

BRIEF REPORT

A Functional Basis for Structure-Seeking: Exposure to Structure Promotes Willingness to Engage in Motivated Action

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A recurring observation of experimental psychologists is that people prefer, seek out, and even selectively “see” structure in their social and natural environments. Structure-seeking has been observed across a wide range of phenomena—from the detection of patterns in random arrays to affinities for order-providing political, religious, social, and scientific worldviews—and is exacerbated under psychological threat. Why are people motivated for structure? An intriguing, but untested, explanation holds that perceiving structure, even in domains unrelated to one’s current behavioral context, can facilitate willingness to take goal-directed actions. Supporting this, in 5 studies, reminders of structure in nature or society increase willingness to engage in goal pursuit.

Keywords: structure seeking, pattern perception, self-regulation, goal pursuit, compensatory control

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People have a persistent and pervasive tendency to perceive structure in their social and natural environments (Becker, 1964; Frankl, 1963; Heider, 1958; Köhler, 1959; Neuberg & Newsome, 1993). While structuring tendencies are partly embedded in human perceptual systems, people also show a motivated preference for clarity and order over ambiguity and randomness (Heine, Proulx, & Vohs, 2006; Kruglanski, 1989; Lerner, 1980). Why are people motivated to perceive a structured world? The current research tests the unexplored hypothesis that perceiving structure facilitates willingness to take goal-directed action.

Is Structure for Doing?

In a 2008 *Science* article, Whitson and Galinsky (2008) showed that following threats to personal control, people falsely detect patterns in random displays. In related findings, similar threat inductions lead people to increasingly: believe in highly

structured scientific theories (Rutjens, van Harreveld, van der Pligt, Kreemers, & Noordewier, 2013), prefer religions that imbue the world with order (Kay, Gaucher, Napier, Callan, & Laurin, 2008), prefer logos with clear boundaries (Cutright, 2012), dislike visually chaotic art (Landau, Greenberg, Solomon, Pyszczynski, & Martens, 2006), and report a need for structure (Whitson & Galinsky, 2008).

Theoretical perspectives on the motivated preference for structure are diverse but share the assumption that structure facilitates goal-directed action, a form of action widely considered fundamental to human nature (Atkinson, 1957; Emmons, 1986; Pervin, 1989). The meaning maintenance model posits that people seek a predictable environment in order to act effectively (Heine et al., 2006). Compensatory control theory (Kay et al., 2008) suggests that global structure can compensate for reduced personal control in promoting commitment to action. Existentially oriented theorists claim that action intentions depend on well-structured conceptions of reality (Becker, 1964; May, 1953). And just world theory (Lerner, 1980) posits that belief in causal order enables the development of long-term goal pursuit. For example, Lerner (1977), in theorizing about how children develop into adults capable of foregoing immediate pleasure to pursue long-term goals, noted the critical importance of an understandable environment. Too many encounters with “inconsistent or arbitrary acts, which create an unstable environment” (p. 8), Lerner suggested, can disrupt this transition by making long-term goal pursuit feel futile. In short, many scholars have posited that (a) perceived structure provides assurance that goal-directed actions are worthwhile, and

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thereby facilitates motivation to pursue goals, and (b) a lack of structure signals that goal-directed actions are unlikely to produce desired outcomes.

But despite this theoretical consensus, no experimental research has examined this hypothesis. Indirect support comes from evidence that perceiving reliable relations between actions and their outcomes in a specific domain promotes motivated action within that same domain (Bandura, 1986; Mitchell, 1973). For example, students study hard only if they believe there is a reliable link between studying and grades (Shell, Murphy, & Bruning, 1989). Importantly, however, such domain-specific perceptions of structure differ qualitatively from the remote structuring tendencies observed in recent research (e.g., preferring order-enhancing ideologies and clearly bounded logos).

Building on those recent findings, we propose that perceived structure can promote willingness to expend effort toward goals even when the source of structure is unrelated to those goals. We tested this novel hypothesis in five experiments using established goal-pursuit measures. In all studies, the structure induction was unrelated to the domains in which participants reported motivation, allowing us to test whether global perception of structure is sufficient to facilitate specific motivational intentions. Study 5 goes further to model the role of dispositional variation in the perception of reliable contingencies between actions and outcomes.

Study 1

Participants read an article describing a natural phenomenon (leaves growing on trees) as structured, random, or in neutral terms, and afterward reported their motivation to pursue their academic, career and financial goals (operationalized as willingness to invest effort and make sacrifices—hallmarks of motivation and self-regulation; Heckhausen, 1991). We hypothesized that participants who had just read about a structured, orderly process would report higher willingness to engage in goal-pursuit.

Method

Undergraduates ($N = 103$, 58% female, $M_{\text{age}} = 22.9$ years), who completed the study in-lab for \$5.00, were randomly assigned to read one of three articles about trees. Participants in the structure condition read that “The way trees produce leaves is one of the many examples of the orderly patterns created by nature; Every species of tree grows its leaves in identifiable patterns, with a system of laws describing the relationships between the leaves.” Participants in the random condition read that “The way trees produce leaves is one of the many examples of the natural randomness that surrounds us; There seems to be no identifiable pattern, no system of laws describing the relationships between the leaves.” Participants in the neutral condition read an article that summarized trees’ role in sustaining life. Pilot testing confirmed the articles’ effectiveness in influencing perceptions of structure, without affecting positive or negative affect; see online supplemental materials.

Participants then indicated, for each of four long-term goals common for this sample (“doing well academically,” “having a successful career in your profession of choice,” “acquiring a house,” “being able to retire comfortably”), their willingness to “work towards this goal” and to “make sacrifices in pursuit of this

goal” (1 = *not at all*; 7 = *extremely*). We averaged the responses into a single index ($\alpha = .77$).

Results and Discussion

As predicted, participants in the structure condition reported greater willingness to engage in motivated action ($M = 5.65$, $SD = 0.95$) than participants in the random condition ($M = 5.16$, $SD = 0.79$), $t(67) = 2.33$, $p < .03$, Cohen’s $d = 0.57$. Participants in the neutral condition reported intermediate levels of motivation ($M = 5.45$, $SD = 0.81$), which did not significantly differ from the structure, $t(66) = 0.95$, $p = .35$, or random conditions, $t(67) = 1.49$, $p = .14$.

Study 2

Study 2 conceptually replicates Study 1 by measuring pursuit of idiosyncratic, rather than assigned, goals. We asked participants to generate their own most important goal, manipulated structure perceptions and measured participants’ willingness to engage in the behaviors necessary to achieve their goal. Because this measure of self-regulation—which we use in both Studies 2 and 3—can be confounded with the desirability of the self-generated goal outcome (i.e., people may work harder for more valuable goals; Atkinson, 1957), following Laurin, Fitzsimons, and Kay (2011), we controlled for the subjective value of the goals.¹

Method

American residents ($N = 67$, 49% female, $M_{\text{age}} = 31.5$ years) participated online via Amazon’s Mechanical Turk. Participants first listed their most important long-term goal (see Figure 1). Participants then read the structure or the randomness article described in Study 1 (the neutral condition was removed). Next, participants answered three questions about their goal (1 = *not very*; 7 = *extremely*). The first assessed subjective value of the outcome: “How happy would you be to achieve this goal?” The next two assessed willingness to engage in goal pursuit: “Think about the work you will have to do in order to achieve this goal. How interested are you in doing this work?” “Think about the temptations you will have to resist in order to achieve this goal. How interested are you in resisting these temptations?”

Following the exact procedure described in Laurin et al. (2011), we created an index of goal pursuit controlling for goal outcome desirability. We regressed the mean of the goal pursuit items ($r = .56$, $p < .001$) on the centered mean of the subjective value item, calculated the unstandardized residual for each participant, and added to those the mean value for the self-regulation items.

Results and Discussion

Participants in the structure condition reported higher willingness to expend effort and make sacrifices to pursue their goal compared to participants in the random condition ($M_{\text{structure}} =$

¹ In Study 2, the pattern of means and p remain virtually unchanged when we remove this covariate from the model; in Study 3, the pattern of the means remains unchanged, and the p increases to .106.

Goal (Study 2)	Goal (Study 3)	Goal (Study 4)	Behavior (Study 4)	Goal (Study 5)	Behavior (Study 5)
Find true love	Become an attorney	Change careers	I called and asked to speak with the person in charge of hiring to see if the position was still open.	Bench press 225 lbs	Since I can't go to the gym in a minute, I opened up a video that showed me how to use proper bench press form.
Finish MBA	Finish basement	Exercise regularly	I ran up and down our stairs 5 times, which is going to be one of my first exercises for heart health.	Buy a new car	I saved a few aluminum cans for recycling for money.
Get a better job	Get out of debt	Find a good steady job	I entered a job search on careerbuilder.com and browsed through the first couple jobs.	Exercise more and eat healthy to get to my ideal weight	Got up and started doing stretches. I'm not sure what the individual stretches are called, but they were arm and leg stretches. Also did 10 pushups.
Live to be 100	I would like to do a triathlon	Get more toned	I did 20 situps and 10 pushups.	Find a professional job so that I can move to a bigger city	I sent an email to the cousin of a friend who works at an appealing company inquiring about openings.
Lose 50 lbs	I'd like to lose 40 lbs	Happy marriage	I hugged my fiancée and told her I love her.	Finish my MBA	I went to the FAFSA website and started my application
Quit smoking	Learn to play guitar very well	Lose 30 pounds	I went and made myself a salad for lunch.	Start my own T-Shirt and Accessories company	I opened up a recent design to color coordinate it and send it off to the printers
Save money for a new car	Start my own business	Love Jesus more	I read a chapter of Proverbs and prayed for wisdom.	To be a better parent	I got up and hugged my kids.
Sell the house	Run a 5k in under 20 minutes	Make more money	I sent an email to my best client and asked if they had any upcoming projects.	To help my son to see his worth, so he can start to live his life	I said a prayer asking God to give me insight so I can help my son and to lead my son to the right path.
Win a bodybuilding show	Write a novel	Not have any debt	I made a payment on a credit card.	Work and make money as a writer	I pulled up the last page of my current story and wrote a new paragraph.

Figure 1. Sample goals and behaviors reported by participants in Studies 2–5.

5.26, $SD_{\text{structure}} = 0.88$; $M_{\text{random}} = 4.72$, $SD_{\text{random}} = 1.32$), $t(65) = 2.00$, $p = .05$, Cohen's $d = 0.50$.

Study 3

Study 3 provided both an exact and conceptual replication of Study 2.

Method

American residents ($N = 66$, 48% female, $M_{\text{age}} = 31.0$ years) participated online via Mechanical Turk. The procedure and materials were identical to Study 2's (see above for description of measures). The hard work and temptation resistance items again correlated significantly ($r = .69$, $p < .001$), with the

addition of two alternative measures of willingness to engage in goal-pursuit. Participants indicated how much time during the next week they planned to spend in pursuit of their goal in both qualitative terms (1 = *not very much time*; 7 = *a huge amount of time*) and quantitative terms (total minutes).

Results and Discussion

A series of t tests demonstrated effects consistent with our predictions (see Table 1). The effect observed in Study 2 replicated; moreover, participants in the order condition intended to spend more time in pursuit of their goal, whether measured on a Likert-type scale or via estimated number of minutes.

Table 1

Effects of Order Versus Disorder on Motivation and Intentions to Spend Time in Pursuit of an Important Goal (Study 3)

Dependent measure	Structure		Randomness		t	df	p	Cohen's d
	M	SD	M	SD				
Motivation index	5.59	1.16	4.88	1.40	2.13	62 ^a	.04	0.55
Time (Likert-type scale)	5.30	1.38	4.38	1.67	2.36	64	.02	0.60
Time (minutes) ^b	1,721	2,133	792	1,027	2.36	64	.02	0.60

^a Two participants failed to complete the measure of subjective attractiveness, so they are not included in this analysis. ^b Levene's test indicated that the variance differed marginally between conditions ($F = 3.44$, $p < .07$), but the t test adjusted to take into account these unequal variances remained significant, $t(34.42) = 2.10$, $p < .05$.

Study 4

Study 4 conceptually replicated the previous studies by semantically priming the construct of structure using a scrambled-sentence task. Unlike the manipulation used thus far, the semantic prime has minimal real-world context, and therefore affords an even more conservative test of whether the salience of global structure promotes willingness to engage in unrelated goal pursuit. We also employed a more behavioral dependent measure.

Method

American residents ($N = 67$, 46% female, $M_{\text{age}} = 30.6$ years) participated online via Mechanical Turk. Participants first nominated their three most important long-term goals (see Figure 1). Next, participants completed a scrambled sentence task (see online supplemental materials) in which they manipulated words related to structure (e.g., *systematic*, *pattern*) or randomness (e.g., *disorder*, *random*). Pretest participants failed to notice the theme in the sentences, and none reported suspicion.

Participants were then told they should stop completing the survey and spend a few minutes doing something that would help them make progress toward one of the goals they had listed. Participants could only click on the “next” button after a delay of at least 60 s (the forced delay was included to prevent participants from just skipping this phase so as to finish the experiment as quickly as possible; participants clicked after 142 s); once they did, they saw a checklist with four options: “I decided to do something that would help me make progress toward my [first/second/third] goal,” and “I did not do anything.” Next to the “I did not do anything” checkbox, a note in large, bold, red text read: “NOTE: Checking this box will NOT prevent you from receiving payment; we appreciate your honesty.” We included this note to help elicit honest answers. Whether they reported engaging in motivated action was our primary dependent measure of interest.

Participants then described what they did (see Figure 1) and indicated: “How useful was it in moving you closer towards your goal?” and “How crucial was it for your goal that you engage in this behavior?” (1 = *not very*; 7 = *extremely*; $r = .62$). We also asked two coders, blind to condition, to rate the value (1 = *not at all valuable*; 7 = *extremely valuable*) of each participant’s action, where value was defined as a combination of how much the action brought them closer to their goal, and how necessary the action was to them achieving their goal. Coders’ ratings were reasonably highly correlated ($r = .53$, $p < .001$). In an ancillary set of analyses, we used these self-report and coder ratings to assess whether, among those who did in fact choose to engage in goal-directed behavior, the order primes led to more valuable or effective actions.

Results and Discussion

Primary analyses. A chi-square analysis among all participants demonstrated the predicted effect of condition: Participants primed with structure-related words were more likely to engage in goal-directed action (94%) than participants primed with randomness-related words (76%), $\chi^2(1, N = 67) = 4.02$, $p < .05$.

Secondary analyses. We also examined whether, among participants who did in fact report engaging in goal-directed action, there would be any evidence that the structure primes led to actions

deemed (by either the participants themselves or blind coders) as increasingly effective for reaching the reported goal. A multivariate analysis of variance (MANOVA) revealed the predicted main effect of condition across participants’ and coders’ ratings, $F(1, 53) = 3.80$, $p < .03$. When examining just the self-report ratings, we see that participants primed with structure (vs. randomness) viewed their reported action as more useful and crucial for achieving their goal ($M_{\text{structure}} = 4.84$, $SD_{\text{structure}} = 1.51$; $M_{\text{random}} = 3.86$, $SD_{\text{random}} = 1.61$), $F(1, 54) = 5.47$, $p < .03$, Cohen’s $d = 0.63$. While coders’ ratings showed a similar pattern of means, this effect did not reach statistical significance ($M_{\text{structure}} = 4.13$, $SD_{\text{structure}} = 1.26$; $M_{\text{random}} = 3.60$, $SD_{\text{random}} = 1.47$), $F(1, 54) = 2.10$, $p = .15$, Cohen’s $d = 0.39$, a null finding that may not be that surprising given the inherent ambiguity in judging the effectiveness of a (very tersely described) action for someone else’s idiosyncratic goal.

Study 5

In Study 5 we go further to test of a potential boundary condition, one that can also shed light on mechanism. If the salience of global structure facilitates goal pursuit by implicitly alleviating feelings that investments of time and energy may be a waste of precious resources, this effect should be most pronounced for those low in general contingency beliefs—that is, beliefs that actions and outcomes are tightly, causally interconnected—and substantially weaker (or absent entirely) for those high in this general belief (i.e., for those who do not have these chronic contingency concerns). In other words, we contend that structure promotes goal pursuit by reassuring people that actions and outcomes are tightly linked. If this is true, then those who do not already strongly believe in that tight linkage should be most likely to benefit from reminders of order and structure. Thus, in Study 5 we include a measure of generalized contingency belief, predicting that it will moderate our main effect. We also introduce yet another manipulation of order and, rather than comparing its effect to those of a manipulation of randomness, we use a baseline comparison condition.

Method

American adults ($N = 132$, 42% female, $M_{\text{age}} = 29.0$ years) completed the study online via Mechanical Turk.

As in Studies 2, 3, and 4, participants first listed their most important long-term goal (see Figure 1). Participants in the baseline condition then proceeded directly to the dependent measure. Participants in the order condition first completed a questionnaire designed to expose them to a set of orderly natural and economic events. Participants read that the purpose of the questionnaire was to “measure differences in how much ‘structure’ people perceive in the world. To say that an event is structured means that it has a reliable pattern—that we can understand it and confidently predict when and how it will occur.” They then saw a list of 10 events, five of which we selected because of their orderly, structured nature (the other five were fillers): “The earth’s orbit around the sun, the annual profits of a small business, the tides of the oceans, variations in energy usage year round, and variations in traffic congestion throughout the day.” Participants used a 7-point scale (1 = *not at all structured*; 7 = *highly structured*) to rate how much structure they saw in each event. As expected, participants rated these five events

significantly higher than the midpoint ($M = 4.90$, $SD = 0.90$), $t(65) = 8.16$, $p < .001$, and as significantly more structured than the five filler events ($M = 4.07$, $SD = 0.91$), $t(65) = 7.14$, $p < .001$.

The dependent measure was identical to the one used in Study 4; we modified the exact wording to reflect the fact that participants only generated one goal, not three. Finally, participants indicated their agreement with two items indexing generalized contingency belief: “My actions have predictable consequences” and “The things I do now will predict what happens later, even if it takes time.” These items were included at the end of the survey rather than the beginning to avoid priming notions of order and contingency in all of our participants; importantly, the structure manipulation had no effect on this measure—which is unsurprising given the extent to which *explicit* beliefs in generalized efficacy are thought to be chronic (Bandura, 1977; Rotter, 1966)—making it statistically suitable as a moderator ($M_{order} = 5.48$, $SD_{order} = 0.84$; $M_{neutral} = 5.41$, $SD_{neutral} = 0.89$), $t(130) = 0.45$, $p = .65$.²

Results and Discussion

As predicted and replicating the result of Study 4, structure-primed participants were more likely to take goal-directed action (83%) than baseline participants (65%), $\chi^2(1, N = 132) = 5.70$, $p < .02$. To test whether participants’ beliefs about contingency moderated this effect, we dummy-coded engagement in goal pursuit and subjected this binary variable to a logistic regression using condition (baseline = 0; order = 1), contingency beliefs (mean centered), and their interaction as predictors. Consistent with the chi square analysis, at mean levels of contingency beliefs, participants in the order condition were more likely to engage in goal pursuit than participants in the baseline condition ($B = .91$, $Wald = 4.31$, $p < .04$). Moreover, this main effect was qualified by a significant interaction ($B = -1.09$, $Wald = 4.40$, $p < .04$; see Figure 2): Among participants low in contingency beliefs, the effect of condition was strong ($B = 1.86$, $Wald = 8.52$, $p = .004$), whereas it disappeared among participants high in contingency beliefs ($B = -.03$, $Wald = 0.003$, $p = .96$). Viewed differently, among participants in the baseline condition, individual differences in general contingency beliefs strongly predicted goal pursuit ($B = 0.83$, $Wald = 6.17$, $p < .02$); among participants in the order condition, they did not ($B = -.28$, $Wald = 0.47$, $p = .76$).

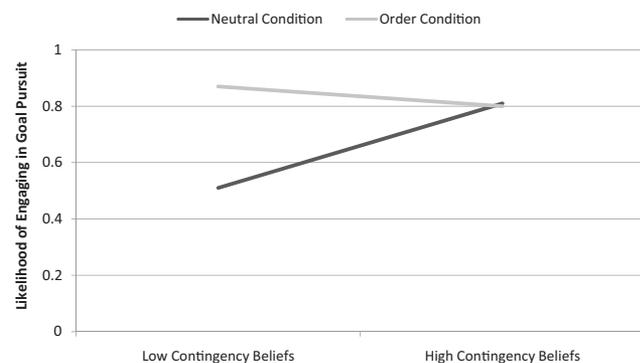


Figure 2. Effect of structure versus neutral primes and generalized contingency beliefs (at 1 standard deviation above and below the mean) on likelihood of engaging in goal pursuit.

General Discussion

A long-standing theoretical tradition asserts that people’s perception of the world as structured (rather than chaotic) facilitates their motivation to engage in goal-directed action. But while modern psychological science has made it clear that people do have a motivation to believe in simple structure—insofar as these tendencies are exacerbated under psychological threat—the current research is the first to test the assumption that structure facilitates motivation to pursue goals. These results provide much-needed evidence in support of a range of current theories positing a functional account to the apparent motivation to seek out and preserve beliefs in structure (e.g., Heine et al., 2006; Kay et al., 2008; Landau, Sullivan, Keefer, Rothschild, & Osman, 2012; Proulx, Inzlicht, & Harmon-Jones, 2012).

Specifically, exposing people to passages that suggest that leaves grow in an orderly pattern (Studies 1–3), or to sentences related to structure (Study 4), or to world events that are seen as highly structured (Study 5) prompted increased goal-directed motivation in unrelated domains, both in self-reported motivation and in actual behavior. These results are both surprising and sensible. It is striking indeed that simply exposing people to notions of structure can increase motivation to pursue important personal goals. At the same time, it makes good sense that broad beliefs about structure would be related to localized attempts to pursue goals.

The present set of studies has some limitations that future research can help resolve. First, we did not attempt to disentangle the effects of order primes on goal engagement from the effects of randomness primes on goal disengagement. Because perceptions of order and randomness exist on the same continuum, any attempt to conclusively disentangle their effects would require a sample of participants whose baseline perceptions lay at the exact midpoint of that continuum, and manipulations that were perfectly calibrated to move people’s perceptions away from that midpoint to the exact same degree in either direction. Otherwise, any differences observed could be attributed to differences in the manipulations’ ability to influence the underlying psychological construct, or to differences in the extremity of the induced perceptions. We did demonstrate in Study 5 that order facilitates goal pursuit even when compared to a baseline condition, but it remains an open question whether randomness is more debilitating than order is functional. That said, to the extent that the purpose of this research was to demonstrate one reason people may be motivated to perceive relatively more order in their environment (which necessarily implies perceiving less randomness), the relative strength of the direction of the effect is less important than the fact that the effect does occur.

Second, important work has demonstrated that *personal* uncertainty—confusion or indecision regarding one’s own goals—can motivate increased goal commitment (Nash, McGregor, & Prentice, 2011). This finding may appear in some ways opposite to the one reported here. However, because that research focuses on personal indecision and insecurity regarding one’s own priorities, values or plans, and not on cognitions regarding the world external

² One might wonder whether generalized contingency beliefs would also mediate the effects of the structure primes on motivation. Because *explicit* generalized contingency beliefs are relatively stable over time (Rotter, 1966), we deemed that unlikely. To capture mediation, an implicit measure of contingency beliefs would be needed, but we know of no such measure.

to the self—two different types of cognitions that have been demonstrated to have very different effects (see Shepherd, Kay, Landau, & Keefer, 2011)—we view it as qualitatively different from what we investigated here. Nonetheless, future research might consider manipulating these types of beliefs orthogonally and assessing whether and how their effects interact.

Finally, while the present studies demonstrate that exposure to ordered representations of the natural or physical world facilitate long-term goal engagement, must order and structure always be functional in this way? One possible exception to this rule may be when people imbue the world with order via belief in a “higher power” that controls how the world works. Believing that nothing is random because it is all willed by an interventionist God, although potentially existentially palliative, may actually demotivate people from pursuing long-term goals. If outcomes are fated, or the rules of the game are at the sole discretion of one (unpredictable) source of power, this may lessen people’s faith in contingency between their own actions and outcomes, making the expenditure of effort feel more fruitless. Consistent with this, previous research demonstrates that when people are reminded of God (and an interventionist God, specifically) they become less likely to report a willingness to expend effort to pursue (earthly) long-term goals (Laurin, Kay, & Fitzsimons, 2012). On the other hand, a higher power that mainly imbues the world with order by providing a set enforceable contingencies—for example, like governments do by instilling policies and laws, or organizations do by applying rules and procedures, or some religions do by dictating contingencies between behaviors and rewards—may still be functional, so long as people see that source of power as reliable.

References

- Atkinson, J. W. (1957). Motivational determinants of risk-taking behavior. *Psychological Review*, *64*, 359–372. doi:10.1037/h0043445
- Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavior change. *Psychological Review*, *84*, 191–215. doi:10.1037/0033-295X.84.2.191
- Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice-Hall.
- Becker, E. (1964). *Revolution in psychiatry*. New York, NY: The Free Press.
- Cutright, K. M. (2012). The beauty of boundaries: When and why we seek structure in consumption. *Journal of Consumer Research*, *38*, 775–790. doi:10.1086/661563
- Emmons, R. A. (1986). Personal strivings: An approach to personality and subjective well-being. *Journal of Personality and Social Psychology*, *51*, 1058–1068. doi:10.1037/0022-3514.51.5.1058
- Frankl, V. E. (1963). *The doctor and the soul*. New York, NY: Knopf.
- Heckhausen, H. (1991). *Motivation and action*. Heidelberg, Germany: Springer-Verlag. doi:10.1007/978-3-642-75961-1
- Heider, F. (1958). *The psychology of interpersonal relations*. New York, NY: Wiley. doi:10.1037/10628-000
- 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*, 88–110. doi:10.1207/s15327957pspr1002_1
- 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. doi:10.1037/0022-3514.95.1.18
- Köhler, W. (1959). Gestalt psychology today. *American Psychologist*, *14*, 727–734. doi:10.1037/h0042492
- Kruglanski, A. W. (1989). *Lay epistemics and human knowledge: Cognitive and motivational bases*. New York, NY: Plenum Press. doi:10.1007/978-1-4899-0924-4
- 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*, 879–892. doi:10.1037/0022-3514.90.6.879
- Landau, M. J., Sullivan, D., Keefer, L. A., Rothschild, Z. K., & Osman, M. R. (2012). Subjectivity uncertainty theory of objectification: Compensating for uncertainty about how to positively relate to others by downplaying their subjective attributes. *Journal of Experimental Social Psychology*, *48*, 1234–1246. doi:10.1016/j.jesp.2012.05.003
- Laurin, K., Fitzsimons, G. M., & Kay, A. C. (2011). Social disadvantage and the self-regulatory function of justice beliefs. *Journal of Personality and Social Psychology*, *100*, 149–171. doi:10.1037/a0021343
- Laurin, K., Kay, A. C., & Fitzsimons, G. M. (2012). Divergent effects of activating thoughts of God on self-regulation. *Journal of Personality and Social Psychology*, *102*, 4–21. doi:10.1037/a0025971
- Lerner, M. J. (1977). The justice motive: Some hypotheses as to its origins and forms. *Journal of Personality*, *45*, 1–52. doi:10.1111/j.1467-6494.1977.tb00591.x
- Lerner, M. J. (1980). *Belief in a just world: A fundamental delusion*. New York, NY: Plenum Press. doi:10.1007/978-1-4899-0448-5
- May, R. (1953). *Man’s search for himself*. New York, NY: Norton.
- Mitchell, T. R. (1973). Motivation and participation: An integration. *Academy of Management Journal*, *16*, 670–679.
- 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*, 1291–1301.
- Neuberg, S. L., & Newsom, J. T. (1993). Personal need for structure: Individual differences in the desire for simpler structure. *Journal of Personality and Social Psychology*, *65*, 113–131. doi:10.1037/0022-3514.65.1.113
- Pervin, L. A. (1989). *Goal concepts in personality and social psychology*. Mahwah, NJ: Erlbaum.
- Proulx, T., Inzlicht, M., & Harmon-Jones, E. (2012). Understanding all inconsistency compensation as a palliative response to violated expectations. *Trends in Cognitive Sciences*, *16*, 285–291. doi:10.1016/j.tics.2012.04.002
- Rotter, J. B. (1966). Generalized expectancies for internal versus external control of reinforcement. *Psychological Monographs: General and Applied*, *80*, 1–28. doi:10.1037/h0092976
- Rutjens, B. T., van Harreveld, F., van der Pligt, J., Kreemers, L. M., & Noordewier, M. (2013). Steps, stages, and structure: Finding compensatory order in scientific theories. *Journal of Experimental Psychology: General*, *142*, 313–318. doi:10.1037/a0028716
- Shell, D. F., Murphy, C. C., & Bruning, R. H. (1989). Self-efficacy and outcome expectancy mechanisms in reading and writing achievement. *Journal of Educational Psychology*, *81*, 91–100. doi:10.1037/0022-0663.81.1.91
- 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*, 949–958. doi:10.1016/j.jesp.2011.03.026
- Whitson, J. A., & Galinsky, A. D. (2008). Lacking control increases illusory pattern perception. *Science*, *322*, 115–117. doi:10.1126/science.1159845

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