defenses are so remarkably similar for uncertainty and mortality threats (Wichman, Bruner, & Weary, 2013), that a very similar anxiety-related process consistent with our general model seems to be at play.

In order to resolve the open questions about the coactivity of general and specific processes, the heterogeneous procedures used to manipulate and measure threats, mediators, moderators, and defenses will need to be more clearly acknowledged in future research. For example, there are no clear standards for how long a delay should be, what participants are supposed to do during the delay, or even whether a delay is used at all before measuring the central dependent variables. Furthermore, research has been inconsistent in its identification of particular types of defenses (e.g., directly related to the threat or not) and whether they are measured before or after a delay. Moreover, most but not all experiments offer only one single defensive option. This might force people to use a certain defense even if they would have spontaneously preferred a different one, perhaps one more closely linked to the threat (see Shepherd et al., 2011, for recent empirical findings that support this reasoning). Threat and defense researchers should aim at establishing shared methodological standards to facilitate integrative progress.

A remaining question for future research is the extent to which defenses are merely palliative vs. effective at resolving discrepancies. One prediction that follows from the present model is that abstract defenses may often be more effective at reducing anxiety than concrete ones. It is unclear, however, how effectively they might also help to repair the discrepancy. When addressing the question of effectiveness, the distinction between anxiety relief in the short term and discrepancy reduction in the long term is important. Over the longer term, a criterion of effective coping may be that the threatening information can be integrated into the self and one's broader social life (e.g., relationships, values, group memberships, worldviews). This would minimize the necessity of defensive reactions in upcoming threat

situations, because thoughts about the threats would already be linked with meaningful representations. This self-integrative process might buffer individuals against stressful consequences of threats in the future.

Our general anxiety-to-approach model would further specify that resilience in the face of threat might be attained by finding ways to help people maintain proactive approach orientation for immunity to BIS-related states. Doing so might free resources for an open-minded search for opportunities to resolve discrepancies in a more direct fashion. To the extent that proactive approach-oriented states are prosocial, they might also enable people to navigate threatening terrain prosocially (Van den Bos et al., 2011; Van den Bos & Lind, 2013; see also Hirsh, Galinsky, & Zhong, 2011).

Interestingly, self-affirmations involving idealistic abstractions (highest personal values) make people more open-minded (Correll, Spencer, & Zanna, 2004), less anxious (Creswell et al., 2005), less defensive (Sherman & Cohen, 2006), and more prosocial (Crocker, Niiya, & Mischkowski, 2008; Shnabel, Purdie-Vaughns, Cook, Garcia, & Cohen, 2013). Future research should probe the extent to which these effects are mediated by approach-motivated states. Self-affirmations may allow people to respond more constructively to everyday discrepancies without resorting to exaggerated defenses for relief from anxiety. Future research should examine the time course of self-affirmation effects on approach motivation and various symptoms of anxiety.

Our general process model may also shed light on "ego-depletion" and self-control failure (Baumeister, Bratlavsky, Muraven, & Tice, 1998). Dozens of experiments have demonstrated that persistent inhibition of prepotent responses (e.g., resisting temptation, persisting with a boring task, suppressing emotion) causes subsequent self-control failure. From our perspective, this is because the manipulations in these studies essentially induce discrepancies. People want to approach the temptation, quit the boring task, or express their emotion, but the experimental instructions require a discrepant course of action. This discrepancy activates the BIS, and this causes a reactive increase in impulsive behavior as a way to activate approach-motivated states for relief from anxiety. There is some existing evidence for heightened approach motivation after ego-depletion manipulations (Schmeichel et al., 2010), but the role of BIS as a mediating mechanism requires future research (cf. Inzlicht & Gutsell, 2007). Recent advances in understanding basic processes underlying depletion are consistent with our interpretation of depletion as BIS activation that can be relieved by restoration of approach motivation (e.g., by detecting

sugar in one's mouth; Hagger & Chatzisarantis, 2013; Molden et al., 2012; see Fox & Davidson, 1986, for evidence that oral sugar activates approach-motivated states).

One important implication of our general process model is its potential for greater understanding of reactive hostility in its various concrete and abstract manifestations. Anger and aggression are approach-motivated states (Carver & Harmon-Jones, 2009). Accordingly, our model suggests a broadening of the frustration–aggression hypothesis (Berkowitz, 1989; Dollard, Doob, Miller, Mowrer, & Sears, 1939).[8] Frustration is a kind of discrepancy (between the goal-standard and perceived progress), but according to our model, any kind of discrepancy would incline people toward approach behaviors, related or unrelated to aggression. Aggression is only one of the ways people respond to discrepancies in an approach-oriented fashion, and it may not even be the most important one. Whether aggression or prosocial responses prevail should depend on the social situation (e.g., salience of normative cues; Berkowitz & Lepage, 1967; Jonas et al., 2008; Rothschild et al., 2009; Schumann et al., 2013).

After 20 years of model proliferation, we are now well positioned to apply a rich, accumulated understanding of general processes and specific moderating and mediating processes to the prediction and control of important social processes in the real world. For example, due to their approach-oriented character, salient prosocial ideals may provide both resilience to anxiety and constructive, prosocial directions for threat reactions. The often abstract and socially bolstered nature of defenses and affirmations suggests that groups might become more resilient, prosocial, and effective if they proactively promoted prosocial and cooperative identities, brands, and worldviews (Jonas & Fritsche, 2013). Proactive salience of ideologies and meaningful group identities can decrease defensiveness and anxiety without increasing jingoism (McGregor, Haji, & Kang 2008; McGregor et al., 2005). Constructive ideological branding may seem quaint to the post-modern mind, but if the basic motivational processes we have identified are correct, promotion of conciliatory social norms could conceivably transform cycles of anxiety and conflict into more prosocial intergroup dynamics.

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REFERENCES

Agroskin, D., & Jonas, E. (2010). Out of control: How and why does perceived lack of control lead to ethnocentrism? *Review of Psychology*, *17*(2), 79–90.

Agroskin, D., & Jonas, E. (2013). Controlling death by defending ingroups—Mediational insights into terror management and control restoration. *Journal of Experimental Social Psychology*, *49*(6), 1144–1158. http://dx.doi.org/10.1016/j.jesp.2013.05.014.

Agroskin, D., Klackl, J., Lechinger, J., Speitel, C., & Jonas, E. (2013). *Frontal midline theta is increased in response to threat*. Unpublished manuscript.

Agroskin, D., Klackl, J., McGregor, I., & Jonas, E. (2013). *Temporal perspectives on approach and avoidance tendencies in response to threat*. Unpublished manuscript.

Allman, J. M., Hakeem, A., Erwin, J. M., Nimchinsky, E., & Hof, P. (2001). The anterior cingulate cortex. The evolution of an interface between emotion and cognition. *Annals of the New York Academy of Sciences*, *935*, 107–117.

Amodio, D. M., Devine, P. G., & Harmon-Jones, E. (2007). A dynamic model of guilt—Implications for motivation and self-regulation in the context of prejudice. *Psychological Science*, *18*(6), 524–530. http://dx.doi.org/10.1111/j.1467-9280.2007.01933.x.

Amodio, D. M., Master, S. L., Yee, C. M., & Taylor, S. E. (2008). Neurocognitive components of the behavioral inhibition and activation systems: Implications for theories of self-regulation. *Psychophysiology*, *45*(1), 11–19. http://dx.doi.org/10.1111/j.1469-8986.2007.00609.x.

Amodio, D. M., Shah, J. Y., Sigelman, J., Brazy, P. C., & Harmon-Jones, E. (2004). Implicit regulatory focus associated with asymmetrical frontal cortical activity. *Journal of Experimental Social Psychology*, *40*(2), 225–232. http://dx.doi.org/10.1016/S0022-1031(03)00100-8.

Arndt, J., Greenberg, J., Schimel, J., Pyszczynski, T., & Solomon, S. (2002). To belong or not to belong, that is the question: Terror management and identification with gender and ethnicity. *Journal of Personality and Social Psychology*, *83*(1), 26–43.

Arndt, J., Greenberg, J., Simon, L., Pyszczynski, T., & Solomon, S. (1998). Terror management and self-awareness: Evidence that mortality salience provokes avoidance of the self-focused state. *Personality and Social Psychology Bulletin*, *24*(11), 1216–1227.

Arndt, J., Routledge, C., & Goldenberg, J. L. (2006). Predicting proximal health responses to reminders of death: The influence of coping style and health optimism. *Psychology and Health*, *21*(5), 593–614. http://dx.doi.org/10.1080/14768320500537662.

Arndt, J., Schimel, J., & Goldenberg, J. L. (2003). Death can be good for your health: Fitness intentions as a proximal and distal defense against mortality salience. *Journal of Applied Social Psychology*, *33*(8), 1726–1746.

Aronson, J., Cooper, J., & Blanton, H. (1995). From dissonance to disidentification—Selectivity in the self-affirmation process. *Journal of Personality and Social Psychology*, *68*(6), 986–996. http://dx.doi.org/10.1037/0022-3514.68.6.986.

Bannerman, D. M., Rawlins, J. N. P., McHugh, S. B., Deacon, R. M. J., Yee, B. K., Bast, T., et al. (2004). Regional dissociations within the hippocampus—Memory and anxiety. *Neuroscience and Biobehavioral Reviews*, *28*(3), 273–283. http://dx.doi.org/10.1016/j.neubiorev.2004.03.004.

Bartholow, B. D., Pearson, M. A., Dickter, C. L., Sher, K. J., Fabiani, M., & Gratton, G. (2005). Strategic control and medial frontal negativity: Beyond errors and response conflict. *Psychophysiology*, *42*(1), 33–42. http://dx.doi.org/10.1111/j.1469-8986.2005.00258.x.

Baumeister, R. F., Bratlavsky, E., Muraven, M., & Tice, D. M. (1998). Ego depletion: Is the active self a limited resource. *Journal of Personality and Social Psychology*, *74*, 1252–1265.

Baumeister, R. F., & Leary, M. R. (1995). The need to belong—Desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin*, *117*(3), 497–529. http://dx.doi.org/10.1037/0033-2909.117.3.497.

Baumeister, R. F., Smart, L., & Boden, J. M. (1996). Relation of threatened egotism to violence and aggression: The dark side of high self-esteem. *Psychological Review*, *103*(1), 5–33. http://dx.doi.org/10.1037/0033-295x.103.1.5.

Baumeister, R. F., Tice, D. M., & Hutton, D. G. (1989). Self-presentational motivations and personality differences in self-esteem. *Journal of Personality*, *57*(3), 547–579.

Baumgardner, A. H. (1990). To know oneself is to like oneself: Self-certainty and self-affect. *Journal of Personality and Social Psychology*, *58*, 1062–1072.

Beauregard, K. S., & Dunning, D. (1998). Turning up the contrast: Self-enhancement motives prompt egocentric contrast effects in social judgments. *Journal of Personality and Social Psychology*, *74*(3), 606–621. http://dx.doi.org/10.1037//0022-3514.74.3.606.

Beauregard, K. S., & Dunning, D. (2001). Defining self-worth: Trait self-esteem moderates the use of self-serving trait definitions in social judgment. *Motivation and Emotion*, *25*(2), 135–161. http://dx.doi.org/10.1023/A:1010665926045.

Berkowitz, L. (1989). The frustration-aggression hypothesis: An examination and reformulation. *Psychological Bulletin*, *106*, 59–73.

Berkowitz, L., & Lepage, A. (1967). Weapons as aggression-eliciting stimuli. *Journal of Personality and Social Psychology*, *7*, 202–207.

Bishop, S., Duncan, J., Brett, M., & Lawrence, A. D. (2004). Prefrontal cortical function and anxiety: Controlling attention to threat-related stimuli. *Nature Neuroscience*, *7*(2), 184–188. http://dx.doi.org/10.1038/nn1173.

Blackhart, G. C., Nelson, B. C., Knowles, M. L., & Baumeister, R. F. (2009). Rejection elicits emotional reactions but neither causes immediate distress nor lowers self-esteem: A meta-analytic review of 192 studies on social exclusion. *Personality and Social Psychology Review*, *13*(4), 269–309. http://dx.doi.org/10.1177/1088868309346065.

Blaine, B., & Crocker, J. (1993). Self-esteem and self-serving biases in reactions to positive and negative events: An integrative review. In R. F. Baumeister (Ed.), *Self-esteem: The puzzle of low self-regard* (pp. 55–85). New York, NY: Plenum Press.

Boksem, M. A., Tops, M., Kostermans, E., & De Cremer, D. (2008). Sensitivity to punishment and reward omission: Evidence from error-related ERP components. *Biological Psychology*, *79*(2), 185–192. http://dx.doi.org/10.1016/j.biopsycho.2008.04.010.

Boksem, M. A., Tops, M., Wester, A. E., Meijman, T. F., & Lorist, M. M. (2006). Error-related ERP components and individual differences in punishment and reward sensitivity. *Brain Research*, *1101*(1), 92–101. http://dx.doi.org/10.1016/j.brainres.2006.05.004.

Botvinick, M. M., Braver, T. S., Barch, D. M., Carter, C. S., & Cohen, J. D. (2001). Conflict monitoring and cognitive control. *Psychological Review*, *108*(3), 624–652.

Boucher, H. C. (2011). Self-knowledge defenses to self-threats. *Journal of Research in Personality*, *45*(2), 165–174. http://dx.doi.org/10.1016/j.jrp.2010.12.006.

Bozo, O., Tunca, A., & Simsek, Y. (2009). The effect of death anxiety and age on health-promoting behaviors: A terror-management theory perspective. *Journal of Psychology: Interdisciplinary and Applied*, *143*(4), 377–389. http://dx.doi.org/10.3200/JRLP.143.4.377-389.

Bradley, M. M. (2009). Natural selective attention: Orienting and emotion. *Psychophysiology*, *46*(1), 1–11. http://dx.doi.org/10.1111/j.1469-8986.2008.00702.x.

Brewer, M. B., Hong, Y.-Y., & Li, Q. (2004). Dynamic entitativity: Perceiving groups as actors. In V. Yzerbyt, C. M. Judd, & O. Corneille (Eds.), *The psychology of group perception: Perceived variability, entitativity, and essentialism* (pp. 25–38). New York, NY: Psychology Press.

Burke, B. L., Martens, A., & Faucher, E. H. (2010). Two decades of terror management theory: A meta-analysis of mortality salience research. *Personality and Social Psychology Review*, *14*(2), 155–195. http://dx.doi.org/10.1177/1088868309352321.

Burris, C. T., & Rempel, J. K. (2004). It's the end of the world as we know it: Threat and the spatial-symbolic self. *Journal of Personality and Social Psychology*, *86*(2), 284. http://dx.doi.org/10.1037/H0087891.

Bush, G., Luu, P., & Posner, M. I. (2000). Cognitive and emotional influences in anterior cingulate cortex. *Trends in Cognitive Sciences*, *4*(6), 215–222. http://dx.doi.org/10.1016/S1364-6613(00)01483-2.

Bushman, B. J., & Baumeister, R. F. (1998). Threatened egotism, narcissism, self-esteem, and direct and displaced aggression: Does self-love or self-hate lead to violence? *Journal of Personality and Social Psychology*, *75*(1), 219–229. http://dx.doi.org/10.1037/0022-3514.75.1.219.

Bushman, B. J., Baumeister, R. F., & Phillips, C. M. (2001). Do people aggress to improve their mood? Catharsis beliefs, affect regulation opportunity, and aggressive responding. *Journal of Personality and Social Psychology*, *81*(1), 17–32.

Byrne, D., Mcdonald, R. D., & Mikawa, J. (1963). Approach and avoidance affiliation motives. *Journal of Personality*, *31*(1), 21–37. http://dx.doi.org/10.1111/j.1467-6494.1963.tb01837.x.

Campbell, J. D. (1990). Self-esteem and clarity of the self-concept. *Journal of Personality and Social Psychology*, *59*, 538–549.

Campbell, W. K., & Sedikides, C. (1999). Self-threat magnifies the self-serving bias: A meta-analytic integration. *Review of General Psychology*, *3*(1), 23–43.

Carter, C. S., Braver, T. S., Barch, D. M., Botvinick, M. M., Noll, D., & Cohen, J. D. (1998). Anterior cingulate cortex, error detection, and the online monitoring of performance. *Science*, *280*(5364), 747–749.

Carter-Sowell, A. R., Chen, Z., & Williams, K. D. (2008). Ostracism increases social susceptibility. *Social Influence*, *3*(3), 143–153. http://dx.doi.org/10.1080/15534510802204868.

Carver, C. S., & Harmon-Jones, E. (2009). Anger is an approach-related affect: Evidence and implications. *Psychological Bulletin*, *135*(2), 183–204. http://dx.doi.org/10.1037/A0013965.

Carver, C. S., & Scheier, M. (1998). *On the self-regulation of behavior*. Cambridge, UK; New York, NY, USA: Cambridge University Press.

Castano, E., & Dechesne, M. (2005). On defeating death: Group reification and social identification as immortality strategies. *European Review of Social Psychology*, *16*(7), 221–255. http://dx.doi.org/10.1080/10463280500436024.

Castano, E., Yzerbyt, V., Paladino, M. P., & Sacchi, S. (2002). I belong, therefore, I exist: Ingroup identification, ingroup entitativity, and ingroup bias. *Personality and Social Psychology Bulletin*, *28*(2), 135–143. http://dx.doi.org/10.1177/0146167202282001.

Cavallo, J. V., Fitzsimons, G. M., & Holmes, J. G. (2009). Taking chances in the face of threat: Romantic risk regulation and approach-motivation. *Personality and Social Psychology Bulletin*, *35*(6), 737–751. http://dx.doi.org/10.1177/0146167209332742.

Cavallo, J. V., Fitzsimons, G. M., & Holmes, J. G. (2010). When self-protection overreaches: Relationship-specific threat activates domain-general avoidance motivation. *Journal of Experimental Social Psychology*, *46*(1), 1–8. http://dx.doi.org/10.1016/j.jesp.2009.07.007.

Cavallo, J. V., Holmes, J. G., Fitzsimons, G. M., Murray, S. L., & Wood, J. V. (2012). Managing motivational conflict: How self-esteem and executive resources influence self-regulatory responses to risk. *Journal of Personality and Social Psychology*, *103*(3), 430–451. http://dx.doi.org/10.1037/A0028821.

Cialdini, R. B., Borden, R. J., Thorne, A., Walker, M. R., Freeman, S., & Sloan, L. R. (1976). Basking in reflected glory—Three (football) field studies. *Journal of Personality and Social Psychology*, *34*(3), 366–375. http://dx.doi.org/10.1037//0022-3514.34.3.366.

Cialdini, R. B., Kallgren, C. A., & Reno, R. R. (1991). A focus theory of normative conduct—A theoretical refinement and reevaluation of the role of norms in human behavior. *Advances in Experimental Social Psychology*, *24*, 201–234. http://dx.doi.org/10.1016/S0065-2601(08)60330-5.

Coan, J. A., Schaefer, H. S., & Davidson, R. J. (2006). Lending a hand: Social regulation of the neural response to threat. *Psychological Science*, *17*(12), 1032–1039. http://dx.doi.org/10.1111/j.1467-9280.2006.01832.x.

Cobb, S. (1974). Physiologic changes in men whose jobs were abolished. *Journal of Psychosomatic Research*, *18*(4), 245–258. http://dx.doi.org/10.1016/0022-3999(74)90005-1.

Cooper, D. P., Goldenberg, J. L., & Arndt, J. (2010). Examining the terror management health model: The interactive effect of conscious death thought and health-coping variables on decisions in potentially fatal health domains. *Personality and Social Psychology Bulletin*, *37*(7), 937–946. http://dx.doi.org/10.1177/0146167210370694.

Cooper, D. P., Goldenberg, J. L., & Arndt, J. (2011). Empowering the self: Using the terror management health model to promote breast self-examination. *Self and Identity*, *10*(3), 315–325.

Corr, P. J. (2002). J.A. Gray's reinforcement sensitivity theory: Tests of the joint subsystems hypothesis of anxiety and impulsivity. *Personality and Individual Differences*, *33*, 511–532.

Corr, P. J. (2008). *The reinforcement sensitivity theory of personality*. Cambridge: Cambridge University Press.

Corr, P. J. (2011). Anxiety: Splitting the phenomenological atom. *Personality and Individual Differences*, *50*(7), 889–897. http://dx.doi.org/10.1016/j.paid.2010.09.013.

Corr, P. J., DeYoung, C. G., & McNaughton, N. (2013). Motivation and personality: A neuropsychological perspective. *Social and Personality Psychology Compass*, *7*(3), 158–175. http://dx.doi.org/10.1111/spc3.12016.

Correll, J., Spencer, S. J., & Zanna, M. P. (2004). An affirmed self and an open mind: Self-affirmation and sensitivity to argument strength. *Journal of Experimental Social Psychology*, *40*, 350–356.

Cox, C. R., & Arndt, J. (2012). How sweet it is to be loved by you: The role of perceived regard in the terror management of close relationships. *Journal of Personality and Social Psychology*, *102*, 616–632.

Cox, C. R., Arndt, J., Pyszczynski, T., Greenberg, J., Abdollahi, A., & Solomon, S. (2008). Terror management and adults' attachment to their parents: The safe haven remains. *Journal of Personality and Social Psychology*, *94*(4), 696–717. http://dx.doi.org/10.1037/0022-3514.94.4.696.

Cox, C. R., Cooper, D. P., Vess, M., Arndt, J., Goldenberg, J. L., & Routledge, C. (2009). Bronze is beautiful but pale can be pretty: The effects of appearance standards and mortality salience on sun-tanning outcomes. *Health Psychology*, *28*(6), 746–752. http://dx.doi.org/10.1037/N0016388.

Craig, A. D. (2002). How do you feel? Interoception: The sense of the physiological condition of the body. *Nature Reviews Neuroscience*, *3*(8), 655–666.

Craig, A. D. (2009). How do you feel—Now? The anterior insula and human awareness. *Nature Reviews Neuroscience*, *10*(1), 59–70.

Creswell, J. D., Welch, W. T., Taylor, S. E., Sherman, D. K., Gruenewald, T. L., & Mann, T. (2005). Affirmation of personal values buffers neuroendocrine and psychological stress responses. *Psychological Science*, *16*(11), 846–851. http://dx.doi.org/10.1111/j.1467-9280.2005.01624.x.

Crocker, J., & Luhtanen, R. K. (2003). Level of self-esteem and contingencies of self-worth: Unique effects on academic, social, and financial problems in college students. *Personality and Social Psychology Bulletin*, *29*(6), 701–712. http://dx.doi.org/10.1177/0146167203252881.

Crocker, J., Niiya, Y., & Mischkowski, D. (2008). Why does writing about important values reduce defensiveness? Self-affirmation and the role of positive other-directed feelings. *Psychological Science*, *19*(7), 740–747.

Crombez, G., Eccleston, C., De Vlieger, P., Van Damme, S., & De Clercq, A. (2008). Is it better to have controlled and lost than never to have controlled at all? An experimental investigation of control over pain. *Pain*, *137*(3), 631–639. http://dx.doi.org/10.1016/j.pain.2007.10.028.

Davidson, R. J., Ekman, P., Saron, C. D., Senulis, J. A., & Friesen, W. V. (1990). Approach-withdrawal and cerebral asymmetry: Emotional expression and brain physiology: I. *Journal of Personality and Social Psychology*, *58*(2), 330.

Dechesne, M., Greenberg, J., Arndt, J., & Schimel, J. (2000). Terror management and the vicissitudes of sports fan affiliation: The effects of mortality salience on optimism and fan identification. *European Journal of Social Psychology*, *30*(6), 813–835. http://dx.doi.org/10.1002/1099-0992(200011/12)30:6<813::Aid-Ejsp17>3.0.Co;2-M.

Dehaene, S., Posner, M. I., & Tucker, D. M. (1994). Localization of a neural system for error detection and compensation. *Psychological Science*, *5*(5), 303–305. http://dx.doi.org/10.1111/j.1467-9280.1994.tb00630.x.

Deppe, J., & Fritsche, I. (2013). Threat to control and approach-motivation: A group-based control perspective. In *Talk presented at the EASP Small Group Meeting 'social determinants and consequences of threat'. Berlin, Germany, June.*

DeWall, C. N., & Baumeister, R. F. (2007). From terror to joy: Automatic tuning to positive affective information following mortality salience. *Psychological Science*, *18*(11), 984–990. http://dx.doi.org/10.1111/j.1467-9280.2007.02013.x.

DeWall, C. N., Maner, J. K., & Rouby, D. A. (2009). Social exclusion and early-stage interpersonal perception: Selective attention to signs of acceptance. *Journal of Personality and Social Psychology*, *96*(4), 729–741. http://dx.doi.org/10.1037/A0014634.

Dodgson, P. G., & Wood, J. V. (1998). Self-esteem and the cognitive accessibility of strengths and weaknesses after failure. *Journal of Personality and Social Psychology*, *75*(1), 178–197. http://dx.doi.org/10.1037/0022-3514.75.1.178.

Dollard, J., Doob, L. W., Miller, N. E., Mowrer, O. H., & Sears, R. R. (1939). *Frustration and Aggression*. New Haven: Yale University Press.

Du, H., Jonas, E., Klackl, J., Agroskin, D., Hui, E. K., & Ma, L. (2013). Cultural influences on terror management: Independent self-esteem as anxiety buffers. *Journal of Experimental Social Psychology*, *49*(6), 1002–1011.

Dunning, D., & Hayes, A. F. (1996). Evidence for egocentric comparison in social judgment. *Journal of Personality and Social Psychology*, *71*(2), 213–229. http://dx.doi.org/10.1037//0022-3514.71.2.213.

Echebarria-Echabe, A. (2013). Mortality salience and uncertainty: Similar effects but different processes? *European Journal of Social Psychology*, *43*(3), 185–191. http://dx.doi.org/10.1002/Ejsp.1938.

Echterhoff, G., Higgins, E. T., & Groll, S. (2005). Audience-tuning effects on memory: The role of shared reality. *Journal of Personality and Social Psychology*, *89*(3), 257–276. http://dx.doi.org/10.1037/0022-3514.89.3.257.

Egner, T. (2011). Surprise! A unifying model of dorsal anterior cingulate function? *Nature Neuroscience*, *14*(10), 1219–1220. http://dx.doi.org/10.1038/nn.2932.

Eisenberger, N. I., Lieberman, M. D., & Williams, K. D. (2003). Does rejection hurt? An fMRI study of social exclusion. *Science*, *302*(5643), 290–292. http://dx.doi.org/10.1126/science.1089134.

Elliot, A. J., & Devine, P. G. (1994). On the motivational nature of cognitive dissonance: Dissonance as psychological discomfort. *Journal of Personality and Social Psychology*, *67*(3), 382–394. http://dx.doi.org/10.1037//0022-3514.67.3.382.

Elliot, A. J., & McGregor, H. A. (1999). Test anxiety and the hierarchical model of approach and avoidance achievement motivation. *Journal of Personality and Social Psychology*, *76*(4), 628–644. http://dx.doi.org/10.1037/0022-3514.76.4.628.

Fein, S., & Spencer, S. J. (1997). Prejudice as self-image maintenance: Affirming the self through derogating others. *Journal of Personality and Social Psychology*, *73*(1), 31–44. http://dx.doi.org/10.1037/0022-3514.73.1.31.

Ferraro, R., Shiv, B., & Bettman, J. R. (2005). Let us eat and drink, for tomorrow we shall die: Effects of mortality salience and self-esteem on self-regulation in consumer choice. *Journal of Consumer Research*, *32*(1), 65–75. http://dx.doi.org/10.1086/429601.

Ferriday, C., McGregor, I., & Nash, K. (2011). Religious radicalization after anxious uncertainty threats to achievement, romantic, and economic goals. In *Paper presented at the 72nd Annual Conference of the Canadian Psychological Association, Toronto, ON, June.*

Festinger, L. (1950). Informal social communication. *Psychological Review*, *57*(5), 271–282. http://dx.doi.org/10.1037/H0056932.

Festinger, L. (1957). *A theory of cognitive dissonance*. Stanford, CA: Stanford University Press.

Fiske, S. T. (2002). Five core social motives, plus or minus five. In S. J. Spencer, S. Fein, M. P. Zanna, & J. Olson (Eds.), *Motivated social perception: The Ontario symposium*, Vol. 9, (pp. 223–236). Mahwah, NJ: Erlbaum.

Florian, V., & Mikulincer, M. (1998). Symbolic immortality and the management of the terror of death: The moderating role of attachment style. *Journal of Personality and Social Psychology*, *74*(3), 725–734. http://dx.doi.org/10.1037//0022-3514.74.3.725.

Foster, J. D., & Trimm, R. F. (2008). On being eager and uninhibited: Narcissism and approach-avoidance motivation. *Personality and Social Psychology Bulletin*, *34*(7), 1004–1017. http://dx.doi.org/10.1177/0146167208316688.

Fox, N. A., & Davidson, R. G. (1986). Taste-elicited changes in facial signs of emotion and the asymmetry of brain electrical activity in human newborns. *Neuropsychologica*, *24*, 417–422.

Fransen, M. L., Fennis, B. M., Pruyn, A. T. H., & Das, E. (2008). Rest in peace? Brand-induced mortality salience and consumer behavior. *Journal of Business Research*, *61*(10), 1053–1061. http://dx.doi.org/10.1016/j.jbusres.2007.09.020.

Freud, A. (1967). *The ego and the mechanisms of defense* (Rev. ed.). New York, NY: International Universities Press.

Fritsche, I., & Jonas, E. (2005). Gender conflict and worldview defence. *British Journal of Social Psychology*, *44*, 571–581. http://dx.doi.org/10.1348/014466605x27423.

Fritsche, I., Jonas, E., Ablasser, C., Beyer, M., Kuban, J., Manger, A. M., et al. (2013). The power of we: Evidence for group-based control. *Journal of Experimental Social Psychology*, *49*(1), 19–32. http://dx.doi.org/10.1016/j.jesp.2012.07.014.

Fritsche, I., Jonas, E., & Fankhänel, T. (2008). The role of control motivation in mortality salience effects on ingroup support and defense. *Journal of Personality and Social Psychology*, *95*(3), 524–541.

Fritsche, I., Jonas, E., Fischer, P., Koranyi, N., Berger, N., & Fleischmann, B. (2007). Mortality salience and the desire for offspring. *Journal of Experimental Social Psychology*, *43*(5), 753–762. http://dx.doi.org/10.1016/j.jesp.2006.10.003.

Fritsche, I., Jonas, E., & Kessler, T. (2011). Collective reactions to threat: Implications for intergroup conflict and for solving societal crises. *Social Issues and Policy Review*, *5*(1), 101–136. http://dx.doi.org/10.1111/j.1751-2409.2011.01027.x.

Fritsche, I., Jonas, E., Klackl, J., & Decker, O. (2013). *Group-based control restoration under conditions of unemployment threat*. Manuscript submitted for publication.

Fritsche, I., Jonas, E., Niesta Kayser, D., & Koranyi, N. (2010). Existential threat and compliance with pro-environmental norms. *Journal of Environmental Psychology*, *30*(1), 67–79. http://dx.doi.org/10.1016/j.jenvp.2009.08.007.

Fritsche, I., Bilewicz, M., Jugert, P., Lücke, B., Beelmann, A., Noack, P., et al. (2013). *Threat to personal control is breeding intolerance in intergroup relations: Evidence from representative samples and longitudinal data*. Unpublished manuscript.

Gable, S. L. (2006). Approach and avoidance social motives and goals. *Journal of Personality*, *74*(1), 175–222. http://dx.doi.org/10.1111/j.1467-6494.2005.00373.x.

Gable, S. L., & Gosnell, C. L. (2013). Approach and avoidance behavior in interpersonal relationships. *Emotion Review*, *5*(3), 269–274. http://dx.doi.org/10.1177/1754073913477513.

Gailliot, M. T., Stillman, T. F., Schmeichel, B. J., Maner, J. K., & Plant, E. A. (2008). Mortality salience increases adherence to salient norms and values. *Personality and Social Psychology Bulletin*, *34*(7), 993–1003. http://dx.doi.org/10.1177/0146167208316791.

Gardner, W. L., Pickett, C. L., & Brewer, M. B. (2000). Social exclusion and selective memory: How the need to belong influences memory for social events. *Personality and Social Psychology Bulletin*, *26*(4), 486–496. http://dx.doi.org/10.1177/0146167200266007.

Gawronski, B. (2012). Back to the future of dissonance theory: Cognitive consistency as a core motive. *Social Cognition*, *30*(6), 652–668.

Giannakakis, A. E., & Fritsche, I. (2011). Social identities, group norms, and threat: On the malleability of ingroup bias. *Personality and Social Psychology Bulletin*, *37*(1), 82–93. http://dx.doi.org/10.1177/0146167210386120.

Gray, J. A. (1985). Emotional behaviour and the limbic system. In M. R. Trimble (Ed.), *Interface between neurology and psychiatry* (pp. 1–25). Basel/New York: Karger.

Gray, J. A., & McNaughton, N. (2000). *The neuropsychology of anxiety: An enquiry into the functions of the septo-hippocampal system* (2nd ed.). Oxford: Oxford University Press.

Greenberg, J., Arndt, J., Simon, L., Pyszczynski, T., & Solomon, S. (2000). Proximal and distal defenses in response to reminders of one's mortality: Evidence of a temporal sequence. *Personality and Social Psychology Bulletin*, *26*(1), 91–99. http://dx.doi.org/10.1177/0146167200261009.

Greenberg, J., Kosloff, S., Solomon, S., Cohen, F., & Landau, M. (2010). Toward understanding the fame game: The effect of mortality salience on the appeal of fame. *Self and Identity*, *9*(1), 1–18. http://dx.doi.org/10.1080/15298860802391546.

Greenberg, J., Martens, A., Jonas, E., Eisenstadt, D., Pyszczynski, T., & Solomon, S. (2003). Psychological defense in anticipation of anxiety: Eliminating the potential for anxiety eliminates the effect of mortality salience on worldview defense. *Psychological Science*, *14*(5), 516–519. http://dx.doi.org/10.1111/1467-9280.03454.

Greenberg, J., Pyszczynski, T., Burling, J., Simon, L., Solomon, S., Rosenblatt, A., et al. (1992). Why do people need self-esteem—Converging evidence that self-esteem serves an anxiety-buffering function. *Journal of Personality and Social Psychology*, *63*(6), 913–922.

Greenberg, J., Pyszczynski, T., Solomon, S., Pinel, E., Simon, L., & Jordan, K. (1993). Effects of self-esteem on vulnerability-denying defensive distortions: Further evidence of an anxiety-buffering function of self-esteem. *Journal of Experimental Social Psychology*, *29*(3), 229–251.

Greenberg, J., Pyszczynski, T., Solomon, S., Rosenblatt, A., Veeder, M., Kirkland, S., et al. (1990). Evidence for terror management theory II: The effects of mortality salience on reactions to those who threaten or bolster the cultural worldview. *Journal of Personality and Social Psychology*, *58*(2), 308–318.

Greenberg, J., Pyszczynski, T., Solomon, S., Simon, L., & Breus, M. (1994). Role of consciousness and accessibility of death-related thoughts in mortality salience effects. *Journal of Personality and Social Psychology*, *67*(4), 627–637.

Greenberg, J., Schimel, J., Martens, A., Solomon, S., & Pyszcznyski, T. (2001). Sympathy for the devil: Evidence that reminding whites of their mortality promotes more favorable reactions to white racists. *Motivation and Emotion*, *25*(2), 113–133. http://dx.doi.org/10.1023/A:1010613909207.

Greenberg, J., Simon, L., Harmon-Jones, E., Solomon, S., Pyszczynski, T., & Lyon, D. (1995). Testing alternative explanations for mortality salience effects: Terror management, value accessibility, or worrisome thoughts? *European Journal of Social Psychology*, *25*(4), 417–433. http://dx.doi.org/10.1002/ejsp.2420250406.

Greenberg, J., Simon, L., Pyszczynski, T., Solomon, S., & Chatel, D. (1992). Terror management and tolerance—Does mortality salience always intensify negative reactions to others who threaten ones worldview. *Journal of Personality and Social Psychology*, *63*(2), 212–220. http://dx.doi.org/10.1037/0022-3514.63.2.212.

Greenberg, J., Solomon, S., & Pyszczynski, T. (1997). Terror management theory of self-esteem and social behavior: Empirical assessments and conceptual refinements. In M. P. Zanna (Ed.), *Advances in experimental social psychology*, Vol. 29, (pp. 61–139). New York, NY: Academic Press.

Greenwald, A. G. (1980). The totalitarian ego—Fabrication and revision of personal history. *American Psychologist*, *35*(7), 603–618. http://dx.doi.org/10.1037/0003-066x.35.7.603.

Greve, W., & Strobl, R. (2004). Social and individual coping with threats: Outlines of an interdisciplinary approach. *Review of General Psychology*, *8*(3), 194–207.

Gurari, I., Strube, M. J., & Hetts, J. J. (2009). Death? Be proud! The ironic effects of terror salience on implicit self-esteem. *Journal of Applied Social Psychology*, *39*(2), 494–507. http://dx.doi.org/10.1111/j.1559-1816.2008.00448.x.

Hagger, M. S., & Chatzisarantis, N. L. (2013). The sweet taste of success. The presence of glucose in the oral cavity moderates the depletion of self-control resources. *Personality and Social Psychology Bulletin*, *39*(1), 28–42.

Hajcak, G., & Foti, D. (2008). Errors are aversive: Defensive motivation and the error-related negativity. *Psychological Science*, *19*(2), 103–108. http://dx.doi.org/10.1111/j.1467-9280.2008.02053.x.

Hajcak, G., MacNamara, A., & Olvet, D. M. (2010). Event-related potentials, emotion, and emotion regulation: An integrative review. *Developmental Neuropsychology*, *35*(2), 129–155.

Hajcak, G., McDonald, N., & Simons, R. F. (2003). Anxiety and error-related brain activity. *Biological Psychology*, *64*(1–2), 77–90.

Hamilton, M. L. (1967). Affiliative behavior as a function of approach and avoidance affiliation motives, opinion evaluation, and birth order. *The Journal of Social Psychology*, *72*(1), 61–70. http://dx.doi.org/10.1080/00224545.1967.9922299.

Han, S., Qin, J., & Ma, Y. (2010). Neurocognitive processes of linguistic cues related to death. *Neuropsychologia*, *48*(12), 3436–3442.

Hardin, C. D., & Higgins, E. T. (1996). Shared reality: How social verification makes the subjective objective. In R. M. Sorrentino & E. T. Higgins (Eds.), *The interpersonal context: 3. Handbook of motivation and cognition*. (pp. 28–84). New York, NY: Guilford.

Harmon-Jones, E. (2000). Cognitive dissonance and experienced negative affect: Evidence that dissonance increases experienced negative affect even in the absence of aversive consequences. *Personality and Social Psychology Bulletin*, *26*(12), 1490–1501. http://dx.doi.org/10.1177/01461672002612004.

Harmon-Jones, E. (2004). Contributions from research on anger and cognitive dissonance to understanding the motivational functions of asymmetrical frontal brain activity. *Biological Psychology*, *67*(1–2), 51–76. http://dx.doi.org/10.1016/j.biopsycho.2004.03.003.

Harmon-Jones, E., Amodio, D. M., & Harmon-Jones, C. (2009). Action-based model of dissonance: A review, integration, and expansion of conceptions of cognitive conflict. In M. P. Zanna (Ed.), *Advances in experimental social psychology*, Vol. 41, (pp. 119–166). Burlington, MA: Academic Press.

Harmon-Jones, E., Greenberg, J., Solomon, S., & Simon, L. (1996). The effects of mortality salience on intergroup bias between minimal groups. *European Journal of Social Psychology*, *26*(4), 677–681.

Harmon-Jones, E., & Mills, J. (1999). *Cognitive dissonance: Progress on a pivotal theory in social psychology* (1st ed.). Washington, DC: American Psychological Association.

Harmon-Jones, E., & Peterson, C. K. (2008). Effect of trait and state approach-motivation on aggressive inclinations. *Journal of Research in Personality*, *42*(5), 1381–1385. http://dx.doi.org/10.1016/j.jrp.2008.05.001.

Harmon-Jones, E., Simon, L., Greenberg, J., Pyszczynski, T., Solomon, S., & McGregor, H. (1997). Terror management theory and self-esteem: Evidence that increased self-esteem reduces mortality salience effects. *Journal of Personality and Social Psychology*, *72*(1), 24–36.

Hart, J., & Burns, D. J. (2012). Nothing concentrates the mind: Thoughts of death improve recall. *Psychonomic Bulletin and Review*, *19*(2), 264–269. http://dx.doi.org/10.3758/s13423-011-0211-9.

Hart, J., Shaver, P. R., & Goldenberg, J. L. (2005). Attachment, self-esteem, worldviews, and terror management: Evidence for a tripartite security. *Journal of Personality and Social Psychology*, *88*(6), 999–1013. http://dx.doi.org/10.1037/0022-3514.88.6.999.

Hayes, J., Schimel, J., Arndt, J., & Faucher, E. H. (2010). A theoretical and empirical review of the death-thought accessibility concept in terror management research. *Psychological Bulletin*, *136*(5), 699–739. http://dx.doi.org/10.1037/A0020524.

Hayes, J., Schimel, J., Williams, T. J., Howard, A. L., Webber, D., & Faucher, E. H. (2013). *Worldview accommodation: Selectively modifying committed beliefs provides defense against worldview threat*. Manuscript submitted for publication.

Heimpel, S. A., Elliot, A. J., & Wood, J. V. (2006). Basic personality dispositions, self-esteem, and personal goals: An approach-avoidance analysis. *Journal of Personality*, *74*(5), 1293–1319. http://dx.doi.org/10.1111/j.1467-6494.2006.00410.x.

Heimpel, S. A., Wood, J. V., Marshall, M. A., & Brown, J. D. (2002). Do people with low self-esteem really want to feel better? Self-esteem differences in motivation to repair negative moods. *Journal of Personality and Social Psychology*, *82*(1), 128–147. http://dx.doi.org/10.1037//0022-3514.82.1.128.

Heine, S. J., Harihara, M., & Niiya, Y. (2002). Terror management in Japan. *Asian Journal of Social Psychology*, *5*(3), 187–196. http://dx.doi.org/10.1111/1467-839x.00103.

Heine, S. J., Proulx, T., & Vohs, K. D. (2006). The meaning maintenance model: On the coherence of social motivations. *Personality and Social Psychology Review*, *10*(2), 88–110.

Higgins, E. T., Roney, C. J. R., Crowe, E., & Hymes, C. (1994). Ideal versus ought predilections for approach and avoidance—Distinct self-regulatory systems. *Journal of Personality and Social Psychology*, *66*(2), 276–286. http://dx.doi.org/10.1037//0022-3514.66.2.276.

Hirschberger, G., & Ein-Dor, T. (2005). Does a candy a day keep the death thoughts away? The terror management function of eating. *Basic and Applied Social Psychology*, *27*(2), 179–186. http://dx.doi.org/10.1207/s15324834basp2702_9.

Hirschberger, G., Ein-Dor, T., Caspi, A., Arzouan, Y., & Zivotfsky, A. Z. (2010). Looking away from death: Defensive attention as a form of terror management. *Journal of Experimental Social Psychology*, *46*(1), 172–178. http://dx.doi.org/10.1016/j.jesp.2009.10.005.

Hirschberger, G., Florian, V., & Mikulincer, M. (2003). Strivings for romantic intimacy following partner complaint or partner criticism: A terror management perspective. *Journal of Social and Personal Relationships*, *20*(5), 675–687. http://dx.doi.org/10.1177/02654075030205006.

Hirsh, J. B., Galinsky, A. D., & Zhong, C.-B. (2011). Drunk, powerful, and in the dark: How general processes of disinhibition produce both prosocial and antisocial behavior. *Perspectives on Psychological Science*, *6*(5), 415–427. http://dx.doi.org/10.1177/1745691611416992.

Hirsh, J. B., Mar, R. A., & Peterson, J. B. (2012). Psychological entropy: A framework for understanding uncertainty-related anxiety. *Psychological Review*, *119*(2), 304–320. http://dx.doi.org/10.1037/A0026767.

Hogg, M. A. (2007). Uncertainty–identity theory. In M. P. Zanna (Ed.), *Advances in experimental social psychology*, Vol. 39, (pp. 69–126). San Diego, CA: Academic Press.

Hogg, M. A., Sherman, D. K., Dierselhuis, J., Maitner, A. T., & Moffitt, G. (2007). Uncertainty, entitativity, and group identification. *Journal of Experimental Social Psychology*, *43*(1), 135–142. http://dx.doi.org/10.1016/j.jesp.2005.12.008.

Holbrook, C. (2013). Worldview defense: Compensatory affirmation or unconscious vigilance? In *Paper presented at the 14th annual meeting of the Society for personality and social psychology, New Orleans, LA, January*.

Holbrook, C., & Sousa, P. (2013). Supernatural beliefs, unconscious threat, and judgment bias in Tibetan Buddhists. *Journal of Cognition and Culture*, *13*, 33–56.

Holbrook, C., Sousa, P., & Hahn-Holbrook, J. (2011). Unconscious vigilance: Worldview defense without adaptations for terror, coalition, or uncertainty management. *Journal of Personality and Social Psychology*, *101*, 451–466.

Holroyd, C. B., & Coles, M. G. (2002). The neural basis of human error processing: Reinforcement learning, dopamine, and the error-related negativity. *Psychological Review*, *109*(4), 679–709.

Hooker, C. I., & Knight, R. T. (2006). The role of the orbitofrontal cortex in the inhibition of emotion. In D. H. Zald & S. L. Rauch (Eds.), *The orbitofrontal cortex* (pp. 307–324). New York: Oxford University Press.

Horney, K. (1945). *Our inner conflicts, a constructive theory of neurosis*. New York, NY: W.W. Norton & Company.

Impett, E. A., Gordon, A. M., Kogan, A., Oveis, C., Gable, S. L., & Keltner, D. (2010). Moving toward more perfect unions: Daily and long-term consequences of approach and avoidance goals in romantic relationships. *Journal of Personality and Social Psychology*, *99*(6), 948–963. http://dx.doi.org/10.1037/a0020271.

Inzlicht, M., & Al-Khindi, T. (2012). ERN and the placebo: A misattribution approach to studying the arousal properties of the error-related negativity. *Journal of Experimental Psychology: General*, *141*, 799–807. http://dx.doi.org/10.1037/a0027586.

Inzlicht, M., & Gutsell, J. N. (2007). Running on empty neural signals for self-control failure. *Psychological Science*, *18*(11), 933–937.

Inzlicht, M., McGregor, I., Hirsh, J. B., & Nash, K. (2009). Neural markers of religious conviction. *Psychological Science*, *20*, 385–392.

Inzlicht, M., & Tullett, A. M. (2010). Reflecting on God: Religious primes can reduce neurophysiological response to errors. *Psychological Science*, *21*(8), 1184–1190.

Jackson, D. C., Mueller, C. J., Dolski, I., Dalton, K. M., Nitschke, J. B., Urry, H. L., et al. (2003). Now you feel it, now you don't: Frontal brain electrical asymmetry and individual differences in emotion regulation. *Psychological Science*, *14*(6), 612–617.

Jessop, D. C., Albery, I. P., Rutter, J., & Garrod, H. (2008). Understanding the impact of mortality-related health-risk information: A terror management theory perspective. *Personality and Social Psychology Bulletin*, *34*(7), 951–964. http://dx.doi.org/10.1177/0146167208316790.

Jewell, G., & McCourt, M. E. (2000). Pseudoneglect: A review and meta-analysis of performance factors in line bisection tasks. *Neuropsychologia*, *38*(1), 93–110. http://dx.doi.org/10.1016/S0028-3932(99)00045-7.

Johannes, S., Wieringa, B. M., Nager, W., Dengler, R., & Munte, T. F. (2001). Oxazepam alters action monitoring. *Psychopharmacology*, *155*(1), 100–106.

Jonas, E., & Fischer, P. (2006). Terror management and religion: Evidence that intrinsic religiousness mitigates worldview defense following mortality salience. *Journal of Personality and Social Psychology*, *91*(3), 553–567.

Jonas, E., & Fritsche, I. (2012). Follow the norm! Terror management theory and the influence of descriptive norms. *Social Psychology*, *43*(1), 28–32. http://dx.doi.org/10.1027/1864-9335/A000077.

Jonas, E., & Fritsche, I. (2013). Destined to die but not to wage war: How existential threat can contribute to escalation or de-escalation of violent intergroup conflict. *American Psychologist*, *68*(7), 543–558. http://dx.doi.org/10.1037/a0033052.

Jonas, E., Fritsche, I., & Greenberg, J. (2005). Currencies as cultural symbols, an existential psychological perspective on reactions of Germans toward the Euro. *Journal of Economic Psychology*, *26*(1), 129–146. http://dx.doi.org/10.1016/j.joep.2004.02.003.

Jonas, E., & Greenberg, J. (2004). Terror management and political attitudes: The influence of mortality salience on Germans' defence of the German reunification. *European Journal of Social Psychology*, *34*(1), 1–9. http://dx.doi.org/10.1002/Ejsp.178.

Jonas, E., Greenberg, J., & Frey, D. (2003). Connecting terror management and dissonance theory: Evidence that mortality salience increases the preference for supporting information after decisions. *Personality and Social Psychology Bulletin*, *29*(9), 1181–1189. http://dx.doi.org/10.1177/0146167203254599.

Jonas, E., Kauffeld, S., Sullivan, D., & Fritsche, I. (2011). Dedicate your life to the company! A terror management perspective on organizations. *Journal of Applied Social Psychology*, *41*, 2858–2882.

Jonas, E., Niesta Kayser, D., Martens, A., Fritsche, I., Sullivan, D., & Greenberg, J. (2008). Focus theory of normative conduct and terror-management theory: The interactive impact of mortality salience and norm salience on social judgment. *Journal of Personality and Social Psychology*, *95*(6), 1239–1251. http://dx.doi.org/10.1037/A0013593.

Jonas, E., Schimel, J., Greenberg, J., & Pyszczynski, T. (2002). The scrooge effect: Evidence that mortality salience increases prosocial attitudes and behavior. *Personality and Social Psychology Bulletin*, *28*(10), 1342–1353. http://dx.doi.org/10.1177/014616702236834.

Jonas, E., Sullivan, D., & Greenberg, J. (2013). Generosity, greed, norms, and death—Differential effects of mortality salience on charitable behavior. *Journal of Economic Psychology*, *35*, 47–57. http://dx.doi.org/10.1016/j.joep.2012.12.005.

Jost, J. T., Napier, J. L., Thorisdottir, H., Gosling, S. D., Palfai, T. P., & Ostafin, B. (2007). Are needs to manage uncertainty and threat associated with political conservatism or ideological extremity? *Personality and Social Psychology Bulletin*, *33*(7), 989–1007. http://dx.doi.org/10.1177/0146167207301028.

Kallgren, C. A., Reno, R. R., & Cialdini, R. B. (2000). A focus theory of normative conduct: When norms do and do not affect behavior. *Personality and Social Psychology Bulletin*, *26*(8), 1002–1012. http://dx.doi.org/10.1177/01461672002610009.

Kanske, P., Heissler, J., Schonfelder, S., Bongers, A., & Wessa, M. (2011). How to regulate emotion? Neural networks for reappraisal and distraction. *Cerebral Cortex*, *21*(6), 1379–1388.

Kasl, S. V., & Cobb, S. (1970). Blood pressure changes in men undergoing job loss: A preliminary report. *Psychosomatic Medicine*, *32*(1), 19–38.

Kasser, T., & Sheldon, K. M. (2000). Of wealth and death: Materialism, mortality salience, and consumption behavior. *Psychological Science*, *11*, 348–351.

Kay, A. C., Gaucher, D., McGregor, I., & Nash, K. (2010). Religious conviction as compensatory control. *Personality and Social Psychology Review*, *14*, 37–48.

Kay, A. C., Gaucher, D., Napier, J. L., Callan, M. J., & Laurin, K. (2008). God and the government: Testing a compensatory control mechanism for the support of external systems. *Journal of Personality and Social Psychology*, *95*(1), 18–35. http://dx.doi.org/10.1037/0022-3514.95.1.18.

Kay, A. C., Moscovitch, D. A., & Laurin, K. (2010). Randomness, attributions of arousal, and belief in god. *Psychological Science*, *21*(2), 216–218. http://dx.doi.org/10.1177/0956797609357750.

Kay, A. C., Shepherd, S., Blatz, C. W., Chua, S. N., & Galinsky, A. D. (2010). For god (or) country: The hydraulic relation between government instability and belief in religious sources of control. *Journal of Personality and Social Psychology*, *99*(5), 725–739. http://dx.doi.org/10.1037/A0021140.

Kay, A. C., Whitson, J. A., Gaucher, D., & Galinsky, A. D. (2009). Compensatory control: Achieving order through the mind, our institutions, and the heavens. *Current Directions in Psychological Science*, *18*(5), 264–268.

Keltner, D., Gruenfeld, D. H., & Anderson, C. (2003). Power, approach, and inhibition. *Psychological Review*, *110*(2), 265–284. http://dx.doi.org/10.1037/0033-295x.110.2.265.

Kerns, J. G., Cohen, J. D., MacDonald, A. W., Cho, R. Y., Stenger, V. A., & Carter, C. S. (2004). Anterior cingulate conflict monitoring and adjustments in control. *Science*, *303*(5660), 1023–1026. http://dx.doi.org/10.1126/science.1089910.

Kirkpatrick, L. A., & Navarrete, C. D. (2006). Reports of my death anxiety have been greatly exaggerated: A critique of terror management theory from an evolutionary perspective. *Psychological Inquiry*, *17*(4), 288–298. http://dx.doi.org/10.1080/10478400701366969.

Kitayama, S., Chua, H. F., Tompson, S., & Han, S. H. (2013). Neural mechanisms of dissonance: An fMRI investigation of choice justification. *NeuroImage*, *69*, 206–212. http://dx.doi.org/10.1016/j.neuroimage.2012.11.034.

Klackl, J., Jonas, E., & Kronbichler, M. (2013a). Existential neuroscience: Neurophysiological correlates of proximal defenses against death-related thoughts. *Social Cognitive and Affective Neuroscience*, *8*(3), 333–340. http://dx.doi.org/10.1093/scan/nss003.

Klackl, J., Jonas, E., & Kronbichler, M. (2013b). Existential neuroscience: Self-esteem moderates neuronal processes elicited by mortality salience. *Social Cognitive and Affective Neuroscience*. Advance online publication. http://dx.doi.org/10.1093/scan/nst167.

Klinger, E. (1977). *Meaning and void: Inner experience and the incentives in people's lives*. Minneapolis: University of Minnesota Press.

Koole, S. L., Smeets, K., Van Knippenberg, A., & Dijksterhuis, A. (1999). The cessation of rumination through self-affirmation. *Journal of Personality and Social Psychology*, *77*(1), 111–125.

Kruglanski, A. W. (2004). *The psychology of closed-mindedness*. New York, NY: Psychology Press.

Kruglanski, A. W., Pierro, A., Mannetti, L., & De Grada, E. (2006). Groups as epistemic providers: Need for closure and the unfolding of group-centrism. *Psychological Review*, *113*, 84–100.

Kruglanski, A. W., & Webster, D. M. (1996). Motivated closing of the mind: "Seizing" and "freezing". *Psychological Review*, *103*(2), 263–283.

Landau, M. J., & Greenberg, J. (2006). Play it safe or go for the gold? A terror management perspective on self-enhancement and protection motives in risky decision making. *Personality and Social Psychology Bulletin*, *32*, 1633–1645.

Landau, M. J., Greenberg, J., Solomon, S., Pyszczynski, T., & Martens, A. (2006). Windows into nothingness: Terror management, meaninglessness, and negative reactions to modern art. *Journal of Personality and Social Psychology*, *90*(6), 879–892. http://dx.doi.org/10.1037/0022-3514.90.6.879.

Landau, M. J., Greenberg, J., Sullivan, D., Routledge, C., & Arndt, J. (2009). The protective identity: Evidence that mortality salience heightens the clarity and coherence of the self-concept. *Journal of Experimental Social Psychology*, *45*(4), 796–807. http://dx.doi.org/10.1016/j.jesp.2009.05.013.

Landau, M. J., Johns, M., Greenberg, J., Pyszczynski, T., Martens, A., Goldenberg, J. L., et al. (2004). A function of form: Terror management and structuring the social world. *Journal of Personality and Social Psychology*, *87*(2), 190–210. http://dx.doi.org/10.1037/0022-3514.87.2.190.

Landau, M. J., Kosloff, S., & Schmeichel, B. J. (2011). Imbuing everyday actions with meaning in response to existential threat. *Self and Identity*, *10*(1), 64–76. http://dx.doi.org/10.1080/15298860903557243.

Lang, P. J., Bradley, M. M., & Cuthbert, B. N. (1997). Motivated attention: Affect, activation, and action. In P. J. Lang, R. F. Simons, & M. Balaban (Eds.), *Attention and orienting: Sensory and motivational processes* (pp. 97–135). Mahwah, NJ: Lawrence Erlbaum Associates.

Langens, T. A. (2007). Emotional and motivational reactions to failure: The role of illusions of control and explicitness of feedback. *Motivation and Emotion*, *31*(2), 105–114. http://dx.doi.org/10.1007/s11031-007-9058-9.

Leary, M. R., Twenge, J. M., & Quinlivan, E. (2006). Interpersonal rejection as a determinant of anger and aggression. *Personality and Social Psychology Review*, *10*(2), 111–132. http://dx.doi.org/10.1207/s15327957pspr1002_2.

Leotti, L. A., Iyengar, S. S., & Ochsner, K. N. (2010). Born to choose: The origins and value of the need for control. *Trends in Cognitive Sciences*, *14*(10), 457–463. http://dx.doi.org/10.1016/j.tics.2010.08.001.

Lévesque, J., Eugène, F., Joanette, Y., Paquette, V., Mensour, B., Beaudoin, G., et al. (2003). Neural circuitry underlying voluntary suppression of sadness. *Biological Psychiatry*, *53*(6), 502–510.

Logue, M. (2006). *Aggressive response to peer rejection and acceptance as a function of rejection sensitivity and attachment style*. Canada: Canadian theses, York University.

Luu, P., Collins, P., & Tucker, D. M. (2000). Mood, personality, and self-monitoring: Negative affect and emotionality in relation to frontal lobe mechanisms of error monitoring. *Journal of Experimental Psychology: General*, *129*(1), 43–60.

Luu, P., & Tucker, D. M. (2001). Regulating action: Alternating activation of midline frontal and motor cortical networks. *Clinical Neurophysiology*, *112*(7), 1295–1306. http://dx.doi.org/10.1016/S1388-2457(01)00559-4.

Luu, P., Tucker, D. M., Derryberry, D., Reed, M., & Poulsen, C. (2003). Electrophysiological responses to errors and feedback in the process of action regulation. *Psychological Science*, *14*(1), 47–53. http://dx.doi.org/10.1111/1467-9280.01417.

Luu, P., Tucker, D. M., & Makeig, S. (2004). Frontal midline theta and the error-related negativity: Neurophysiological mechanisms of action regulation. *Clinical Neurophysiology*, *115*(8), 1821–1835.

Maher, P. J., Van Tilburg, W. A. P., & Van den Tol, A. J. M. (2013). Meaning in music: Deviations from expectations in music prompt outgroup derogation. *European Journal of Social Psychology*, *43*(6), 449–454. http://dx.doi.org/10.1002/ejsp.1969.

Mandel, N., & Heine, S. (1999). Terror management and marketing: He who dies with the most toys wins. *Advances in Consumer Research*, *26*, 527–532.

Maner, J. K., DeWall, C. N., Baumeister, R. F., & Schaller, M. (2007). Does social exclusion motivate interpersonal reconnection? Resolving the "porcupine problem" *Journal of Personality and Social Psychology*, *92*(1), 42–55. http://dx.doi.org/10.1037/0022-3514.92.1.42.

Mann, N. H., Kawakami, K., Phills, C., Nash, K., Litvack, A., & McGregor, I. (2013). *Responding to threat with a global focus and approach-orientation*. Unpublished manuscript.

Marigold, D. C., McGregor, I., & Zanna, M. P. (2010). Defensive conviction as emotion regulation: Goal mechanisms and relationship implications. In R. M. Arkin, K. C. Oleson, & P. J. Carroll (Eds.), *The uncertain self: A handbook of perspectives from social and personality psychology* (pp. 232–248). Mahwah, NJ: Lawrence Erlbaum Associates.

Martens, A., Burke, B. L., Schimel, J., & Faucher, E. H. (2011). Same but different: Meta-analytically examining the uniqueness of mortality salience effects. *European Journal of Social Psychology*, *41*(1), 6–10.http://dx.doi.org/10.1002/ejsp.767.

Martens, A., & Schmeichel, B. J. (2011). Evidence that thinking about death relates to time-estimation behavior. *Death Studies*, *35*(6), 504–524. http://dx.doi.org/10.1080/07481187.2011.573174.

McGregor, I. (2006a). Offensive defensiveness: Toward an integrative neuroscience of compensatory zeal after mortality salience, personal uncertainty, and other poignant self-threats. *Psychological Inquiry*, *17*(4), 299–308.

McGregor, I. (2006b). Zeal appeal: The allure of moral extremes. *Basic and Applied Social Psychology*, *28*(4), 343–348. http://dx.doi.org/10.1207/s15324834basp2804_7.

McGregor, I., Gailliot, M. T., Vasquez, N. A., & Nash, K. A. (2007). Ideological and personal zeal reactions to threat among people with high self-esteem: Motivated promotion focus. *Personality and Social Psychology Bulletin*, *33*(11), 1587–1599. http://dx.doi.org/10.1177/0146167207306280.

McGregor, I., Haji, R., & Kang, S. J. (2008). Can ingroup affirmation relieve outgroup derogation? *Journal of Experimental Social Psychology*, *44*(5), 1395–1401. http://dx.doi.org/10.1016/j.jesp.2008.06.001.

McGregor, I., Haji, R., Nash, K. A., & Teper, R. (2008). Religious zeal and the uncertain self. *Basic and Applied Social Psychology*, *30*(2), 183–188.

McGregor, I., & Jordan, C. H. (2007). The mask of zeal: Low implicit self-esteem, threat, and defensive extremism. *Self and Identity*, *6*(2–3), 223–237. http://dx.doi.org/10.1080/15298860601115351.

McGregor, H. A., Lieberman, J. D., Greenberg, J., Solomon, S., Arndt, J., Simon, L., et al. (1998). Terror management and aggression: Evidence that mortality salience motivates aggression against worldview-threatening others. *Journal of Personality and Social Psychology*, *74*(3), 590–605.

McGregor, I., & Marigold, D. C. (2003). Defensive zeal and the uncertain self: What makes you so sure? *Journal of Personality and Social Psychology*, *85*(5), 838–852. http://dx.doi.org/10.1037/0022-3514.85.5.838.

McGregor, I., Nail, P. R., Marigold, D. C., & Kang, S. J. (2005). Defensive pride and consensus: Strength in imaginary numbers. *Journal of Personality and Social Psychology*, *89*(6), 978–996. http://dx.doi.org/10.1037/0022-3514.89.6.978.

McGregor, I., Nash, K. A., & Inzlicht, M. (2009). Threat, high self-esteem, and reactive approach-motivation: Electroencephalographic evidence. *Journal of Experimental Social Psychology*, *45*(4), 1003–1007.

McGregor, I., Nash, K., Mann, N., & Phills, C. E. (2010). Anxious uncertainty and reactive approach-motivation (RAM). *Journal of Personality and Social Psychology*, *99*(1), 133–147.

McGregor, I., Nash, K., & Prentice, M. (2010). Reactive approach-motivation (RAM) for religion. *Journal of Personality and Social Psychology*, *99*(1), 148–161. http://dx.doi.org/10.1037/A0019702.

McGregor, I., Nash, K., Prentice, M., Ferriday, C., Laurin, K., & Kay, A. (2013). Goal impedance, anxiety and reactive approach-motivation for ideals and worldviews. In *Paper presented at the 14th annual meeting of the society for personality and social psychology, Louisiana, LA, January*.

McGregor, I., Prentice, M., & Nash, K. (2013a). Anxious uncertainty and reactive approach-motivation (RAM) for religious, idealistic, and lifestyle extremes. *Journal of Social Issues*, *69*(3), 537–563.

McGregor, I., Prentice, M., & Nash, K. (2013b). Approaching relief: Compensatory ideals relieve threat-induced anxiety by promoting approach-motivated states. *Social Cognition*, *30*(6), 689–714.

McGregor, I., Zanna, M. P., Holmes, J. G., & Spencer, S. J. (2001). Compensatory conviction in the face of personal uncertainty: Going to extremes and being oneself. *Journal of Personality and Social Psychology*, *80*(3), 472–488.

McNaughton, N., & Corr, P. J. (2004). A two-dimensional neuropsychology of defense: Fear/anxiety and defensive distance. *Neuroscience and Biobehavioral Review*, *28*(3), 285–305. http://dx.doi.org/10.1016/j.neubiorev.2004.03.005.

McNaughton, N., & Gray, J. A. (2000). Anxiolytic action on the behavioural inhibition system implies multiple types of arousal contribute to anxiety. *Journal of Affective Disorders*, *61*(3), 161–176.http://dx.doi.org/10.1016/S0165-0327(00)00344-X.

McPherson, S., & Joireman, J. (2009). Death in Groups: Mortality salience and the interindividual-intergroup discontinuity effect. *Group Processes and Intergroup Relations*, *12*(4), 419–429. http://dx.doi.org/10.1177/1368430209105044.

Mendes, W. B., Blascovich, J., Hunter, S. B., Lickel, B., & Jost, J. T. (2007). Threatened by the unexpected: Physiological responses during social interactions with expectancy-violating partners. *Journal of Personality and Social Psychology*, *92*(4), 698–716. http://dx.doi.org/10.1037/0022-3514.92.4.698.

Menon, V., & Uddin, L. Q. (2010). Saliency, switching, attention and control: A network model of insula function. *Brain Structure and Function*, *214*(5–6), 655–667. http://dx.doi.org/10.1007/s00429-010-0262-0.

Mikulincer, M., Birnbaum, G., Woddis, D., & Nachmias, G. (2000). Stress and accessibility of proximity-related thoughts: Exploring the normative and intraindividual components of attachment theory. *Journal of Personality and Social Psychology*, *78*(3), 509–523. http://dx.doi.org/10.1037//0022-3514.78.3.509.

Mikulincer, M., Florian, V., & Hirschberger, G. (2003). The existential function of close relationships: Introducing death into the science of love. *Personality and Social Psychology Review*, *7*(1), 20–40. http://dx.doi.org/10.1207/S15327957pspr0701_2.

Mikulincer, M., Gillath, O., & Shaver, P. R. (2002). Activation of the attachment system in adulthood: Threat-related primes increase the accessibility of mental representations of attachment figures. *Journal of Personality and Social Psychology*, *83*(4), 881–895. http://dx.doi.org/10.1037//0022-3514.83.4.881.

Milner, A. D., Brechmann, M., & Pagliarini, L. (1992). To halve and to halve not: An analysis of line bisection judgements in normal subjects. *Neuropsychologia*, *30*(6), 515–526. http://dx.doi.org/10.1016/0028-3932(92)90055-Q.

Molden, D. C., Hui, C. M., Scholar, A. A., Meier, B. P., Noreen, E. E., D'Agostino, P. R., et al. (2012). Motivational versus metabolic effects of carbohydrates on self-control. *Psychological Science*, *23*(19), 1137–1144.

Motyl, M., Hart, J., Pyszczynski, T., Weise, D., Maxfield, M., & Siedel, A. (2011). Subtle priming of shared human experiences eliminates threat-induced negativity toward Arabs, immigrants, and peace-making. *Journal of Experimental Social Psychology*, *47*(6), 1179–1184. http://dx.doi.org/10.1016/j.jesp.2011.04.010.

Motyl, M., & Pyszczynski, T. (2009). The existential underpinnings of the cycle of terrorist and counterterrorist violence and pathways to peaceful resolutions. *International Review of Social Psychology*, *2*, 267–291.

Murray, S. L., Holmes, J. G., & Griffin, D. W. (1996). The benefits of positive illusions: Idealization and the construction of satisfaction in close relationships. *Journal of Personality and Social Psychology*, *70*(1), 79–98. http://dx.doi.org/10.1037/0022-3514.70.1.79.

Nail, P. R., & McGregor, I. (2009). Conservative shift among Liberals and Conservatives following 9/11/01. *Social Justice Research*, *22*(2–3), 231–240. http://dx.doi.org/10.1007/s11211-009-0098-z.

Nakonezny, P. A., Rodgers, J. L., & Reddick, R. E. (2004). Did divorces decline after the Oklahoma City bombing? *Journal of Marriage and Family*, *66*, 90–100.

Nash, K., Inzlicht, M., & McGregor, I. (2012). Approach-related left prefrontal EEG asymmetry predicts muted error-related negativity. *Biological Psychology*, *91*(1), 96–102. http://dx.doi.org/10.1016/j.biopsycho.2012.05.005.

Nash, K., McGregor, I., & Inzlicht, M. (2010). Line bisection as a neural marker of approach-motivation. *Psychophysiology*, *47*(5), 979–983. http://dx.doi.org/10.1111/j.1469-8986.2010.00999.x.

Nash, K., McGregor, I., & Prentice, M. (2011). Threat and defense as goal regulation: From implicit goal conflict to anxious uncertainty, reactive approach-motivation, and ideological extremism. *Journal of Personality and Social Psychology*, *101*(6), 1291–1301. http://dx.doi.org/10.1037/A0025944.

Nash, K., Prentice, M., Hirsh, J., McGregor, I., & Inzlicht, M. (2013). Muted neural response to distress among securely attached people. *Social Cognitive and Affective Neuroscience*. Advance online publication. http://dx.doi.org/10.1093/scan/nst099.

Nash, K., Prentice, M., McGregor, I., Phills, C., & Inzlicht, M. (2013). *Reactive approach motivation for risk: Why anxiety can cause risky preferences*. Manuscript submitted for publication.

Nomura, M., Ohira, H., Haneda, K., Iidaka, T., Sadato, N., Okada, T., et al. (2004). Functional association of the amygdala and ventral prefrontal cortex during cognitive evaluation of facial expressions primed by masked angry faces: An event-related fMRI study. *NeuroImage*, *21*(1), 352–363.

Ohira, H., Nomura, M., Ichikawa, N., Isowa, T., Iidaka, T., Sato, A., et al. (2006). Association of neural and physiological responses during voluntary emotion suppression. *NeuroImage*, *29*(3), 721–733.

Öhman, A. (2005). The role of the amygdala in human fear: Automatic detection of threat. *Psychoneuroendocrinology*, *30*(10), 953–958.

Oliveira, F. T., McDonald, J. J., & Goodman, D. (2007). Performance monitoring in the anterior cingulate is not all error related: Expectancy deviation and the representation of action-outcome associations. *Journal of Cognitive Neuroscience*, *19*(12), 1994–2004. http://dx.doi.org/10.1162/jocn.2007.19.12.1994.

Park, L. E. (2010). Responses to self-threat: Linking self and relational constructs with approach and avoidance motivation. *Social and Personality Psychology Compass*, *4*(3), 201–221. http://dx.doi.org/10.1111/j.1751-9004.2009.00247.x.

Paterson, R. J., & Neufeld, R. W. J. (1987). Clear danger—Situational determinants of the appraisal of threat. *Psychological Bulletin*, *101*(3), 404–416. http://dx.doi.org/10.1037/0033-2909.101.3.404.

Peterson, J. B. (1999). *Maps of meaning: The architecture of belief*. New York, NY: Routledge.

Phan, K. L., Fitzgerald, D. A., Nathan, P. J., Moore, G. J., Uhde, T. W., & Tancer, M. E. (2005). Neural substrates for voluntary suppression of negative affect: A functional magnetic resonance imaging study. *Biological Psychiatry*, *57*(3), 210–219.

Phills, C. E., Santelli, A. G., Kawakami, K., Struthers, C. W., & Higgins, E. T. (2011). Reducing implicit prejudice: Matching approach/avoidance strategies to contextual valence and regulatory focus. *Journal of Experimental Social Psychology*, *47*(5), 968–973. http://dx.doi.org/10.1016/j.jesp.2011.03.013.

Pittman, T. S. (1998). Motivation. In D. T. Gilbert, S. T. Fiske & G. Lindzey (Eds.), *The handbook of Social Psychology*: Vol. 1. (pp. 549–590) (4th ed.). New York, NY: MacGraw-Hill.

Pittman, T. S., & Zeigler, K. R. (2007). Basic human needs. In A. Kruglanski & E. T. Higgins (Eds.), *Social psychology: Handbook of basic principles* (pp.473–489) (2nd ed.). New York, NY: Guilford.

Potts, G. F., George, M. R. M., Martin, L. E., & Barratt, E. S. (2006). Reduced punishment sensitivity in neural systems of behavior monitoring in impulsive individuals. *Neuroscience Letters*, *397*(1–2), 130–134. http://dx.doi.org/10.1016/j.neulet.2005.12.003.

Proulx, T. (2013). Threat compensation or inconsistency compensation? Even non-threatening inconsistencies evoke compensation behaviors. In *Paper presented at the EASP Small Group Meeting 'social determinants and consequences of threat'. Berlin, Germany, June.*

Proulx, T., & Heine, S. J. (2008). The case of the transmogrifying experimenter: Affirmation of a moral schema following implicit change detection. *Psychological Science*, *19*(12), 1294–1300. http://dx.doi.org/10.1111/j.1467-9280.2008.02238.x.

Proulx, T., & Heine, S. J. (2009). Connections from Kafka: Exposure to meaning threats improves implicit learning of an artificial grammar. *Psychological Science*, *20*(9), 1125–1131.

Proulx, T., Heine, S. J., & Vohs, K. D. (2010). When is the unfamiliar the uncanny? Meaning affirmation after exposure to absurdist literature, humor, and art. *Personality and Social Psychology Bulletin*, *36*(6), 817–829. http://dx.doi.org/10.1177/0146167210369896.

Proulx, T., & Inzlicht, M. (2012). The five "A"s of meaning maintenance: Finding meaning in the theories of sense-making. *Psychological Inquiry*, *23*(4), 317–335. http://dx.doi.org/10.1080/1047840x.2012.702372.

Proulx, T., Inzlicht, M., & Harmon-Jones, E. (2012). Understanding all inconsistency compensation as a palliative response to violated expectations. *Trends in Cognitive Sciences*, *16*(5), 285–291. http://dx.doi.org/10.1016/j.tics.2012.04.002.

Proulx, T., & Major, B. (2013). A raw deal: Heightened liberalism following exposure to anomalous playing cards. *Journal of Social Issues*, *69*(3), 455–472. http://dx.doi.org/10.1111/josi.12024.

Pyszczynski, T., Abdollahi, A., Solomon, S., Greenberg, J., Cohen, F., & Weise, D. (2006). Mortality salience, martyrdom, and military might: The great satan versus the axis of evil. *Personality and Social Psychology Bulletin*, *32*(4), 525–537. http://dx.doi.org/10.1177/0146167205282157.

Pyszczynski, T., Greenberg, J., & Solomon, S. (1999). A dual-process model of defense against conscious and unconscious death-related thoughts: An extension of terror management theory. *Psychological Review*, *106*(4), 835–845.

Pyszczynski, T., Greenberg, J., Solomon, S., Arndt, J., & Schimel, J. (2004). Why do people need self-esteem? A theoretical and empirical review. *Psychological Bulletin*, *130*(3), 435–468.

Pyszczynski, T., Greenberg, J., Solomon, S., & Maxfield, M. (2006). On the unique psychological import of the human awareness of mortality: Theme and variations. *Psychological Inquiry*, *17*(4), 328–356. http://dx.doi.org/10.1080/10478400701369542.

Pyszczynski, T., & Kesebir, P. (2011). Anxiety buffer disruption theory: A terror management account of posttraumatic stress disorder. *Anxiety, Stress, and Coping*, *24*(1), 3–26. http://dx.doi.org/10.1080/10615806.2010.517524.

Pyszczynski, T., Motyl, M., Vail, K., Hirschberger, G., Arndt, J., & Kesebir, P. (2012). A collateral advantage of drawing attention to global climate change: Increased support for peace-making and decreased support for war. *Journal of Peace Psychology*, *18*, 354–368.

Quirin, M., Loktyushin, A., Arndt, J., Kustermann, E., Lo, Y. Y., Kuhl, J., et al. (2012). Existential neuroscience: A functional magnetic resonance imaging investigation of neural responses to reminders of one's mortality. *Social Cognitive Affective Neuroscience*, *7*(2), 193–198. http://dx.doi.org/10.1093/scan/nsq106.

Randles, D., Heine, S. J., & Santos, N. (2013). The common pain of surrealism and death: Acetaminophen reduces compensatory affirmation following meaning threats. *Psychological Science*, *24*(6), 966–973. http://dx.doi.org/10.1177/0956797612464786.

Randles, D., Proulx, T., & Heine, S. J. (2011). Turn-frogs and careful-sweaters: Non-conscious perception of incongruous word pairings provokes fluid compensation. *Journal of Experimental Social Psychology*, *47*(1), 246–249. http://dx.doi.org/10.1016/j.jesp.2010.07.020.

Ridderinkhof, K. R., Ullsperger, M., Crone, E. A., & Nieuwenhuis, S. (2004). The role of the medial frontal cortex in cognitive control. *Science*, *306*(5695), 443–447. http://dx.doi.org/10.1126/science.1100301.

Rosenblatt, A., Greenberg, J., Solomon, S., Pyszcynski, T., & Lyon, D. (1989). Evidence for terror management theory: I. The effects of mortality salience on reactions to those who violate or uphold cultural values. *Journal of Personality and Social Psychology*, *57*(4), 681–690.

Rothbaum, F., Weisz, J. R., & Snyder, S. S. (1982). Changing the world and changing the self: A two-process model of perceived control. *Journal of Personality and Social Psychology*, *42*(1), 5–37.

Rothschild, Z. K., Abdollahi, A., & Pyszczynski, T. (2009). Does peace have a prayer? The effect of mortality salience, compassionate values, and religious fundamentalism on hostility toward out-groups. *Journal of Experimental Social Psychology*, *45*(4), 816–827. http://dx.doi.org/10.1016/j.jesp.2009.05.016.

Routledge, C., & Arndt, J. (2008). Self-sacrifice as self-defence: Mortality salience increases efforts to affirm a symbolic immortal self at the expense of the physical self. *European Journal of Social Psychology*, *38*(3), 531–541. http://dx.doi.org/10.1002/ejsp.442.

Routledge, C., Arndt, J., & Goldenberg, J. L. (2004). A time to tan: Proximal and distal effects of mortality salience on sun exposure intentions. *Personality and Social Psychology Bulletin*, *30*(10), 1347–1358. http://dx.doi.org/10.1177/0146167204264056.

Routledge, C., Ostafin, B., Juhl, J., Sedikides, C., Cathey, C., & Liao, J. Q. (2010). Adjusting to death: The effects of mortality salience and self-esteem on psychological well-being, growth motivation, and maladaptive behavior. *Journal of Personality and Social Psychology*, *99*(6), 897–916. http://dx.doi.org/10.1037/A0021431.

Rudman, L. A., Dohn, M. C., & Fairchild, K. (2007). Implicit self-esteem compensation: Automatic threat defense. *Journal of Personality and Social Psychology*, *93*(5), 798–813. http://dx.doi.org/10.1037/0022-3514.93.5.798.

Rutjens, B. T., Van der Pligt, J., & Van Harreveld, F. (2010). Deus or Darwin: Randomness and belief in theories about the origin of life. *Journal of Experimental Social Psychology*, *46*(6), 1078–1080. http://dx.doi.org/10.1016/j.jesp.2010.07.009.

Rutjens, B. T., Van Haneveld, F., Van der Pligt, J., Kreemers, L. M., & Noordewier, M. K. (2013). Steps, stages, and structure: Finding compensatory order in scientific theories. *Journal of Experimental Psychology—General*, *142*(2), 313–318. http://dx.doi.org/10.1037/A0028716.

Salomons, T. V., Johnstone, T., Backonja, M. M., & Davidson, R. J. (2004). Perceived controllability modulates the neural response to pain. *The Journal of Neuroscience*, *24*(32), 7199–7203. http://dx.doi.org/10.1523/JNEUROSCI.1315-04.2004.

Santesso, D. L., Segalowitz, S. J., Ashbaugh, A. R., Antony, M. M., McCabe, R. E., & Schmidt, L. A. (2008). Frontal EEG asymmetry and sensation seeking in young adults. *Biological Psychology*, *78*(2), 164–172. http://dx.doi.org/10.1016/j.biopsycho.2008.02.003.

Schachter, S. (1959). *The psychology of affiliation; experimental studies of the sources of gregariousness*. Stanford, CA: Stanford University Press.

Schimel, J., Simon, L., Greenberg, J., Pyszczynski, T., Solomon, S., Waxmonsky, J., et al. (1999). Stereotypes and terror management: Evidence that mortality salience enhances stereotypic thinking and preferences. *Journal of Personality and Social Psychology*, 77(5), 905–926. http://dx.doi.org/10.1037/0022-3514.77.5.905.

Schmeichel, B. J., Gailliot, M. T., Filardo, E. A., McGregor, I., Gitter, S., & Baumeister, R. F. (2009). Terror management theory and self-esteem revisited: The roles of implicit and explicit self-esteem in mortality salience effects. *Journal of Personality and Social Psychology*, *96*(5), 1077–1087.

Schmeichel, B. J., Harmon-Jones, C., & Harmon-Jones, E. (2010). Exercising self-control increases approach-motivation. *Journal of Personality and Social Psychology*, *99*(1), 162–173. http://dx.doi.org/10.1037/A0019797.

Schmeichel, B. J., & Martens, A. (2005). Self-affirmation and mortality salience: Affirming values reduces worldview defense and death-thought accessibility. *Personality and Social Psychology Bulletin*, *31*(5), 658–667. http://dx.doi.org/10.1177/0146167204271567.

Schumann, K., McGregor, I., Nash, K., & Ross, M. (2013). *Religious magnanimity: Reminding people of their religious belief system reduces hostility after threat*. Manuscript submitted for publication.

Sedikides, C. (1993). Assessment, enhancement, and verification determinants of the self-evaluation process. *Journal of Personality and Social Psychology*, *65*(2), 317–338. http://dx.doi.org/10.1037//0022-3514.65.2.317.

Shackman, A. J., Salomons, T. V., Slagter, H. A., Fox, A. S., Winter, J. J., & Davidson, R. J. (2011). The integration of negative affect, pain and cognitive control in the cingulate cortex. *Nature Review Neuroscience*, *12*(3), 154–167. http://dx.doi.org/10.1038/nrn2994.

Shepherd, S., Kay, A. C., Landau, M. J., & Keefer, L. A. (2011). Evidence for the specificity of control motivations in worldview defense: Distinguishing compensatory control from uncertainty management and terror management processes. *Journal of Experimental Social Psychology*, *47*(5), 949–958. http://dx.doi.org/10.1016/j.jesp.2011.03.026.

Sherman, D. K., & Cohen, G. L. (2006). The psychology of self-defense: Self-affirmation theory. In M. P. Zanna (Ed.), *Advances in experimental social psychology*, Vol. 38, (pp. 183–242). San Diego, CA: Academic Press.

Sherman, D. K., & Kim, H. S. (2005). Is there an "I" in "Team"? The role of the self in group-serving judgments. *Journal of Personality and Social Psychology*, *88*(1), 108–120.

Sherman, D. K., Kinias, Z., Major, B., Kim, H. S., & Prenovost, M. (2007). The group as a resource: Reducing biased attributions for group success and failure via group affirmation. *Personality and Social Psychology Bulletin*, *33*(8), 1100–1112. http://dx.doi.org/10.1177/0146167207303027.

Sherman, D. K., Nelson, L. D., & Steele, C. M. (2000). Do messages about health risks threaten the self? Increasing the acceptance of threatening health messages via self-affirmation. *Personality and Social Psychology Bulletin*, *26*(9), 1046–1058. http://dx.doi.org/10.1177/01461672002611003.

Shi, Z., & Han, S. (2013). Transient and sustained neural responses to death-related linguistic cues. *Social Cognitive Affective Neuroscience*, *8*(5), 573–578.

Shnabel, N., Purdie-Vaughns, V., Cook, J. E., Garcia, J., & Cohen, G. L. (2013). Demystifying values-affirmation interventions writing about social belonging is a key to buffering against identity threat. *Personality and Social Psychology Bulletin*, *39*(5), 663–676.

Sokolov, E. N. (1963). *Perception and the conditioned reflex*. Oxford, NY: Pergamon Press.

Sokolov, E. N. (1990). The orienting response, and future-directions of its development. *Pavlovian Journal of Biological Science*, *25*(3), 142–150.

Sokolov, E. N. (2002). *The orienting response in information processing*. Mahwah, NJ: Lawrence Erlbaum Associates.

Steele, C. M. (1988). The psychology of self-affirmation: Sustaining the integrity of the self. In L. Berkowitz (Ed.), *Advances in experimental social psychology*, Vol. 21, (pp. 261–302). New York, NY: Academic Press.

Steele, C. M., & Liu, T. J. (1983). Dissonance processes as self-affirmation. *Journal of Personality and Social Psychology*, *45*(1), 5–19. http://dx.doi.org/10.1037/0022-3514.45.1.5.

Stevens, F. L., Hurley, R. A., & Taber, K. H. (2011). Anterior cingulate cortex: Unique role in cognition and emotion. *The Journal of Neuropsychiatry and Clinical Neurosciences*, *23*(2), 121–125. http://dx.doi.org/10.1176/appi.neuropsych.23.2.121.

Stone, J., Wiegand, A. W., Cooper, J., & Aronson, E. (1997). When exemplification fails: Hypocrisy and the motive for self-integrity. *Journal of Personality and Social Psychology*, *72*(1), 54–65. http://dx.doi.org/10.1037/0022-3514.72.1.54.

Stroebe, W., Stroebe, M., & Abakoumkin, G. (1996). The role of loneliness and social support in adjustment to loss: A test of attachment versus stress theory. *Journal of Personality and Social Psychology*, *70*(6), 1241–1249. http://dx.doi.org/10.1037//0022-3514.70.6.1241.

Sullivan, D., Jonas, E., & Jodlbauer, B. (2011). Mortality salience and worldview affirmation strengthen support for foreign products. *Journal of Psychology*, *219*(4), 224–230. http://dx.doi.org/10.1027/2151-2604/A000076.

Sullivan, D., Landau, M. J., & Rothschild, Z. K. (2010). An existential function of enemyship: Evidence that people attribute influence to personal and political enemies

to compensate for threats to control. *Journal of Personality and Social Psychology*, *98*(3), 434–449. http://dx.doi.org/10.1037/A0017457.

Swann, W. B., Griffin, J. J., Predmore, S. C., & Gaines, B. (1987). The Cognitive-affective crossfire—When self-consistency confronts self-enhancement. *Journal of Personality and Social Psychology*, *52*(5), 881–889. http://dx.doi.org/10.1037//0022-3514.52.5.881.

Swann, W. B., & Read, S. J. (1981). Self-verification processes—How we sustain our self-conceptions. *Journal of Experimental Social Psychology*, *17*(4), 351–372. http://dx.doi.org/10.1016/0022-1031(81)90043-3.

Sweeny, K., Melnyk, D., Miller, W., & Shepperd, J. A. (2010). Information avoidance: Who, what, when, and why. *Review of General Psychology*, *14*(4), 340–353. http://dx.doi.org/10.1037/A0021288.

Tajfel, H., & Turner, J. C. (1979). An intergrative theory of intergroup conflict. In W. G. Austin & S. Worchel (Eds.), *The social psychology of intergroup relations* (pp. 33–47). Monterey, CA: Brooks/Cole.

Tajfel, H., & Turner, J. C. (1986). The social identity theory of intergroup behavior. In S. Worchel & W. G. Austin (Eds.), *Psychology of intergroup relations* (pp. 7–24). Chicago, IL: Nelson-Hall.

Talati, Z., Fritsche, I., Du, H., Jonas, E., Castano, E., & Locke, V. (2013). *The possibility of self-determined death eliminates mortality salience effects on cultural worldview defense: Cross-cultural evidence.* Unpublished manuscript.

Tangney, J. P., Baumeister, R. F., & Boone, A. L. (2004). High self-control predicts good adjustment, less pathology, better grades, and interpersonal success. *Journal of Personality*, *72*(2), 271–324. http://dx.doi.org/10.1111/j.0022-3506.2004.00263.x.

Taubman Ben-Ari, O., Florian, V., & Mikulincer, M. (1999). The impact of mortality salience on reckless driving: A test of terror management mechanisms. *Journal of Personality and Social Psychology*, *76*(1), 35–45. http://dx.doi.org/10.1037//0022-3514.76.1.35.

Taylor, S. E., & Armor, D. A. (1996). Positive illusions and coping with adversity. *Journal of Personality*, *64*(4), 873–898. http://dx.doi.org/10.1111/j.1467-6494.1996.tb00947.x.

Tesser, A. (1988). Toward a self-evaluation maintenance model of social behavior. In L. Berkowitz (Ed.), *Advances in experimental social psychology*, Vol. 21, (pp. 181–227). New York, NY: Academic Press.

Tesser, A. (2000). On the confluence of self-esteem maintenance mechanisms. *Personality and Social Psychology Review*, *4*(4), 290–299. http://dx.doi.org/10.1207/S15327957pspr0404_1.

Tice, D. M. (1991). Esteem protection or enhancement? Self-handicapping motives and attributions differ by trait self-esteem. *Journal of Personality and Social Psychology*, *60*(5), 711–725. http://dx.doi.org/10.1037//0022-3514.60.5.711.

Townsend, S. S. M., Major, B., Sawyer, P. J., & Mendes, W. B. (2010). Can the absence of prejudice be more threatening than its presence? It depends on one's worldview. *Journal of Personality and Social Psychology*, *99*(6), 933–947. http://dx.doi.org/10.1037/A0020434.

Turner, J. C., Hogg, M. A., Oakes, P. J., Reicher, S. D., & Wetherell, M. S. (1987). *Rediscovering the group: A self-categorization theory*. New York, NY: Blackwell.

Urry, H. L., Nitschke, J. B., Dolski, I., Jackson, D. C., Dalton, K. M., Mueller, C. J., et al. (2004). Making a life worth living: Neural correlates of well-being. *Psychological Science*, *15*(6), 367–372. http://dx.doi.org/10.1111/j.0956-7976.2004.00686.x.

Vail, K. E., Arndt, J., Rampy, N., Pope, J. B., & Pinel, E. (2012). *Intolerance of intolerance: Mortality salience, tolerant values, and attitudes toward an anti-Muslim leader.* Unpublished manuscript.

Vail, K. E., Rothschild, Z. K., Weise, D. R., Solomon, S., Pyszczynski, T., & Greenberg, J. (2010). A terror management analysis of the psychological functions of religion. *Personality and Social Psychology Review*, *14*(1), 84–94. http://dx.doi.org/10.1177/1088868309351165.

Vallacher, R. R., & Wegner, D. M. (1989). Levels of personal agency—Individual variation in action identification. *Journal of Personality and Social Psychology*, *57*(4), 660–671. http://dx.doi.org/10.1037/0022-3514.57.4.660.

Van den Bos, K. (2009). Making sense of life: The existential self trying to deal with personal uncertainty. *Psychological Inquiry*, *20*(4), 197–217. http://dx.doi.org/10.1080/10478400903333411.

Van den Bos, K., Ham, J., Lind, E. A., Sinionis, M., van Essen, W. J., & Rijpkema, M. (2008). Justice and the human alarm system: The impact of exclamation points and flashing lights on the justice judgment process. *Journal of Experimental Social Psychology*, *44*(2), 201–219. http://dx.doi.org/10.1016/j.jesp.2007.03.001.

Van den Bos, K., & Lind, E. A. (2013). On sense-making reactions and public inhibition of benign social motives: An appraisal model of prosocial behavior. In J. M. Olson & M. P. Zanna (Eds.), *Advances in experimental social psychology*, Vol. 48, (pp. 1–58). San Diego, CA: Academic Press.

Van den Bos, K., & Miedema, J. (2000). Toward understanding why fairness matters: The influence of mortality salience on reactions to procedural fairness. *Journal of Personality and Social Psychology*, *79*(3), 355–366.

Van den Bos, K., Poortvliet, P. M., Maas, M., Miedema, J., & Van den Ham, E.-J. (2005). An enquiry concerning the principles of cultural norms and values: The impact of uncertainty and mortality salience on reactions to violations and bolstering of cultural worldviews. *Journal of Experimental Social Psychology*, *41*(2), 91–113.

Van den Bos, K., Van Lange, P. A. M., Lind, E. A., Venhoeven, L. A., Beudeker, D. A., Cramwinckel, F. M., et al. (2011). On the benign qualities of behavioral disinhibition: Because of the prosocial nature of people, behavioral disinhibition can weaken pleasure with getting more than you deserve. *Journal of Personality and Social Psychology*, *101*(4), 791–811. http://dx.doi.org/10.1037/A0023556.

Van Veen, V., Krug, M. K., Schooler, J. W., & Carter, C. S. (2009). Neural activity predicts attitude change in cognitive dissonance. *Nature Neuroscience*, *12*(11), 1469–1474. http://dx.doi.org/10.1038/Nn.2413.

Van Zomeren, M., Spears, R., Fischer, A. H., & Leach, C. W. (2004). Put your money where your mouth is! Explaining collective action tendencies through group-based anger and group efficacy. *Journal of Personality and Social Psychology*, *87*(5), 649–664. http://dx.doi.org/10.1037/0022-3514.87.5.649.

Vinogradova, O. S. (1975). Functional organization of the limbic system in the process of registration of information: Facts and hypotheses. In R. I. Isaacson & K. H. Pribram (Eds.), *Neurophysiology and Behavior*: Vol. 2. *The Hippocampus* (pp. 3–69). New York, NY: Plenum Press.

Vohs, K. D., & Heatherton, T. F. (2001). Self-esteem and threats to self: Implications for self-construals and interpersonal perceptions. *Journal of Personality and Social Psychology*, *81*(6), 1103–1118. http://dx.doi.org/10.1037/0022-3514.81.6.1103.

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology*, *54*, 1063–1070.

Wegner, D. M. (1994). Ironic processes of mental control. *Psychological Review*, *101*(1), 34–52. http://dx.doi.org/10.1037/0033-295x.101.1.34.

Weise, D. R., Arciszewski, T., Verlhiac, J. F., Pyszczynski, T., & Greenberg, J. (2012). Terror management and attitudes toward immigrants differential effects of mortality salience for low and high right-wing authoritarians. *European Psychologist*, *17*(1), 63–72. http://dx.doi.org/10.1027/1016-9040/A000056.

Weise, D. R., Pyszczynski, T., Cox, C. R., Arndt, J., Greenberg, J., Solomon, S., et al. (2008). Interpersonal politics the role of terror management and attachment processes

in shaping political preferences. *Psychological Science*, *19*(5), 448–455. http://dx.doi.org/10.1111/j.1467-9280.2008.02108.x.

Wenzel, M., Mummendey, A., & Waldzus, S. (2007). Superordinate identities and intergroup conflict: The ingroup projection model. *European Review of Social Psychology*, *18*, 331–372. http://dx.doi.org/10.1080/10463280701728302.

Wenzlaff, R. M., & Bates, D. E. (1998). Unmasking a cognitive vulnerability to depression: How lapses in mental control reveal depressive thinking. *Journal of Personality and Social Psychology*, *75*(6), 1559–1571. http://dx.doi.org/10.1037/0022-3514.75.6.1559.

White, R. W. (1959). Motivation reconsidered: The concept of competence. *Psychological Review*, *66*, 297–333.

Whitson, J. A., & Galinsky, A. D. (2008). Lacking control increases illusory pattern perception. *Science*, *322*(5898), 115–117. http://dx.doi.org/10.1126/science.1159845.

Wichman, A. L., Brunner, R. P., & Weary, G. (2008). Immediate and delayed effects of causal uncertainty inductions on uncertainty accessibility. *Journal of Experimental Social Psychology*, *44*(4), 1106–1113. http://dx.doi.org/10.1016/j.jesp.2007.12.002.

Wichman, A. L., Brunner, R. P., & Weary, G. (2013). Uncertainty threat and inhibition of compensatory behaviors: A goal conflict management perspective. *Self and Identity*. Advance online publication. http://dx.doi.org/10.1080/15298868.2013.775718.

Williams, K. D. (2007). Ostracism: The kiss of social death. *Social and Personality Psychology Compass*, *1*(1), 236–247. http://dx.doi.org/10.1111/j.1751-9004.2007.00004.x.

Williams, K. D. (2009). Ostracism: A temporal need-threat model. *Advances in Experimental Social Psychology*, *41*, 275–314. http://dx.doi.org/10.1016/S0065-2601(08)00406-1.

Wisman, A., & Goldenberg, J. L. (2005). From the grave to the cradle: Evidence that mortality salience engenders a desire for offspring. *Journal of Personality and Social Psychology*, *89*(1), 46–61. http://dx.doi.org/10.1037/0022-3514.89.1.46.

Wisman, A., & Koole, S. (2003). Hiding in the crowd: Can mortality salience promote affiliation with others who oppose one's worldviews? *Journal of Personality and Social Psychology*, *84*(3), 511–526.

Yanagisawa, K., Kashima, E. S., Moriya, H., Masui, K., Furutani, K., Nomura, M., et al. (2013). Non-conscious neural regulation against mortality concerns. *Neuroscience Letters*, *552*, 35–39.

Yeung, N., Botvinick, M. M., & Cohen, J. D. (2004). The neural basis of error detection: Conflict monitoring and the error-related negativity. *Psychological Review*, *111*(4), 931–959. http://dx.doi.org/10.1037/0033-295X.111.4.939.

Zanna, M. P., & Cooper, J. (1974). Dissonance and pill—Attribution approach to studying arousal properties of dissonance. *Journal of Personality and Social Psychology*, *29*(5), 703–709. http://dx.doi.org/10.1037/H0036651.