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PART 2

Socially grounded responses to perceived lack of control

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COMPENSATORY CONTROL THEORY AND THE PSYCHOLOGICAL IMPORTANCE OF PERCEIVING ORDER

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Control can be defined as the individual's perceived impact on events and the ability to bring the environment in line with individual wishes and motives. Experiencing a sense of control over life's outcomes and one's physical and social environment is considered a basic human need with far-reaching consequences for psychological as well as physical well-being. As a result, lacking desired levels of control has been found to be generally experienced as aversive (e.g., Heckhausen & Schulz, 1995; Langer & Rodin, 1976; Maier & Seligman, 1976; Moulding & Kyrios, 2006; Sedek & Kofta, 1990; Skinner, 1996; Thompson & Spacapan, 1991). Given that perceived control is such an important motivation for adaptive and healthy functioning, an obvious question arises: how do people cope with inevitably fluctuating levels of personal control in their daily lives? Indeed, in the last five years or so we have seen a rapid increase in the amount of research aimed at documenting and explaining the various ways in which people respond to instances of lowered personal control. In this chapter, we review Compensatory Control Theory (CCT; Kay et al., 2008), which was developed to help answer this question, as well as research that is directly or indirectly inspired by its central tenets.

The origins of CCT

CCT was formulated to help provide an answer to the following question: Assuming that the need for control is pivotal, how do people maintain a belief in control when they face all of the events in their daily lives that challenge it? It is obvious

that it is oftentimes not possible to maintain perceptions of control, either because of external causes (e.g., social developments such as financial crises or terrorist threats) or because of personal causes (e.g., personal situations or events such as getting fired over poor performance or a relationship breakup). Moreover, although control is an important motivation, instances do occur in which people would rather leave responsibility to others (e.g., to the pilot when airborne, to the surgeon when deciding on the viability of an operation; see also Burger, 1989). This brings us to the question of how people cope with situations in which the fundamental motive to perceive personal control is threatened. What do people do when they encounter situations in which personal control is either *threatened* or *undesired*?

A seminal paper by Rothbaum et al. (1982), which forms one of the pillars that CCT builds on, posits a dual-process model of perceived control. That model outlined four *secondary control* strategies people may employ when they lack *primary* (or personal) control. While primary control refers to the person's ability to bring the environment in line with the self, secondary control can be defined as an attempt to bring the self in line with the environment. Two of the secondary control strategies that have been most influential are illusory control and vicarious control. Illusory control (Langer, 1975) refers to the tendency to attribute chance to skill or ability; an example is the erroneous belief that a powerful throw of the dice leads to a higher roll (Plous, 1993). Another example is that people are more reluctant to exchange lottery tickets that they purchased themselves, because they somehow feel that the act of choosing one's own ticket influences lottery outcomes (Langer, 1975; Thompson, 2004). Indeed, many manifestations of superstitious behavior and magical thinking – which are often sparked by situations of low control and uncertainty – are driven by illusions of control (Malinowski, 1979; Matute, 1994; Matute et al., 2010; Vyse, 1997). Vicarious control, on the other hand, refers to aligning oneself with a powerful other agent, such as a powerful ingroup, a political party, or a controlling deity. An example of vicarious control constitutes praying to God in order to obtain or prevent a certain outcome (Rothbaum et al., 1982). Below we briefly touch upon how we may view the concepts of illusory and vicarious control through the lens of CCT and explain how CCT differs from the aforementioned dual-process approach to control.

Regarding dual-process models of control, there are different views on the extent to which primary control is to be preferred over secondary control (Heckhausen & Schulz, 1995), and some theorists even argue that secondary control cannot be equated with control in the first place (but should rather be seen as a form of *accommodation* to the uncontrollable context; Skinner, 1996). CCT, however, argues that primary (i.e., personal) and compensatory control are *functionally equivalent* and therefore substitutable. Thus, although the concept of compensatory control might at first glance seem closely related to the concept of vicarious control, they are different models that offer different predictions: Vicarious control refers to the acknowledgment that there is a powerful external agent (e.g., God, a political party, a powerful ingroup) with which one can align the self in order to a) share in their power and b) make certain that particular goals are met that the individual by itself

cannot accomplish (Fritsche, Jonas, & Fankhänel, 2008), and/or c) appeal to the higher power to act on the self's behalf, for example via prayer. Compensatory control on the other hand refers to merely endorsing faith in a powerful other and thus affirming the belief that "things are under control" rather than random (see Kay et al., 2008, p. 32). Sometimes, these two predictions are difficult to distinguish from another. For example, consistent with both models, several lines of research have shown that a threat to personal control leads to the endorsement of such external systems, both secular and religious, that are capable of controlling the social world. This may result in, for example, a tendency to bolster a strong government or defend the legitimacy of the social system (i.e., system justification; Jost, Glaser, Kruglanski, & Sulloway, 2003) and an enhanced belief in a controlling deity (Kay et al., 2008, 2010). Though it might be tricky in cases such as these to determine whether an instance of increased religious or political faith following a control threat is indicative of compensatory control processes, secondary control processes, or some combination of both, the empirical distinction between these processes will be made more clear in subsequent sections, especially those addressing "non-agentic" sources of compensatory control.

Religion provides an especially potent source of compensatory control, since belief in God's control is relatively infallible and non-falsifiable. Unfalsifiable beliefs are particularly well-suited to satiate psychological needs related to existential concerns and motivations (Friesen, Campbell, & Kay, 2015). Another reason that religion is a powerful source of compensatory control is that God is seen by many believers as omnipotent and therefore as capable of controlling everything; that is, there is literally no event that a true believer could not attribute to God's will, as opposed to randomness or chance. Indeed, long before CCT was introduced, Spilka et al. (1985) and Rothbaum et al. (1982) argued that an important psychological function of religious belief is that it effectuates the need for control. However, it is important to distinguish this early idea of God as a source of vicarious control (which is more sensitive to the valence of a certain event; what use is God *as a source of control* when something bad happens to us?) from the notion posited by CCT that God is in control regardless of what happens, which facilitates perceptions of the world as a place that is orderly and under control. Though this latter belief cannot, like vicarious control, offer the individual an indirect means (e.g., prayer and appeals) by which they can exert control over the environment, it is still presumed to be control-restoring. A world rife with order and structure, rather than randomness and chaos, affords predictability and the basic set of epistemic beliefs – e.g., contingencies between actions and outcomes – needed to afford efficacious action (Landau, Whitson, & Kay, 2015). Supporting this notion of the functional basis of perceiving structure in the world, recent work has shown that belief in a controlling God can both help and hinder the detection of structure, depending on whether God's intervention follows a systematic logic or is unpredictable (Kay, Landau, & Khenfer, & Keefer, under review). In one illustrative study, for example, it was observed that amongst those who view God's control as characterized by predictable and understandable rules, higher belief in God was associated with increased

efficacy and self-regulatory confidence, but amongst those who view God's control as "mysterious", the reverse relationship was found: higher belief in God was associated with decreased efficacy and self-regulatory confidence.

In short, CCT posits that a key motive is to perceive the world in which one lives as orderly; that is, a structured, predictable and sensible place in which things do not just happen haphazardly. Compensatory control, such as the endorsement of external religious and sociopolitical systems, does therefore not necessarily need to encompass an attempt to bolster agency by (indirectly or vicariously) regaining personal control through external systems that one can either appeal to or align with. While not disputing this does indeed happen, CCT instead emphasizes the utility of external agents of control in re-affirming epistemic beliefs in the non-randomness of the world, which beliefs in personal control can then be built upon (more on this in a later section).

Order as a basic motive

As described in the above paragraphs, CCT crucially diverges from previous theories on control motivation by emphasizing order as a basic motivation that can underlie direct and indirect attempts to obtain control. Maintaining a belief in order and non-randomness in the environment can be achieved either through exerting personal control or through the endorsement of external systems of control (i.e., compensatory control), such as God or government. CCT proposes that personal control and compensatory control function in a hydraulic fashion as different routes to order¹. Thus, if one of these perceptions is threatened, increasing faith in the other can be an effective means of coping, and vice versa (see also Kay et al., 2010).

The notion that perceiving order and structure in the world is a powerful human motivation is common in the history of psychology (Kay, Landau, & Sullivan, 2015). People want to believe that the world and their social environments are orderly, predictable, and make sense (Janoff-Bulman, 1992; Krantz, 1998; Kruglanski & Webster, 1996; Landau et al., 2004; Lerner, 1980; Pittman, 1998). The naturally occurring tendency to impose structure on and derive patterns from the things that surround us has been argued to stem from the evolutionary error-management motives to protect oneself from making what is often referred to as type II errors (e.g., overlooking a pattern, resulting in being devoured by a sabretooth tiger; Foster & Kokko, 2009; see also Haselton & Buss, 2000). It has even been suggested that this innate preference for order over disorder extends beyond humans and is found in animals such as chickens (Chiandetti & Vallortigara, 2011).

Initially, CCT provided two types of evidence for the notion that perceptions of control can sometimes be a means to an end (order). The first is by focusing on the aforementioned substitutability of different sources of personal and external control. Not only do fluctuations in personal control alter the belief in and defense of external sources of control (e.g., God, government) and vice versa, but affirming (threatening) one source of external control (e.g., God) subsequently impacts the motivated belief in and defense of other sources of

external control (e.g., government). This observation helps us understand the impact of fluctuations in the perceived strength of governmental systems. For example, one study looked at the impact of elections in Malaysia and found that the elections (which constitute a temporal threat to governmental stability) had an effect on belief in God among the Malaysian population. Indeed, belief in God increased as a result of the destabilizing effects of the election, and – pivotally – was restored to baseline after the elections (when governmental stability was restored; Kay et al., 2010; Study 3).

Other evidence for the notion that order is the central motive constituted an experiment in which, rather than threatening or affirming a particular source of control, order perceptions were directly lowered by means of a randomness prime (Kay, Moscovitch, & Laurin, 2010). Employing the scrambled sentences method (Srull & Wyer, 1979) in order to supraliminally prime randomness, it was found that belief in a controlling God was enhanced as a result of such a direct threat to order perceptions. In a similar vein, Meijers and Rutjens (2014) have shown that the same randomness primes increased the motivation to exert personal control. Related to these findings, Whitson and Galinsky (2008) focused on order perceptions as outcome variables. They offer a number of demonstrations of the effect of control threats on preferences for order and structure, including illusory pattern perception, conspiratorial thinking, and personal need for structure. In a related vein, work by Cutright (2011) has shown that control threat leads to preference for consumer products that offer structure (for example through clearly bounded logos or design).

More recently, Rutjens and colleagues (2010, 2013) followed up on the Whitson and Galinsky (2008) findings that compensatory control processes can unfold without any external source of control that is capable of acting on the individual's behalf (see also Cutright, 2011). Based on the central tenet of CCT that control is a means to establish perceptions of order, the reasoning in this line of work was as follows: If order is basic, then affirmations of order that do not involve external agents of control should suffice as compensation for threats to control and order. In a first test of this idea, Rutjens, van der Pligt, and van Harreveld (2010) gauged the effects of control threat on the endorsement of different views on the origins of life, particularly evolutionary theory and intelligent design. It was hypothesized that a threat to personal control would result in an increased preference for a view that stresses belief in an external source of control (a controlling deity), but only when the alternative view did not provide a notion of an orderly world. This is exactly what was found: control threat enhanced preferences for intelligent design (an external agent controls outcomes) only when the alternative option was evolutionary theory framed in terms of unpredictable and unstructured processes. However, when evolutionary theory was framed in terms of an orderly and structured process (Conway-Morris, 2005), this effect disappeared. Thus, an increased preference for views that provide an orderly perspective on the origins of life was observed, regardless of whether or not a tangible agent (in this case, God) was involved in the process.

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A second test of this idea was conducted a few years later in a line of research focusing on scientific theory preferences (Rutjens, van Harreveld, van der Pligt, Kreemers, & Noordewier, 2013). Certain scientific theories might be better equipped to impose order on the world than others. Stage theories are a good example, since these describe certain phenomena or processes as occurring in a predictable series of discontinuous steps, and as such offer a more orderly and predictable account of human and societal development. By contrast, non-stage theories such as continuum theories generally describe similar phenomena or processes in terms of gradual transitions without clear disruptions or discernable steps. An initial study showed that people rate different stage theories as more ordered and predictable (while less credible) than their continuum counterparts. In the subsequent series of studies, participants were asked to indicate their preference for stage versus continuum theories across a number of domains (moral development, grief, Alzheimer's disease). It was found that a threat to personal control enhanced preference for stage theories, and that a motivated search for order underlies these preference shifts. More specifically, in one study it was observed that illusory pattern perception (see Whitson & Galinsky, 2008) mediated the effects of control threat on stage theory preference. Here, we see how people compensate for a temporary reduction in personal control by seeking order in the environment without any reference to external agency.

A third and related test of the idea that maintaining perceptions of an orderly world is primary pertains to work on preferences for hierarchy in organizations (Friesen, Kay, Eibach, & Galinsky, 2014). Compared to equality, hierarchy is seen as providing more organizational order and guidance. Similar to the previously described findings on the ordered nature of stage theories, an initial study revealed that people view hierarchy as more ordered and less chaotic (though less fair) than equality. Subsequently, it was found across several studies that threats to personal control triggered an increase in perceptions of hierarchy in social situations as well as an increase in preferences for hierarchy in workplace contexts. Hierarchies were shown to be appealing specifically because they provide order. The effects were moderated by need for structure and also reversed if a manipulation was included that described hierarchy as actually inserting randomness and disorder into the system. What's more, these effects were obtained independent of whether people assumed they would be at the top or bottom of the hierarchy. The latter finding tells us that people may sometimes seek out order at a certain cost; despite remaining at the bottom of the hierarchy (and despite viewing hierarchy as less fair than equality), those low in personal control still prefer to exist in a structured environment, even if it affords them little power and status. A similar cost was observed in the research on stage theory preference described before, where people whose control was threatened preferred the orderly view on disease progression, despite this view being more pessimistic than its less orderly counterpart (and despite rating stage theories as less credible than continuum theories). Other examples, whereby embracing order comes at a cost, include demonstrations that threats to personal control increase affirmation of negatively valenced order,

such as increased conspiracy theory endorsement (Whitson & Galinsky, 2008) and increased belief in the existence of powerful, nefarious enemies and malevolent forces (Rotschild, Landau, Sullivan, & Keefer, 2012; Sullivan, Landau, & Rotschild, 2010). Though none of these promise positive outcomes, they all offer means of explaining (negative) events as non-random, and thereby can serve as effective means of compensatory control.

What the above lines of research show is that people seem to be relatively flexible in finding compensation for threats to control and order. While CCT initially focused on compensatory efforts characterized by (external) agency (“compensatory control”), subsequent research has broadened the scope of compensatory options by focusing more on order-providing theories and worldviews that do not involve agency. Interestingly, these non-agentic compensatory options entail a search for interpretations of the environment that provide order, yet these do not need to be related to the context in which control is reduced. In these cases, a process which has been labelled “nonspecific structure affirmation” takes place (Landau, Whitson, & Kay, 2015). This notion allows for a set of theoretical predictions that further address the notion that, indeed, order can be seen as the primary motive underlying compensatory control effects. First, as mentioned above, when control is threatened, people will be motivated to seek out interpretations of the environment that are unrelated to the context in which they perceive a lack of control. Second, such interpretations can be independent of agency beliefs. Third, such interpretations may arise at the cost of other motivations related to well-being (in the broadest sense) and might otherwise be considered aversive. We have described some of the evidence for these predictions in the current paragraph, reviewing work on illusory pattern perception, on preferences for bounded consumer products, scientific stage theories, and hierarchies, as well as on beliefs related to conspiracies and enemies. As a result, CCT has evolved into a broader motivational theory aimed at understanding the interchangeable ways in which people protect their epistemic understandings of the world as orderly and predictable, and the ways in which this can facilitate (and sometimes hinder) motivation (Landau et al., 2015). We explore this latter issue in more detail in the next section.

The boons and banes of perceiving order

Recently, there has not only been an increase in work on compensatory order (or “nonspecific structure affirmation”; Landau et al., 2015) as an outcome variable, but also an intensification of research gauging the effects of exposing individuals to orderly versus disorderly stimuli and environments. If CCT processes are truly adaptive, then the outcome of imbuing the world with order should be functional and facilitative of personal agency. An orderly environment is more easily navigable than a disorderly one, mainly because contingencies between action and outcome are more easily perceived. In other words, when the environment consists of a range of predictabilities, people can quite easily determine what the effects of a certain action will be and as such predict the (probability of the) consequences of

that particular action (see Landau et al., 2015). It is much harder to predict these probabilities when the environment is disorderly. Thus, perceiving order facilitates commitment to a functional course of action (Harmon-Jones, Amodio, & Harmon-Jones, 2009) and leads to (long-term) goal pursuit and goal-directed action.

Building on this notion, a recent line of work focused on the functional value of perceiving order in the world (Kay et al., 2014). In these studies, the effects of order (or *structure*) affirmations on goal pursuit were assessed. Employing different ways to manipulate order perceptions, for example by utilizing an essay describing nature in terms of orderly (versus neutral or random) processes, it was consistently found that exposure to order increased goal-directed motivation in domains unrelated to the manipulations. More specifically, affirming order increased the motivation to plan and pursue personally important long-term goals (e.g., related to careers or relationships). These findings make sense when considering the aforementioned notion that an orderly, structured world is also an easily navigable one in which contingencies between actions and outcomes can be expected and observed. Conversely, long-term goal planning might seem futile in a haphazard world in which such action-outcome contingencies are not quite as clear. A recent study provided the most direct evidence to date for this notion, by showing that an affirmation of science as a source of order and predictability not only increases perceptions of the world as orderly, but also heightened perceptions of personal control. Moreover, the effect of affirmed belief in science on personal control was fully mediated by the increased orderly world perceptions (Rutjens, unpublished study, 2015).

Although perceiving order thus has obvious psychological advantages, there may also be instances when order affirmations backfire or demotivate people to exert personal action, especially when these order affirmations involve a belief in specific systems solving something for us (Meijers & Rutjens, 2014; see also Shepherd & Kay, 2012). Meijers and Rutjens (2014) explored this idea within the context of environmental behavior and belief in scientific progress. What they found was that exposing participants to a text which strongly affirmed the potency of science to advance and come up with potential solutions to pressing problems such as climate change actually decreased the motivation to engage in personal action. Crucially, affirming scientific progress was shown to increase order perceptions, which in turn affected personal motivation. Similarly, directly priming order (versus randomness) decreased personal motivation to the same extent. These results suggest that perceiving the world as orderly and under control decreases the motivation to engage in personal action. The motivation to perceive order is met, and so the need to draw (exaggerated) perceptions of personal control from one's actions in the environment is reduced. Note that this finding converges with the study mentioned above where it was found that a similar affirmation of science heightened perceptions of order as well as personal control. When personal control perceptions are heightened (through perceptions of order) there is no motivational pressure² to *further enhance* (or exaggerate) perceptions of personal control through action. Similar findings have been reported by Laurin, Kay, and Fitzsimons (2012), who found that reminding people of a controlling God decreased their willingness to expend

effort to pursue long-term goals, and by Laurin, Shariff, Kay, and Henrich (2012), who showed that those who believe in intervening and controlling deities rely less on earthly punishment.

The above research findings suggest that perceiving the world as sufficiently orderly can both help and hinder the motivation to engage in personal action. One variable that might determine the direction of the effects on personal action pertains to the extent to which people feel their own actions can exert any effects at all. An orderly world that is governed entirely – or even predetermined – by an intervening God might reduce people's faith in their own actions sorting any impact at all (Kay et al., 2014). Likewise, a reduced sense of urgency that might be triggered by the notion that things are already taken care of might reduce people's motivation to expend any effort (Meijers & Rutjens, 2014). Related to this, people might sometimes wish to “outsource” responsibility to an external agent of system (e.g., in the case of punishing transgressors, see Laurin, Shariff, Kay, & Henrich, 2012), perhaps to conserve effort or because they feel they are not up to the task (see also the examples discussed by Burger, 1989, e.g., the pilot flying an airplane rather than oneself). Finally, a recent paper (Kay et al., under review) provides evidence for an important moderator that helps understand when belief in a controlling God facilitates or impairs the motivation to engage in personal action: predictability. That is, when relying on an external agent to control outcomes, the extent to which the agent's interventions are presumed to follow predictable and systematic rules determines whether people feel efficacious enough to engage in personal action. An agent that controls outcomes in ways we cannot fathom (“God works in mysterious ways”) decreases personal action, while an agent that follows systematic rules facilitates order and as a consequence strengthens people's perceptions of personal control. It is a good possibility that one of the reasons that participants in the Meijers and Rutjens (2014) studies, described a little earlier, were less inclined to engage in personal action after reading about science's potential to solve environmental problems was that they did not feel they understood exactly *how* science would help combat these problems. In other words, they might have felt that science too works in mysterious ways.

In sum, whether affirming order perceptions helps or hinders the expenditure of desired actions and behaviors likely depends on a host of potential moderators: perceptions of external agency and particularly the predictable nature of those external agents' actions, the perceived impact of one's own actions, and the willingness (and perceived capability) to engage in (a particular) personal action.

Related work and future directions

In the previous paragraph we described a number of recent strands of research investigating the boons and banes of perceiving order. Sometimes perceiving order facilitates motivated action and sometimes it does not. Taking that research one step further, different programs of research that are relevant but not directly related to

CCT reveal the potentially more detrimental or undesired consequences of perceiving order. We will briefly discuss two.

First, recent work has shown that perceptions of external control (i.e., God) in the form of reminding people of God increases risk taking (Chan, Tong, & Tan, 2014; Kupor, Laurin, & Levav, 2015). In a similar vein, enhanced perceptions of personal control also drive risk taking (Kouchaki, Oveis, & Gino, 2014). In all these cases, people feel safe and secure, confident, and protected enough to take “a leap of faith” (Chan et al., 2014), and so they consequentially engage in risky behaviors more often. It is likely that an important moderator here is whether people believe that the external source of control is benign and cares about their well-being. Put differently, merely believing that an external agent (e.g., God, government) provides order is not sufficient to increase risk; in an orderly and just world the individual might still be punished for taking risks. Rather, people must either believe that they themselves can control outcomes and thus feel less vulnerable (i.e., God provides them with personal control; Chan et al., 2014) or that an external agent controls outcomes (i.e., God cares about them and provides protection; Kupor et al., 2015).

Second, a recent paper discusses an intriguing experiment in which it is shown that a radically predictable and structured situation can even trigger the tendency to engage in self-inflicted pain stimulation. More specifically, participants in this study were asked to sit in a room by themselves with nothing to do. Strikingly, 67% of the male and 25% of the female participants voluntarily exposed themselves to negative stimuli (i.e., administered electric shocks to themselves; Wilson et al., 2014). Sitting alone with nothing to do was apparently aversive enough that it drove a substantial number of participants to self-administer electric shocks. This finding can be linked to the literature on boredom, which generally tends to define boredom as an aversive affective state characterized by a lack of challenge and oftentimes by a lack of meaning (e.g., Bench & Lench, 2013; Van Tilburg & Igou, 2012). Arguably, boredom can be labelled as a monotonous state, characterized by a lack of stimulation and relatively high levels of order and predictability. Indeed, a recent perspective argues how highly predictable states (e.g., certain instances of routine and boredom) reflect an “order overdose” (Rutjens, van Harreveld, & Cunningham, in preparation). Here, several experiments show that manipulations aimed to induce such a state of order overdose (e.g., boredom, undesirable routine) lead to a preference for unpredictability and, consequentially, to increased risk taking. Thus, if we view boredom and highly predictable routine as experiences characterized by overly high levels of perceived order, we can interpret the findings described above as at least partially reflecting the motivational consequences of order perceptions.

The research reviewed in the second part of this chapter prompts us to believe that there are many exciting future directions for research on compensatory control and the importance of perceiving order in our natural and social environments. We are gradually starting to uncover how, when, and why perceptions of external control and perceptions of order and structure impact personal action as well as motivation more generally (e.g., Fennis & Wiebenga, 2015; Kay et al., under review; Landau et al., 2015; Meijers & Rutjens, 2014; Rutjens et al., in preparation).

Although the current chapter covered a number of important moderators of these effects, we think that there are several fruitful avenues for future research to further our understanding of compensatory control and order motivation processes and its impact on cognition, motivation, and behavior. One obvious example is to further uncover the situational and individual factors that determine when compensatory control and order perceptions facilitate versus hamper personal action. Second, an important lacuna in the literature relates to the *functional value* of the vast array of compensatory beliefs and behaviors that have been documented so far (Landau et al., 2015; Rutjens, van Harreveld, & van der Pligt, 2013). Again depending on situational and personal factors, some compensatory strategies might be functionally superior to others (e.g., see Helzer & Jayawickreme, 2015). And, finally, future research could zoom in more on the properties of “socially constructive” versus less constructive (and often more defensive) reactions to threats to order and control. For example, while endorsing conspiracies or enemies seem functionally equivalent to, say, belief in scientific progress, they obviously have drastically different consequences for other aspects of social cognition and motivation. Understanding why and when people bolster either of these types of compensatory beliefs, while also taking into account its effects on personal action and the functional value of these beliefs, will help to further elucidate compensatory processes related to control and order motivation.

Notes

- 1 The notion that exerting control is one way to perceive order is also present in the work of Pittman (1998), who argued that control provides people with the idea that their direct environment (and the world as such) is predictable, structured, and coherent (see also Kay, Landau, & Sullivan, 2014; Krantz, 1998).
- 2 Although, of course, *other* motivations unrelated to maintaining order (e.g., desiring to contribute to health or a green environment) might still play an important role in determining personal action.

References

- Bench, S. W., & Lench, H. C. (2013). On the function of boredom. *Behavioral Sciences*, 3(3), 459–472.
- Burger, J. M. (1989). Negative reactions to increases in perceived personal control. *Journal of Personality and Social Psychology*, 56, 246–256.
- Chan, K. Q., Tong, E. M. W., & Tan, Y. L. (2014). Taking a leap of faith: Reminders of God lead to greater risk taking. *Social Psychological and Personality Science*, 5, 901–909.
- Chianetti, C., & Vallortigara, G. (2011). Chicks like consonant music. *Psychological Science*, 22, 1270–1273.
- Conway-Morris, S. (2005). *Life's solution: inevitable humans in a lonely universe*. Cambridge: Cambridge University Press.
- Cutright, K. M. (2012). The beauty of boundaries: When and why we seek structure in consumption. *Journal of Consumer Research*, 38(5), 775–790.
- Fennis, B. M., & Wiebenga, J. H. (2015). Disordered environments prompt mere goal pursuit. *Journal of Environmental Psychology*, 43, 226–237.

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- Foster, K. R., & Kokko, H. (2009). The evolution of superstitious and superstition-like behaviour. *Proceedings of the Royal Society B*, *276*, 31–37.
- Friesen, J. P., Campbell, T. H., & Kay, A. C. (2015). The psychological advantage of unfalsifiability: The appeal of untestable religious and political ideologies. *Journal of Personality and Social Psychology*, *108*(3), 515.
- 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*, 524–541.
- Friesen, J. P., Kay, A. C., Eibach, R. P., & Galinsky, A. D. (2014). Seeking structure in social organization: Compensatory control and the psychological advantages of hierarchy. *Journal of Personality and Social Psychology*, *106*(4), 590.
- 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. *Advances in Experimental Social Psychology*, *41*, 119–166.
- Haselton, M. G., & Buss, D. M. (2000). Error management theory: A new perspective on biases in cross-sex mind reading. *Journal of Personality and Social Psychology*, *78*(1), 81.
- Heckhausen, J., & Schulz, R. (1995). A life-span theory of control. *Psychological Review*, *102*, 284–304.
- Helzer, E. G., & Jayawickreme, E. (2015). Control and the “good life”: Primary and secondary control as distinct indicators of well-being. *Social Psychological and Personality Science*, *6*, 653–660.
- Janoff-Bulman, R. (1992). *Shattered assumptions: Towards a new psychology of trauma*. New York: Free Press.
- Jost, J. T., Glaser, J., Kruglanski, A. W., & Sulloway, F. J. (2003). Political conservatism as motivated social cognition. *Psychological Bulletin*, *129*, 339–375.
- 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*, 18–35.
- Kay, A. C., Landau, M. J., Khenfer, J., & Keefer, L. A. On the self-regulatory consequences of supernatural belief: When and why does belief in a controlling god strengthen goal commitment? *Under review*.
- Kay, A. C., Landau, M. J., & Sullivan, D. L. (2014). *Agency and control*. *APA handbook of personality and social psychology: Attitudes and social cognition*. Washington, DC: American Psychological Association.
- Kay, A. C., Laurin, K., Fitzsimons, G. M., & Landau, M. J. (2014). A functional basis for structure-seeking: Exposure to structure promotes willingness to engage in motivated action. *Journal of Experimental Psychology: General*, *143*(2), 486.
- Kay, A. C., Moscovitch, D. A., & Laurin, K. (2010). Randomness, attributions of arousal, and belief in God. *Psychological Science*, *21*, 216–218.
- 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.
- Kouchaki, M., Oveis, C., & Gino, F. (2014). Guilt enhances the sense of control and drives risky judgments. *Journal of Experimental Psychology: General*, *143*(6), 2103.
- Krantz, D. L. (1998). Taming chance: Social science and everyday narratives. *Psychological Inquiry*, *9*, 87–94.
- Kruglanski, A. W., & Webster, D. M. (1996). Motivated closing of the mind: “seizing” and “freezing.” *Psychological Review*, *103*, 263–283.
- Kupor, D. M., Laurin, K., & Levav, J. (2015). Anticipating divine protection? Reminders of god can increase nonmoral risk taking. *Psychological Science*, *26*(4), 374–384.

- Landau, M. J., Johns, M., Greenberg, J., Pyszczynski, T., Martens, A., Goldenberg, J. L., & Solomon, S. (2004). A function of form: Terror management and structuring the social world. *Journal of Personality and Social Psychology*, *87*, 190–210.
- Landau, M. J., Kay, A. C., & Whitson, J. A. (2015). Compensatory control and the appeal of a structured world. *Psychological Bulletin*, *141*, 694–722.
- Langer, E. J. (1975). The illusion of control. *Journal of Personality and Social Psychology*, *32*, 311–328.
- Langer, E. J., & Rodin, J. (1976). The effects of choice and enhanced personal responsibility for the aged: A field experiment in an institutional setting. *Journal of Personality and Social Psychology*, *34*, 191–198.
- Laurin, K., Shariff, A. F., Henrich, J., & Kay, A. C. (2012). Outsourcing punishment to God: beliefs in divine control reduce earthly punishment. *Proceedings of the Royal Society of London B: Biological Sciences*, rspb20120615.
- Lerner, M. J. (1980). *The belief in a just world: A fundamental delusion*. New York: Plenum.
- Maier, S. F., & Seligman, M. E. P. (1976). Learned helplessness: Theory and evidence. *Journal of Experimental Psychology: General*, *195*, 3–46.
- Malinowski, B. (1979). The role of magic and religion. In W. A. Lessa & E. Z. Vogt (Eds.), *Reader in comparative religion: An anthropological approach*. New York: Harper and Row, 1972.
- Matute, H. (1994). Learned helplessness and superstitious behavior as opposite effects of uncontrollable reinforcement. *Learning and Motivation*, *25*, 216–232.
- Matute, H., Yarritu, I., & Vadillo, M. A. (2010). Illusions of causality at the heart of pseudoscience. *British Journal of Psychology*, *102*, 392–405.
- Meijers, M. H. C., & Rutjens, B. T. (2014). Affirming belief in scientific progress reduces environmentally friendly behaviour. *European Journal of Social Psychology*, *44*, 487–495.
- Moulding, R., & Kyrios, M. (2006). Anxiety disorders and control related beliefs: The exemplar of Obsessive Compulsive Disorder (OCD). *Clinical Psychology Review*, *26*, 573–583.
- Pittman, T. S. (1998). Motivation. In D. T. Gilbert, S. T. Fiske, & G. Lindzey (Eds.), *The handbook of social psychology* (Vol. 1, 4th ed., pp. 549–590). New York: MacGraw-Hill.
- Plous, S. (1993). *The psychology of judgment and decision making*. New York: McGraw-Hill.
- 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*, 5–37.
- Rothschild, Z. K., Landau, M. J., Sullivan, D., & Keefer, L. A. (2012). A dual-motive model of scapegoating: Displacing blame to reduce guilt or increase control. *Journal of Personality and Social Psychology*, *102*(6), 1148.
- Rutjens, B. T. (2015). Unpublished dataset, University of Amsterdam, the Netherlands.
- 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*, 1078–1080.
- Rutjens, B. T., van Harreveld, F., & Cunningham, W. A balance perspective on threat compensation. *In preparation*.
- Rutjens, B. T., van Harreveld, F., & van der Pligt, J. (2013). Step by step: Finding compensatory order in science. *Current Directions in Psychological Science*, *22*, 250–255.
- Rutjens, B. T., van Harreveld, 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*, 313–318.
- Srull, T. K., & Wyer, R. S. (1979). The role of category accessibility in the interpretation of information about persons: Some determinants and implications. *Journal of Personality and Social Psychology*, *37*(10), 1660–1672.

- Sedik, G., & Kofta, M. (1990). When cognitive exertion does not yield cognitive gain: Toward an informational explanation of learned helplessness. *Journal of Personality and Social Psychology*, *58*(4), 729.
- Shepherd, S., & Kay, A. C. (2012). On the perpetuation of ignorance: System dependence, system justification, and the motivated avoidance of sociopolitical information. *Journal of Personality and Social Psychology*, *102*(2), 264.
- Skinner, E. A. (1996). A guide to constructs of control. *Journal of Personality and Social Psychology*, *71*, 549–570.
- Spilka, B., Shaver, P., & Kirkpatrick, L. A. (1985). A general attribution theory for the psychology of religion. *Journal for the Scientific Study of Religion*, *24*, 1–20.
- 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.
- Thompson, S. C. (2004). Illusions of control. In R. Pohl (Ed.), *Cognitive illusions* (pp. 113–126). New York: Taylor & Francis.
- Thompson, S. C., & Spacapan, S. (1991). Perceptions of control in vulnerable populations. *Journal of Social Issues*, *47*, 1–22.
- van Tilburg, W. A., & Igou, E. R. (2012). On boredom: Lack of challenge and meaning as distinct boredom experiences. *Motivation and Emotion*, *36*(2), 181–194.
- Vyse, S. A. (1997). *Believing in magic: The psychology of superstition*. New York: Oxford University Press.
- Whitson, J. A., & Galinsky, A. D. (2008). Lacking control increases illusory pattern perception. *Science*, *322*, 115–117.
- Wilson, T. D., Reinhard, D. A., Westgate, E. C., Gilbert, D. T., Ellerbeck, N., Hahn, C., . . . Shaked, A. (2014). Just think: The challenges of the disengaged mind. *Science*, *345*(6192), 75–77.