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(The Feeling of) Meaning-as-Information

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Abstract

The desire for meaning is recognized as a central human motive. Yet, knowing that people want meaning does not explain its function. What adaptive problem does this experience solve? Drawing on the feelings-as-information hypothesis, we propose that the feeling of meaning provides information about the presence of reliable patterns and coherence in the environment, information that is not provided by affect. We review research demonstrating that manipulations of stimulus coherence influence subjective reports of meaning in life but not affect. We demonstrate that manipulations that foster an associative mindset enhance meaning. The meaning-as-information perspective embeds meaning in a network of foundational functions including associative learning, perception, cognition, and neural processing. This approach challenges assumptions about meaning, including its motivational appeal, the roles of expectancies and novelty in this experience, and the notion that meaning is inherently constructed. Implications for constructed meaning and existential meanings are discussed.

Keywords

well-being, social cognition, emotion

The desire for meaning has often been characterized as a central human motivation (Frankl, 1963/1984; Maslow, 1968; Williams, 2007). Research on coping with traumatic life events shows that the absence of meaning can be devastating (Janoff-Bulman, 1992), leading to attempts to find or create meaning in those experiences (Park, 2010). Although it is fairly uncontroversial that human beings are motivated toward the experience of meaning, the fact that people want meaning does not tell us *why* they want it. What function does the experience of meaning serve? What adaptive problem does it solve? These questions can be answered by applying lessons learned about how other subjective states, namely affect, play roles in self-regulation and adaptation. At the core of these lessons is the notion that to understand the function of subjective states, their motivational quality must be distinguished from their *informational* value. We propose that the human experience of meaning can be understood through the lens of the broad feelings-as-information approach (Schwarz, 2012; Schwarz & Clore, 1983, 1988).

The feelings-as-information hypothesis asserts that feeling states provide information that directs cognitive processing in important ways (e.g., Schwarz, 2012; Schwarz & Clore, 1983, 1996). To date, this perspective has been focused specifically on affective feeling states, suggesting that positive and negative affects serve as signals that guide the style of information processing that is used (Clore & Palmer, 2009; Schwarz, 2012). Positive affect serves as a safety signal indicating that particular cognitive strategies (e.g., heuristic or, more recently, default processing; Huntsinger, Isbell, & Clore, 2012) are appropriate under current circumstances. Negative affect signals the presence of a

problem to be solved and fosters analytical cognitive strategies (or a switch from default processing).

Alternate motivational explanations of the effect of positive affect on cognitive processes emphasized the desirability of affective states, proposing that the maintenance of positive affective states explained their influence on cognitive processing (Mackie & Worth, 1989; Taylor, 1991). Rather than connecting the person to the world, this motivation would seem to override that connection, focusing the person on his or her internal states, as if such states are an end in themselves. The feelings-as-information approach to affect is compelling because, unlike motivational accounts of the influence of affect on cognition, it embeds subjective affective states within the relationship between the person and the environment. From an informational approach, these states can be seen as guiding the person through the environment, influencing that interaction in adaptive ways. This perspective resonates with models of self-regulation that focus on the role of affect as informative feedback about progress toward motivational pursuits (e.g., Carver & Scheier, 2008).

Clore (1992) suggested that beyond affective feelings, other feeling states, including cognitive feelings such as the feeling of understanding, are also used as sources of information regarding one's interactions with the world. In

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following that argument, we ask: Can a compelling case be made for the experience of meaning as an informative subjective feeling state? Answering this question is our goal in this article.

We begin by defining the feeling of meaning and meaning in life. Then, embedding the experience of meaning in associative learning, we propose that the feeling of meaning provides adaptive information about the presence of reliable associations in the environment. We review studies showing that feelings of meaning, indeed, are sensitive to variation in the coherence of contextual stimuli. We propose that the cognitive consequences of low feelings of meaning are characterized by an associative mindset and review research from the Meaning Maintenance Model (MMM) and counterfactual thinking to support this claim. We then consider the implications of this informational approach for the science of meaning and meaning in life. Embedding the experience of meaning in associative learning and perception has provocative implications for our understanding of the sources of meaning and the neurobiological substrates of this experience and challenges a host of assumptions about the experience of meaning. Finally, we close by considering the potential links between feelings of meaning and existential meaning.

The Feeling of Meaning

William James (1893) suggested that at the heart of the fringe of consciousness is the feeling of the “subjective rationality of experience” or the “rightness of the direction” of one’s thoughts. Mangan (2000, 2001) described the feeling of right direction as the “feeling of meaning,” suggesting that this feeling is responsible for people’s perception that experiences make sense. Hicks and colleagues (Hicks, Cicero, Trent, Burton, & King, 2010) argued that feelings of meaning are essentially about whether stimuli are experienced as possessing an underlying coherence. Similarly, others have defined meaning as referring to connections or expected associations (Baumeister, 1991; Heine, Proulx, & Vohs, 2006).

Of course, we could not simply add the term *meaning* to an affect checklist. To do so would be not only awkward but potentially meaningless. People do not generally report on a feeling of meaning unless that feeling is *about* something. Although some research has examined explicit ratings of meaning with regard to specific targets or experiences, more often psychologists who have studied the experience of meaning have been concerned with meaning about one particular target—one’s personal experiences or life in general. Research on the experience of meaning in life generally includes questionnaires that explicitly ask participants to rate how “meaningful” their lives are (Hicks & King, 2009a).

What does it mean to rate one’s life as meaningful? A number of scholars have offered answers to this question in conceptual definitions of meaning in life. Although these vary, they share three common themes (Heintzelman & King,

2013a), namely, purpose (i.e., goal direction), significance (i.e., mattering), and coherence (i.e., the presence of reliable connections). Each of these themes is captured in the following definition offered by Steger (2012):

Meaning is the web of connections, understandings, and interpretations that help us comprehend our experience (coherence) and formulate plans directing our energies to the achievement of our desired future (purpose). Meaning provides us with the sense that our lives matter (significance), that they make sense (coherence), and that they are more than the sum of our seconds, days, and years (significance).¹ (p. 65; underlines and parenthetical statements added)

Although these three aspects of meaning are often treated as synonymous (with each other and with meaning in life), they are potentially distinct. While purpose and significance are motivational features of meaning in life, the theme of coherence reflects a cognitive component, referring to the sense that one’s life is characterized by reliable connections or comprehensibility (Antonovsky, 1993; Baumeister, 1991; King, Hicks, Krull, & Del Gaiso, 2006; Leontiev, 2005). Quite simply, this aspect of meaning in life refers to the extent to which one’s life (Baumeister & Vohs, 2002) or experiences (Janoff-Bulman & Yopyk, 2004) “make sense.” This cognitive component of meaning in life certainly resonates most clearly with the definition of the feeling of meaning and James’ notion of the feeling of right direction.

What Information Does the Feeling of Meaning Provide?

An optimal answer to this question would possess two essential features. First, this information ought to serve a signal function that solves an adaptive problem. Such information should function similarly to affective feeling states, directing cognitive processing in a way that serves the person in responding to immediate circumstances. Second, the information provided by feelings of meaning ought not to be perfectly redundant with information that is provided by affect. If such information were fully conveyed by positive and negative affect, a subjective feeling of meaning would be unnecessary. So, it is important to show that information about the quality of experience to which feelings of meaning are sensitive is not sufficiently conveyed by affect.

We propose that the informational value of meaning is likely drawn from its cognitive component, the feeling that one’s experiences or life itself make sense.² Although this feature of meaning has long been acknowledged in conceptual treatments of the construct, until recently, research had not directly addressed the role of this cognitive component in the experience of meaning or meaning in life. This neglect is particularly regrettable because this aspect of meaning is relevant to an important adaptive problem: the detection of associations in the environment.

Detecting Reliable Associations

Detecting reliable connections in the environment is a survival-relevant goal for all species (Geary, 2004). Locating reliable sources of food, understanding the local terrain of one's existence, or recognizing the predictable behavior of predators and prey are all essential to survival. These survival-relevant behaviors require the capacity to detect reliable patterns and associations. For the detection of reliable connections to be adaptive, it ought to be reinforcing, and research supports the notion that it is. For instance, when given the option of feeding *ad libitum* or gaining food through operant conditioning, chickens preferred to work for at least some of their diet (Duncan & Hughes, 1972). Building in the need to detect associations (in this case, a call to feed with the availability of food) in pigs effectively fends off boredom (Ernst, Puppe, Schon, & Manteuffel, 2005). These outcomes might suggest that detecting reliable associations in the environment is inherently desirable in itself, implying that it serves an adaptive function.

Certainly the capacity to detect reliable associations is apparent in associative learning (Rescorla, 1972, 1988, 2000). In his functional approach to classical conditioning, Domjan (2005; see also Hollis, 1984) argued that associative learning is an *adaptive trait*, and that such learning in natural environments serves survival. If the feeling of meaning tracked the presence of such associations it might serve an important role in adaptation and self-regulation.

Why might it be advantageous to not only detect reliable connections but also to have a subjective feeling state associated with that detection? When environmental circumstances are of sufficient magnitude to impinge on awareness (when reliable connections are abundantly present or horrendously lacking), it might make sense for an organism to not only perceive the presence or absence of those connections but experience a feeling state that directs attention to these features, rewards their discovery, or indicates that their levels are critically low, and prompts appropriate, survival-relevant, cognitive strategies.

Thus, the meaning-as-information approach proposes that feelings of meaning should vary as a function of the degree to which experience is characterized by reliable pattern and coherence. In the presence of pattern or coherence, the experience of meaning should be high. As stimuli become less coherent, the experience of meaning should ebb. Just as positive affect signals safety and negative affect signals trouble, the feeling of meaning (including meaning in life) would provide a gauge to the existence of systematic connections in the environment.

Stimulus Coherence Uniquely Affects Subjective Reports of Meaning in Life

We recently tested the prediction that subjective feelings of meaning are influenced by the objective coherence of

stimuli, in the absence of effects on affect. In four studies, participants were exposed to stimuli that possessed or did not possess underlying objective coherence and then rated their meaning in life and implicit and explicit affect (Heintzelman, Trent, & King, 2013). The measure of meaning in life included the following items (drawn from established measures of meaning in life): "My life has a clear sense of purpose" (Steger, Frazier, Oishi, & Kaler, 2006); "I have found a really significant meaning in my life"; "I have a sense of direction and purpose in life" (Krause, 2004); "My existence is very purposeful and meaningful"; and "As I view the world in relation to my life, the world fits meaningfully with my life" (Crumbaugh & Maholick, 1964). In all studies, the measure showed high reliability (α 's > .90).

In Studies 1 and 2, participants were shown a series of 16 images, each depicting a tree from one of the four seasons. Participants were asked to rate the contrast in the photos and select the predominant color in the photo from a provided array. Unbeknownst to participants, the tree pictures were presented in different orders. In the patterned groups, the presentation of the pictures followed a reliable order (in cycles according to the seasons in Study 1 or in a novel cyclical pattern based on seasonal content but not conforming to seasonal progression in Study 2). In the control conditions, the 16 pictures were presented in one of eight random orders. In both studies, participants in the patterned conditions reported higher meaning in life, controlling for implicit and explicit affect, than those who viewed the same images presented in a random fashion (Heintzelman, Trent, et al., 2013). Furthermore, the manipulations did not affect affect.

Next, we tested whether stimulus coherence influenced meaning in life using linguistic triads. These triads can be coherent (sharing a fourth common associate; e.g., items from the Remote Associates Test, Mednick & Mednick, 1967) or incoherent. An example of a coherent triad is falling, actor, and dust (these share the associate, star). In research on judgments of semantic coherence, participants are presented coherent triads (those that possess a fourth common associate) and incoherent triads (those with no such associate) and are asked to state whether a triad has a solution or not. Generally, participants are able to distinguish between coherent and incoherent triads at rates greater than chance when these judgments are rendered rapidly without a great deal of deliberation (e.g., Topolinski & Strack, 2008). Importantly, these linguistic stimuli represent overlearned associations (Kahneman & Klein, 2009). In this sense, encountering coherent triads involves exposure to learned associations, while encountering incoherent triads does not.

In Studies 3 and 4, participants were instructed simply to read a series of 10 word triads before rating meaning in life and affect. In both studies, one group read coherent triads and another read incoherent triads. For the incoherent groups, the words were either alternate triads with no common associate (Study 3) or were the very same words as those in the coherent condition jumbled to form 10 incoherent triads

(Study 4). In both studies, participants who read coherent triads rated their lives as more meaningful than did control participants, in the absence of effects on affect (Heintzelman, Trent, et al., 2013). Thus, simply encountering overlearned associations led to higher meaning in life relative to encountering these same stimuli without their associative links.

In sum, across four studies, life was rated as more meaningful after exposure to objectively coherent stimuli and less meaningful after exposure to random or incoherent stimuli. Although meaning in life and positive affect were correlated in all of the studies, manipulations did not influence implicit or explicit affect. Bayes factors for the largest (nonsignificant) differences on affect following the manipulations suggested evidence for the null hypothesis to be stronger than the alternative by factors ranging from 2.70 to 6.31 (Heintzelman, Trent, et al., 2013). These results supported the contention that the information provided by feelings of meaning concerns the existence of reliable pattern and associative links in external stimuli. Moreover, the experience of meaning tracked these aspects of stimuli in ways that affect did not.

Cognitive Consequences of Feelings of Meaning

Having established that encounters with coherence facilitate feelings of meaning, we move to the next question in understanding this feeling from an informational perspective: How might the information provided by feelings of meaning direct cognitive processes? We propose the cognitive process associated with feelings of meaning involves an associative mindset, one that is sensitive to connections in experience and the world. Specifically, low feelings of meaning should spur cognitive processes that identify patterns or reliable associations in the environment. Support for the contention that incoherent stimuli induce such a mindset is provided by research on the MMM. Support for a link between that mindset and feelings of meaning is provided by research on counterfactual thinking. We review each of these literatures briefly below.

The MMM. The MMM (Heine et al., 2006) focuses not on the subjective experience of meaning but on potential meaning-relevant processes that can occur in the absence of awareness. This model emphasizes the central human need for meaning and the role of expectancies as key sources of meaning, positing that expectancy violations threaten meaning. From this perspective, when expectancies are violated in one domain, individuals are motivated to bolster meaning in another domain in a process of fluid compensation. The expectancy violations in these studies have involved the presentation of stimuli that do not make sense (e.g., nonsensical word pairs; a transmogrifying experimenter; inscrutable texts or works of art). Such stimuli influence two outcomes that are thought to indicate meaning reinstatement, either setting higher bail for a hypothetical prostitute or through

performance on an artificial grammar task (Proulx & Heine, 2008, 2009; Proulx, Heine, & Vohs, 2010; Randles, Proulx & Heine, 2011). In all of the studies that manipulated the degree to which stimuli made sense, no effects on affect have been observed. Rather, manipulations influence only putatively meaning-relevant measures. Most importantly for our purposes, exposure to nonsensical stimuli leads to superior performance on the artificial grammar task, suggesting that such stimuli do increase sensitivity to reliable patterns in the environment.

MMM studies have not included measures of the subjective feeling of meaning, in keeping with the model's emphasis on meaning maintenance as an automatic process. Consequently, these studies show us how people think when exposed to nonsensical stimuli, but they do not tell us how they feel with regard to the subjective state of meaning. A link between cognitive outcomes suggestive of pattern recognition (such as the artificial grammar task) and subjective feelings of meaning is provided by research on counterfactual thinking.

Counterfactual thinking. Counterfactual thinking involves imagining how actual outcomes might have been altered if the antecedents to an event had been different (Roese, 1997). For example, a person might think, "If I hadn't been wearing a seatbelt, I might have been killed in that car accident." Mentally undoing past events in this manner leads to an expansive (Markman, Lindberg, Kray, & Galinsky, 2007) or "relational" (Kray, Galinsky, & Wong, 2006) mindset, as evidenced in enhanced performance on insight problem solving (Galinsky & Moskowitz, 2000), LSAT items, and remote associates (Kray et al., 2006; Markman et al., 2007). Furthermore, such effects emerge controlling for the effects of thinking condition on affect (e.g., Markman et al., 2007). Summarizing these cognitive effects, Kray and colleagues (2006, p. 33, emphasis added) concluded that counterfactual thinking leads to an "increased ability to understand and perceive *relationships* . . . structuring thought around salient *associations* and the pursuit of *connections*." This description of the effects of counterfactual thinking on cognitive processing resonates with the processes proposed in the MMM and with results for the artificial grammar task used in those studies.

Importantly, the effects of counterfactual thinking have been generalized to subjective assessments of meaning and meaning in life. For example, compared with thinking factually, thinking counterfactually about life events or personal affiliations (e.g., imagining how the origins of one's company or country could have gone differently thus altering characteristics of the present reality) enhances judgments of the perceived meaning (i.e., their importance, value, meaningfulness, personal significance, and resonance for the self) of those events or organizational allegiances (Ersner-Hersfield, Galinsky, Kray, & King, 2010; Kray et al., 2010). Furthermore, thinking counterfactually about one's birth

(i.e., imagining how the events leading to one's existence, such as one's parents meeting, could have transpired differently resulting in one having never been born) enhances ratings of meaning in life (Heintzelman, Christopher, Trent, & King, 2013). Although cognitive tasks and subjective assessments of meaning have not been included together in the same studies, the finding that counterfactual thinking leads to both outcomes supports the notion that subjective feelings of meaning are influenced by manipulations that spur a relational mindset.

At this point, the details of the associations between subjective feelings of meaning and such cognitive processes are a matter of some conjecture. We have proposed that low levels of feelings of meaning spur associative cognitive processes that ultimately lead to stronger feelings of meaning. Alternatively, the cognitive mindset that emerges in response to MMM manipulations or counterfactual thinking might do so automatically, with the feeling of meaning serving as a gauge in the effectiveness of that mindset in detecting reliable associations. Does a subjective feeling of (low) meaning intervene between these manipulations and their cognitive consequences? Research that included measures of the explicit feeling of meaning, along with cognitive indicators of a relational mindset, would be needed to track the temporal dynamics of their relationship fully. This novel research question is just the first of many we will mention that are motivated by this perspective on meaning. Even in the absence of such studies, however, this informational account of feelings of meaning has a number of provocative implications for our understanding of the human experience of meaning.

Implications for the Science of Meaning

The incorporation of the informational perspective into the affect literature proved generative and has ultimately led to a more complete understanding of the function of affective states. We hope that approaching meaning from this perspective will prove similarly fruitful to forming a richer understanding of this experience. The notion that the adaptive character of the subjective experience of meaning can be found in its capacity to track the systematic quality of environmental stimuli has potentially profound implications for the science of meaning. We now turn to a consideration of these implications.

Unrecognized Sources of Meaning

Embedding the experience of meaning in associative processes suggests a potential role of aspects of life that have not previously been considered relevant to this experience, such as natural regularity and routines and patterns (King, 2012). One unrecognized source of meaning might be mundane habits. Wood and Neal (2007, p. 843) defined habits as "learned dispositions to repeat past responses." Habits draw

their power to direct behavior from contextual associations that activate behavioral programs. Although habits are subjectively experienced as purposeful behaviors triggered by goals, the relevance of goals to the enactment of habit is not a strong predictor of their frequency. Rather, these behavioral programs are guided more strongly by associated contextual stimuli than by goals (Neal, Wood, Labrecque, & Lally, 2012). To the extent that habits reflect associative learning, they may play a role in the experience of meaning.

These initial considerations of the potential role of habits and routine behaviors in the experience of meaning are interesting and informative for a number of real world issues, including unemployment. Not surprisingly, unemployment is associated with mental health problems (McKee-Ryan, Song, Wanberg, & Kinicki, 2005) and decreased well-being (Frey & Stutzer, 2002; Lucas, Clark, Georgellis, & Diener, 2004). However, the nuances of this relationship are especially provocative from our perspective. Maintaining a rigid time structure attenuates the detriments to well-being associated with unemployment (McKee-Ryan et al., 2005; Van Hove & Lootens, 2013). In describing this effect, Van Hove and Lootens (2013) suggested that time structure brings a sense of purpose to a person's life, a sentiment that dovetails nicely with our perspective on meaning.

The commonplace nature of regularities, routines, and habits suggests that the feeling of meaning is not a rarity but rather a potentially *default* experience, grounded in a world where events and experiences often make sense (King, 2012). Thus, the informational perspective anticipates that although meaning in life is often portrayed as difficult to obtain, it might be surprisingly commonplace. Indeed, a recent survey of the meaning in life literature revealed that scores on meaning in life measures are generally (and significantly) above the midpoint (Heintzelman & King, in press), suggesting that for most people, life is rated as pretty meaningful. The fact that self-reports show that meaning in life is not a rare experience requires that we entertain conceptual frameworks that can account for its commonplace nature. The meaning-as-information approach, grounding the experience of meaning in the adaptive problem of detecting reliable associations in the environment, accomplishes this goal.

Of course, we are not suggesting that habit and routine are necessarily the central sources of meaning in life. Many infrequent, if not singular experiences—such as child birth, marriage, or moments of great accomplishment—certainly impart a strong sense of meaning. We are not suggesting that habits and routines are a panacea for those seeking meaning in life. However, our perspective highlights the possibility that the experience of meaning is not limited to profound events. The results reviewed above suggest that feelings of meaning may emerge spontaneously in response to ongoing experience and inform judgments of meaning in life when individuals are prompted by a questionnaire to render such judgments. These feelings of meaning likely come from a host of sources and experiences, but attention to highly vivid

or profound moments to the exclusion of the mundane may miss the contribution of experiences that support the feeling of meaning when it is more quietly present (King & Hicks, 2009).

A Neuroscience of Meaning

The notion that meaning might emerge from the common adaptive capacity to detect reliable associations suggests that we might look for brain mechanisms that undergird this capacity as playing a role in the experience of meaning. The basal ganglia and orbitofrontal cortex (OFC), along with the action of the neurotransmitter dopamine in these regions of the brain, are the likely structures and substrates involved in the detection of reliable associations in the environment. First, nonhuman animals, including lower vertebrates, possess a similar basal ganglia region (Hikosaka, Takikawa, & Kawagoe, 2000), and nonhuman primates share a similar OFC, suggesting that these areas of the brain are evolutionarily primitive. The basal ganglia receive thousands of inputs and rely on dopamine to distinguish between useful and useless information in this abundance of stimuli, a process that operates in the absence of awareness (Lieberman, 2000). This area of the brain detects patterns in environmental stimuli and, over time, can respond to predictors of significant events (Lieberman, 2000). Importantly, in addition to their other functions, the basal ganglia are involved in stimulus-response and habit learning (Packard & Knowlton, 2002).

Moving to the OFC, research has demonstrated the role of OFC in reward learning (Schultz, Tremblay, & Hollerman, 2000) as well as in the perception of coherence in stimuli (Volz, Rübsem, & von Cramon, 2008; Volz & von Cramon, 2006). OFC has been implicated in the *qualia* of sensory experience (De Araujo, Kringelbach, Rolls, & Hobden, 2003), and OFC activation tracks the subjective pleasantness of positive reinforcers (Kringelbach, 2005). This research, integrated with the current conceptualization of meaning, provides a glimpse into an eventual neuroscience of the experience of meaning, particularly implicating the basal ganglia and OFC in that experience.

Beyond the Motivational Appeal of Meaning

Just as the feelings-as-information hypothesis differs from motivational accounts of the effects of positive affect on cognitive processes (e.g., mood management, maintenance, or repair), the current perspective differs from motivational accounts of meaning. Consider that within the MMM, meaning is essentially sought for its own sake. As the name of the model suggests, it is concerned with *maintaining* meaning. This perspective is similar to earlier motivational accounts of the effects of positive affect on cognitive processes.

Focusing on the informational aspect of the experience of meaning suggests that motivational processes such as threat and compensation are unnecessary to understanding the

function of meaning. From an informational perspective, meaning is not “threatened” by incoherent stimuli. Rather, as the results above suggest, meaning is experienced as *lower* in these instances relative to those times when stimuli are coherent. Furthermore, though high levels of meaning (like high levels of positive affect) may “feel better” than low levels, low levels of meaning provide important information, specifically information pertaining to the reliability of stimuli and their usefulness as signals in the environment (Rescorla, 1972, 1988, 2000). Clearly, the motivational implications of this feeling are important, as seeking out reliable environments promotes survival (Domjan, 2005). However, the feeling of meaning is best considered as the subjective gauge of one’s success in securing stable surroundings, not an end in itself. Moreover, the studies described above do not support the notion that meaning reports are inflated defensively to compensate for random or nonsensical experiences.³

Preexisting Expectancies and Meaning

The notion that objective features of reality may support the experience of meaning also suggests that a more tempered perspective on the role of preexisting expectancies in that experience is warranted. As noted previously, the MMM views expectancies as playing a central role in the experience of meaning. Clearly, having preexisting expectancies can facilitate the experience of meaning, providing a guide or template for the likely associations among aspects of experience. However, in the studies described above, preexisting expectancies are not obviously relevant. Participants in those studies certainly had no reason to expect the photos of trees to appear in any particular order or for the words they read to be coherent or not. Thus, the higher meaning in life in the patterned/coherent groups could not have involved expectancy confirmation, and the lower meaning in life in the random/incoherent groups cannot be attributed to expectancy violations.⁴

How then might we understand the role of preexisting expectancies in the effects of coherent stimuli on meaning in life? If expectancies play a role in these results at all, they might reveal the expectation that experiences will make sense (King, 2012). This broad expectancy is present in human infants (e.g., Baillargeon, 2008; Hespos & Baillargeon, 2008; Hespos & vanMarle, 2012) and nonhuman primates (Povinelli, 2000). Such an expectancy might reveal not simply something about the characteristics of organisms in the world, but also about the features of the world itself.

Drawing a distinction between expectancies (in the organism) and connections (in the environment) echoes the debate over the role of constructive processes in perception decades ago. James J. Gibson disputed the notion that preexisting schema were a necessary or inherent part of perception (see also, Fodor, 1984; Raftopoulos, 2001, 2009). Gibson (e.g.,

1973, 1977, 1979/1986) argued that because the perceptual systems of all creatures evolved in a particular world, those systems ought to be shaped by that world and its invariances. He asserted, "If the specifying invariances are normally available an active observer can extract them and does not have to construct them" (Gibson, 1973, p. 396).

Supporting Gibson's view, research has shown that perceptual capacities extract reliable associations automatically. Visual perception, for instance, includes the capacity to detect statistical covariation, in the absence of effortful processing (Turk-Browne, Scholl, Chun, & Johnson, 2008). In addition, the perception of the objective coherence of semantic, visual, and auditory stimuli is similarly automatic (Topolinski & Strack, 2008; Volz et al., 2008; Volz & von Cramon, 2006). Furthermore, stimuli characterized by regularity spontaneously draw visual attention, even when attention to such stimuli is irrelevant to goal-directed behavior (Zhao, Al-Aidroos, & Turk-Browne, 2013). Like Gibson, we argue that the automaticity with which connections and coherence are perceived may demonstrate (not so much the psychological reality of "expectancies" but) the features of the world in which these automatic processes evolved.

Novelty and Meaning

Novel stimuli are a potential puzzle for approaches to perception (and meaning) that rely on acquired expectancies (see, for example, Devitt, 1996). In the absence of preexisting schemas, novel stimuli would seem to present a puzzle, as well, for the perceiver (or "meaning maker"). Novelty, however, is not a dilemma when viewed through the lens of associative learning. Learning occurs when a *novel* association exists (Kamin, 1968; 1969). How might the role of novelty in learning illuminate its place in the experience of meaning?

First, novelty, as an important aspect of the adaptive process of learning, must be distinguished from threat. Novel events are not inevitably threatening (see Kagan, 2009). In infants, events that do not make sense do not lead to responses indicating fear or distress (i.e., indications that these stimuli are threatening). Rather, responses involve looking longer at the stimuli and disruption of ongoing activity, indications of responses to novelty (Scherer, Zentner, & Stern, 2004). The distinction between novel and threatening events is recognized as well in the GLOMO^{sys} account of global vs. local processing (Förster & Dannenberg, 2010). Within this model, the global processing system is recognized as the default processing system and the one primarily responsible for processing novel stimuli (Förster, Liberman, & Shapira, 2009). This model links the processing of novelty to an associative mindset, as global processing integrates novel stimuli into superordinate knowledge structures (Förster & Dannenberg, 2010).

Certainly, on their face, responses to novelty can appear motivated and defensive. For example, Bruner and Postman

(1949) presented participants with two sets of playing cards, trick cards in which the color of the suits did not match expectations and regular cards. Based on increased recognition thresholds and bodily and verbal responses to the trick cards, Bruner and Postman (p. 208) concluded that, ". . . by whatever means available the organism will ward off the perception of the unexpected, those things that do not fit his prevailing set."

Horner and Tung (2011) called into question the conclusions drawn by Bruner and Postman. They argued that, rather than demonstrating perceptual defense in response to expectancy violation, responses to the trick cards ought to be viewed as systematic problem solving in a learning context. Horner and Tung identified two processes that could account for the appearance of perceptual defense in the studies by Bruner and Postman. First, they noted that the trick playing cards changed the reliability of the cue (color) that had been used in the judgment. Second, they suggested that the responses of participants could be understood as simply frustration emerging from task difficulty. Evidence from two studies supported the notion that these mechanisms, rather than perceptual defense, explained the effects identified by Bruner and Postman.

The importance of novelty in learning anticipates the relevance of boredom to meaning. Research on boredom provides clues as to the role of subjective feelings of meaning in a regulatory process. Boredom has been defined as "anxiety about the absence of meaning in a person's activities or circumstances," (Barbalet, 1999, p. 641) and similarly as "an unpleasant affective state that entails a sense of purposelessness" (van Tilburg, Igou, & Sedikides, 2013, p. 450). Boredom is distinct from other negative feelings including sadness, anger, and frustration and as such, has recently been argued to inform a person about the situation and the self (van Tilburg & Igou, 2012). In a number of studies, following experimental boredom inductions, participants rated their lives as less meaningful compared with controls (van Tilburg & Igou, 2011, 2012). These same boredom inductions also affect meaning-relevant outcomes such as ingroup preference (van Tilburg & Igou, 2011). Boredom, then, influences feelings of meaning and may motivate meaning seeking (if ingroup preferences can be taken as an indication of meaning seeking; van Tilburg & Igou, 2012). In addition, meaning (but not affect) manipulations predict changes in boredom (Fahlman, Mercer, Gaskovski, Eastwood, & Eastwood, 2009). These processes would seem to operate in a feedback-loop, such that the absence of meaning leads to feelings of boredom, triggering meaning-seeking processes that, in turn, lead to the experience of feelings of meaning that are then monitored to begin the processes again. Although boredom is associated with (and leads to) feelings of meaninglessness, it might be considered just one of a number of experiences that lead to low levels of meaning. Certainly some experiences that challenge a sense of meaning are far from boring (e.g., traumatic experiences).

Nevertheless, boredom may represent a lower bound on the role that the presence of coherence and regularity plays in fostering the experience of meaning. As Heintzelman, Trent, et al. (2013) pointed out, it is easy to imagine individuals whose lives are characterized by a very high degree of regularity for whom life may lack a strong sense of meaning (e.g., prisoners). Applying lessons from the animal learning literature to the human experience of meaning suggests that the active detection of novel associations is likely to be important to maintaining a high sense of meaning (Ernst et al., 2005). That is, novel stimuli likely contribute to (rather than threaten) a sense of meaning.

Meaning in the Absence of Construction

The next implication of this informational perspective is, perhaps, the most central to understanding the experience of meaning. Human beings have long been described as “natural meaning makers” and, within the psychological literature, meaning is often portrayed as a human construction (King, 2012). Existential thinkers have often viewed the human experience of meaning as laid over the reality of meaninglessness (Camus, 1955; Yalom, 1980). An informational account of the function of the feeling of meaning suggests that meaning is not always a constructed experience driven by its motivational pull. Rather, this perspective suggests an association between the experience of meaning and *objective properties* of external stimuli. Certainly, participants cannot be said to have “constructed” the patterns that emerged in the photos of trees in the studies described above. Rather they encountered them, incidentally, and that encounter led to a feeling of meaning.

Consider that associative learning is generally demonstrated in carefully controlled laboratory settings where the connections in the environment (i.e., the pattern and regularity of stimulus presentation or contingencies between responses and rewards or punishers) are rigidly controlled. The behavior of animals in such environments suggests a readiness to detect associations. This readiness is demonstrated as well in responses to randomness. Random presentation of a conditioned stimulus can lead to strong initial conditioned response (Kremer & Kamin, 1971; Rescorla, 1972, 2000). Such a readiness would appear to represent a vulnerability if natural environments were essentially chaotic. As noted by Domjan (2005, p. 197), for the pairings of conditioned stimuli (CS) and unconditioned stimuli (US) to be functional in a natural environment, “CS-US pairings must be a feature of that environment.” Reliable connections must be a feature of the world for their extraction to serve an adaptive function. The adaptive nature of associative learning (Domjan, 2005), would seem to imply that, at least to the extent that meaning is about connections, *reality is not inherently meaningless*.

To draw a parallel to affect, note that we can, to a certain degree, make ourselves happy or unhappy. However, affect

is not limited to those moments of actively constructed feelings. Affective states can “happen” to us, and the meaning-as-information perspective suggests that so too can feelings of meaning.

Implications for Meaning-Making

As just reviewed, the meaning-as-information approach challenges the notion that meaning is, inevitably, a constructed experience. Nevertheless, this perspective has implications for those times when meaning is constructed. The effects of traumatic events on the experience of meaning have been an important and longstanding interest in the stress and coping literature (e.g., Janoff-Bulman, 1992). The role of meaning-making in coping is the subject of a great deal of research (Park, 2010). In addition, within narrative approaches to personality, the stories individuals construct about their life experiences are considered instantiations of meaning-making (e.g., McAdams, 2011). Much of this research has focused on the existence of exploratory or accommodative processing in personal narratives (e.g., King & Hicks, 2007; Pals, 2006). Such processing involves actively revising preexisting schemas in response to experience (Block, 1982). Recognizing meaning as a feeling state promises to clarify ambiguities in these literatures.

First, faced with similarly traumatic events, some individuals report searching for meaning or actively making meaning while others do not (Park, 2010). Among those who have experienced similar life changing events, such as parenting a child with Down Syndrome (King, Scollon, Ramsey, & Williams, 2000), getting divorced after a long marriage (King & Raspin, 2004), or coming out as gay or lesbian (King & Smith, 2005), some people engage in accommodative processing and others do not (King & Hicks, 2007). A puzzle for researchers has been identifying what separates meaning makers from others.

Typically, conceptual treatments have focused on distress as a key motivator of meaning-making (e.g., Joseph & Linley, 2005; King, 2001, 2008a). That is, distress caused by meaning violations is thought to spur meaning-making to reinstate positive functioning. Thus, meaning-making has been viewed primarily in a context of *affect* regulation. A sticking point for this intuitively appealing idea is that differences in distress do not reliably distinguish meaning makers from others. Distress has not been linked consistently to meaning violation for real world experiences (Park, 2010) or more trivial laboratory manipulations as documented by research on the MMM. Within narratives of difficult life experiences, meaning-making via accommodation is not predicted by negative affect (King et al., 2000; King & Hicks, 2007; King & Raspin, 2004).

Our perspective highlights that low meaning is not the same thing as high negative affect. Rather than being spurred by distress, meaning-making and accommodation might be better explained as motivated by *low levels of meaning*.

Recognizing the feeling of meaning as a subjective state separable from negative affect helps to explain why some distressed individuals search for meaning (because the feeling of meaning is felt to be low) while others do not (because it is felt to be high). Thus, meaning-making can be understood in a context of meaning, not affect, regulation.

Indeed, distress may not be as relevant to the need to create meaning as has long been assumed. Disentangling the feeling states of meaning, negative affect, and positive affect would give empirical evidence for common human wisdom: High meaning can exist alongside profoundly negative emotions, such as grief. Intense distress following the loss of a loved one may feel awful but it might also “feel right.” Furthermore, separating low meaning from high levels of distress may help illuminate those times when profoundly *positive* experiences foster meaning-making or accommodative processing (Shiota, Keltner, & Mossman, 2007).

A second dilemma in the meaning-making literature is the lack of consistent association between made meanings and well-being (Park, 2010). Similarly, accommodation of difficult life experiences in narratives of these experiences is unrelated to well-being (King & Hicks, 2007). From our perspective, when meaning-making terminates (because the feeling of meaning has been restored), it may do so without concomitant changes in affect, as these are separable phenomena. Narrative research shows that rather than benefiting subjective well-being, accommodating difficult life experiences through narrative constructions is associated with changes in the person’s capacities to see the self and world in ever more complex ways (King & Hicks, 2007), suggesting that the construction of meaning may influence cognitive outcomes rather than affective ones.

Complicating the application of a regulatory model to meaning-making is the absence of a criterion against which to judge constructed meanings. Models of self-regulatory systems (e.g., Carver & Scheier, 2008; Powers, 1973) typically include a set of feedback loops, in which a comparator monitors the gap between a present state and a desired state. The goal of such systems is the closing of that gap. What is the desired state against which current levels of meaning are compared? When people engage in meaning-making, what experience are they attempting to reinstate? We suggest that the feeling of meaning that emerges in response to coherent stimuli and connects people to the world in an adaptive way provides the template against which created meanings are compared (Heintzelman & King, 2013b; King, 2012). When constructed meanings “feel right,” they are likely to provide solace to meaning seekers. Of course, James (1893) noted that the subjective rationality of experience was inherently subjective, suggesting that the power of constructed meanings to provide a feeling of rightness may be idiosyncratic. Whether and how the restoration of meaning implicates well-being may depend on aspects of the types of meaning made and their capacity to foster a feeling that approximates

the feeling of right direction that emerges when the world makes sense.

Embedding the experience of meaning in associative learning and perception also illuminates the profound challenge implied in events that are experienced as senseless or meaningless. We have argued that the feeling of meaning is centered in adaptive perceptual and neurobiological processes that are keenly tuned to a world that often makes sense. Research on the MMM strongly supports the notion that these processes are extraordinarily sensitive, detecting even very subtle manipulations that do not register consciously (e.g., Proulx & Heine, 2008). Animal learning research documents the devastating effects of chronic exposure to senseless stimuli on learning processes (e.g., Hannum, Rosellini, & Seligman, 1976). Profound meaninglessness, when it happens, holds our attention and occupies our energy not only because it often occurs in traumatic contexts, but because it is not what we are wired for. Such experiences are exceptions to the world in which the processes of learning and perception evolved. It is fitting that Janoff-Bulman and Yopyk (2004, p. 124) described the initial reaction of individuals to traumatic life events as the feeling that “the world does not make sense.”

Feelings of Meaning and Existential Meaning

Previous approaches to the experience of meaning differ dramatically from the perspective we offer here. Understandably, linking the informational function of feelings of meaning and the grander experience of meaning in life might be disconcerting. Moreover, attaching the human experience of meaning in life to animal learning may seem downright heretical. Can this mismatch be reconciled? Two issues would seem to be implied in these concerns. First is the notion that if meaning in life ratings can be influenced by relatively trivial laboratory manipulations then they are, themselves, trivial. Second is the lack of correspondence between the meaning of meaning as we have discussed it and a deeper, symbolic, or more abstract meaning that is represented in existential approaches in psychology and philosophy. We address each of these issues below.

Trivial Manipulations Affect Meaning in Life

Finding ratings of meaning in life to vary as a function of laboratory manipulations is not new. A large body of research demonstrates that superficial, momentary, and even impersonal experiences of social exclusion reduce the experience of meaningful existence (Williams, 2007, 2012). Similarly, positive affect inductions can enhance ratings of meaning in life (King et al., 2006). Rather than demonstrating that feelings of meaning are, themselves, trivial, such results support the notion that these feelings may play an adaptive role. Any

subjective state that is proposed to play a role in adaptation must be responsive to changing circumstances (Heintzelman, Trent, et al., 2013).

That apparently insignificant laboratory manipulations (e.g., patterns of images displayed on a computer screen) can affect feelings of meaning may leave the erroneous impression that these feelings are actually *not* functional. Can a system be considered adaptive if it is so easily duped by trivial stimuli? Shortly, yes. The large and impactful literature on heuristics and biases suggests just this, that systems that are generally very adaptive can be tricked (Kahneman & Klein, 2009; Tversky & Kahneman, 1974). As is the case with the informational value of other feeling states (Clore, 1992), the informational value of meaning can be thought of as a heuristic. These feelings generally indicate that one's surroundings make sense and this has adaptive benefits in the real world. However, in artificial environments, these same processes operate even though there are no direct survival implications in these situations.

Might Existential Meaning Feel Like Meaning?

The experience of meaning is certainly not typically characterized exclusively by its cognitive component (e.g., Janoff-Bulman & Yopyk, 2004). Existential meaning refers to higher level, symbolic meanings: the achievement of purpose or the overarching significance of one's life to humanity or to history or within a metaphysical or personally generated philosophy of life. Generally, such meanings are often viewed as accomplished through living a life of purpose dedicated to one's self-determined values in an innately meaningless world (e.g., Kierkegaard, 1849/1983). Existential meaning may involve more ultimate answers to the question of life's meaningfulness. Understandably, such experiences may seem somewhat far afield of the feelings of meaning that have occupied this article. However, the same word, *meaning*, is used to describe these experiences. Are these differing experiences of meaning necessarily *qualitatively* different? Might existential meanings be linked to the feeling state of meaning? The content of questionnaires measuring meaning in life suggests they might be.

Generally, scales that measure meaning in life include items that treat the components of meaning (significance, purpose, and coherence) and meaning itself synonymously. In the studies of stimulus coherence described above, the dependent measure included items specifically tapping a sense of *purpose* and such items, like all the items on the scale, were rated higher after exposure to patterned or coherent stimuli. Why should encounters with pattern or coherence (or the enactment of habit) "feel" like purpose? For that matter, why should purpose feel like significance? Why would questionnaire designers choose to include these arguably different experiences as if they indicate the same thing? Often, constructing questionnaires involves beginning with an intuitive sense of what a construct includes and generating

items that best tap the domain of interest (e.g., Burisch, 1984). In this sense, we might take these items as representing what thoughtful scholars intuited to be contained in the experience of meaning.

Notably, despite containing items about grand existential concerns (e.g., having found a mission in life) as well as less grand experiences (e.g., feeling that one's life makes sense) these scales have high reliability. Moreover, psychometric investigations support the conclusion that such scales are unidimensional (e.g., Reker, 2005) or are characterized by a single higher order factor that refers to a global experience of meaning (Krause & Hayward, in press). Thus, though distinct in some ways, experiences of coherence, purpose, and significance may share the same feeling state. When we encounter coherent stimuli, when we engage in purposeful goal-directed behavior, when we matter to others, or when we feel a sense of personal significance, the feeling that emerges in awareness may be the same.

This perspective may shed light on the positive correlations between the experience of meaning in life and functional outcomes related to this experience, including quality of life (Krause, 2007), self-reported health (Steger, Mann, Michels, & Cooper, 2009), social appeal (Stillman, Lambert, Fincham, & Baumeister, 2011), occupational adjustment (Littman-Ovadia & Steger, 2010), adaptive coping (Thompson, Coker, Krause, & Henry, 2003), slower age-related cognitive decline and decreased risk of Alzheimer disease (Boyle, Buchman, Barnes, & Bennett, 2010), and decreased mortality (Boyle, Barnes, Buchman, & Bennett, 2009; Krause, 2009), to name just a few. (Clearly, such findings would seem to argue against the notion that self-reports of meaning in life are inconsequential.) Ratings of meaning in life may represent a summation of the feelings elicited when a person experiences meaning, regardless of the origins of those feelings. Thus, we posit that when even *existential* meaning is felt, it feels like meaning. Certainly, future research examining the distinctive or common meaning-related feelings attached to various trivial and profound experiences is needed to test this potentially provocative proposal.

Conclusion

The science of meaning and meaning in life has long focused on the human need for meaning. Without question, the experience of meaning has a strong motivational pull. Likewise, there is no question that meaninglessness can be not only unpleasant but frankly devastating (e.g., Janoff-Bulman, 1992). People want meaning. However, like motivational explanations of affect, purely motivational accounts of meaning cannot explain why they want it. Just as the affect-as-information approach shed light on the role of subjective states in self-regulation and adaptation, we believe that an informational account of the feelings of meaning and meaning in life can demystify this experience, embedding it in

basic processes, linking it to an adaptive problem, and explaining its enduring motivational appeal. The subjective feeling state of meaning provides information about the degree to which stimuli are characterized by reliable pattern and coherence. Just as positive affect tells us things are going well, and negative affect tells us there is a problem to be solved, the subjective feeling of meaning tells us whether experiences make sense.

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Notes

1. As this definition implies, the experience of meaning is a desirable state and as such it is likely to be experienced as hedonically pleasant. Meaning in life is strongly associated with positive affect and induced positive affect increases meaning in life (Hicks & King, 2007, 2008, 2009b; Hicks, Schlegel, & King, 2010; Hicks, Trent, Davis, & King, 2012). Nevertheless, meaning in life can exist in the absence of positive affect and positive affect can exist in the absence of feelings of meaning. For instance, individuals who are high on (or primed with) religious faith (Hicks & King, 2008) or social connections (Hicks & King, 2009b) endorse high levels of meaning in life even if they are low in positive affect. Furthermore, positive affect does not, inevitably, enhance the experience of meaning in targets such as ambiguous quotes or works of art (Hicks, Cicero, et al., 2010) or activities (King, Hicks, Krull, & Del Gaiso, 2006, Study 6). So, although the feeling of meaning and meaning in life are associated with positive affect, they are not entirely redundant with it.
2. There is no question feelings of purposefulness (e.g., Baumeister, Vohs, Aaker, & Garbinsky, 2013; King et al., 2006; McGregor & Little, 1998; Waterman, 1993) and significance (i.e., mattering to the world, Gerber & Wheeler, 2009; King & Geise, 2011; Tang & Richardson, 2013; Williams, 2012) are associated with meaning in life. However, both of these motivational experiences are also associated with affect. Positive and negative affect are strongly linked to goal pursuit, commitment, value, and progress (e.g., Emmons, 1986; Emmons & King, 1988; King, 2008b). Similarly, with regard to significance, research suggests associations between social relatedness (mattering to the social world) and affect (e.g., Hicks & King, 2009b). Individuals who are lonely generally experience higher levels of distress, depression, anxiety, and

sadness (e.g., Adams & Moon, 2009; Cacioppo, Hawkley, & Thisted, 2010; Constanca, Salma, & Shah, 2006; Hawkley & Cacioppo, 2010). Thus, in terms of identifying an aspect of experience to which feelings of meaning respond but affect does not, these motivational aspects of meaning are not especially straightforward. Feelings of meaning may well provide information about goal direction or significance, but the role of affect in these experiences suggests that feelings of meaning may not be unique in this regard.

3. The notion that exposure to stimuli might promote defensively high reports of meaning in life has been tested in two ways. First, King, Hicks, and Abdelkhalik (2009) examined how exposure to primes of death influence meaning in life ratings. They found that reminders of death led to higher ratings on multiple measures of meaning in life as well as satisfaction with life. However, these authors argued for a purely cognitive explanation of these effects, relying on the link between scarcity and value. They proposed that death reminders served to enhance the value of life, and found that this heuristic link also held when scarcity and value were flipped: When life was rendered less valuable, death was less accessible; when life was rendered more valuable, death was more accessible. Second, Van Tongeren and Green (2010; Study 2) found that primes of meaninglessness led to higher reports of meaning in life. This study differs from other Meaning Maintenance Model (MMM) investigations in that the primes were not simply meaningless (i.e., they were not nonsense word pairs), they were primes of meaninglessness (e.g., the words “empty,” “futile,” “chaos”). Such results might indicate defensiveness (or implied scarcity of meaning), but they are quite dissimilar from typical MMM manipulations.
4. This quality is not dissimilar from a number of MMM studies. The only MMM manipulations in which justifiable expectations were violated are the transmogrifying experimenter paradigm (Proulx & Heine, 2008) and a study in which a story was labeled as a joke or not (Proulx, Heine, & Vohs, 2010, Study 2). However, other manipulations (difficult texts, unusual works of art, nonsense word pairs) do not bear on preexisting expectations.

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