

# The Construct of Mindfulness Amidst and Along Conceptions of Rationality

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Is it rational to be mindful? Can one be more or less rationally mindful? Can one be more or less mindfully rational? In this short article I explore the contribution that mindfulness can make to modeling and theorizing about rationality—including rational choice and rational belief, or ‘epistemic rationality’. The two streams of literature have in fact never met—a sign of the self-defeating isolation in which inquiry proceeds in social science. Had they in fact met, rational choice theory would have benefited from a formalization of the process by which mindful subjects actively draw distinctions that multiply choosable options and vastly expand their state spaces—of possible events or possible worlds. And, mindfulness research would have benefited from considering the kinds of questions that rational choice and rational belief theorists grapple with all the time, such as the optimality of distinction-drawing as a strategy for maximizing one’s psychological or material welfare, and the optimal degree of ‘broadening’ of the space of choosable options.

Whatever might be deemed a viable answer to questions like ‘Is it rational to be mindful?’ will depend on precise characterizations of both ‘mindfulness’ and ‘rationality’, so, let us get to work:

## Mindfulness Constructed so as to Uncover Its Relationship to Rationality

Mindfulness has been described both as a whole mind–body process of active engagement with the present, and, more selectively, as the process of active drawing of distinctions that increase live options for thinking, feeling and action (Langer 1989). Ellen Langer’s work has singularly and diligently built up the penumbra of the

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term in Western psychology, guided by the hypothesis that the process of actively drawing novel-distinctions to parse and make sense of stimulus patterns that are ‘routinely’ interpreted according to well-established concepts and categories in itself increases the subject’s engagement with the ‘now’ (Langer 1989)—the experienced instant—and has lasting positive effects to a person’s psychological and physiological well-being. Self-reported instances of increased engagement and connection to the present, prompted by ‘mindfulness-inducing primes and prompts’ are correlated with interventions that encourage subjects to attend to difference, divergence, anomaly and ‘noise’—as opposed to regularities, uniformities, and ‘signal’—in a stimulus pattern; and, the success of mindfulness-inducing interventions in increasing task performance, subjective reports of well-being, and increased performance on non-task related measures such as health and distributed attention to anomalies and unexpected events have been painstakingly documented by Langer and her coworkers (see Table 1). Studies of mindfulness in the tradition of cognitive and social psychology (Langer 1989; Moldoveanu and Langer 1999; Langer and Moldoveanu 2000) posits mindfulness as a construct that distinguishes states of being involving active choices not only over behavior, but also over the subject’s ongoing interpretation of sensory information and affective states, from states of being wherein the subject variously accepts, takes as given, is controlled by, and ‘falls into’ routinized, habituated or socially ‘acceptable’ behavioral, cognitive, perceptual, and emotional routines and habits.

The benefit to the mindful of mindful engagement arises from the unmediated feeling, perception or awareness of the multiplicity of the ways in which she can engage with the contents of her own mind, and the multiplicity of ways she can engage with the world. In this sense, causal ambiguity, complexity, ambivalence, ontological relativity, epistemic imperfectability, and the kind of radical indeterminism that arises in some interpretations of quantum mechanics are all sources of positive value to the mindful. But, they are high on the ‘enemy list’ of rational choice modelers, as they either assume or entail irresolvable uncertainty, ambiguity, and logical incoherence—quantities to be either excluded from consideration or minimized. The lexicographic hierarchy that regulates the desirability of lotteries (risk → uncertainty → ambiguity) which is assumed—and often prescribed—to govern the choices of expected value maximizers, entails that state-space-inflating processes (multiplying options by making new distinctions, which can also fog up previous distinctions and thus shift the boundaries between what is desirable and what is not) will have strictly negative value, and, by implication, that ‘it is not rational to be mindful’. Forty years of work on the benefits of the ‘act and process of expanding choosable option sets’—see Table 1—suggests there is something wrong with this picture. To figure out what the problem is we need to do a bit of conceptual sleuthing around both mindfulness and rational choice and rational belief models and theories.

**Table 1** The mechanics and benefits of mindful-distinction-stimulating interventions by Ellen Langer and her coworkers 1974–2014

Area of impact	Study
<i>Developmental</i>	
Child Langer et al. (2012)	<ul style="list-style-type: none"> <li>• Hypothesis: this study tested the hypothesis that mindfulness is (a) perceived and preferred by children; and (b) has positive effects on them</li> <li>• Results: the results indicate that children ages 9–12 not only preferred to interact with mindful adults, but devalued themselves following the mindless interaction, despite the fact that only positive content was discussed. (Implications of adults’ mindless responding to children are discussed.)</li> <li>• Mindfulness-inducing intervention: Focusing attention on (mindful listening):                         <ul style="list-style-type: none"> <li>– Inflection of voice</li> <li>– Body language</li> <li>– General state of being</li> </ul> </li> </ul>
Adult	<ul style="list-style-type: none"> <li>• Hypothesis: while chronological age increases in a linear fashion from birth to death, decline, and debility are not inevitable features of human aging and may be reversible (or at least more malleable than we think)</li> <li>• Results: significant improvements induced through voluntary creative mental functioning                         <ul style="list-style-type: none"> <li>– Study 1: More alert and active, happier, and healthier</li> <li>– Study 2: Improved memory, general alertness, and adjustment</li> <li>– Study 3: Increased perceived control, improved mental health, feelings of youthfulness</li> </ul> </li> <li>• Mindfulness-inducing intervention:                         <ol style="list-style-type: none"> <li>1. Encouraging decision making</li> <li>2. Increasing cognitive demandingness of environment</li> <li>3. Active distinction-making/TM</li> </ol> </li> </ul>
<i>Vocational</i>	
Leadership Dunoon and Langer (2011–12)	<ul style="list-style-type: none"> <li>• Hypothesis: when we exercise leadership mindfully, we recognize in particular instances—rather than just in the abstract—that the issues we are dealing with are likely to be contentious. These issues appear differently to those involved and there is no single path through to resolution</li> <li>• Results: through recognizing and embracing the uncertainty they face, leaders learn to control the situation and can find new ways to satisfy different perspectives within the system, enabling them to grow to develop a dynamic, not static, relationship with their environment</li> <li>• Mindfulness-inducing intervention:                         <ul style="list-style-type: none"> <li>– Alertness to multiple perspectives</li> <li>– Active self-reappraisal</li> <li>– Using language descriptively rather than judgmentally</li> <li>– Favoring conditional over absolute language</li> </ul> </li> </ul>

(continued)

**Table 1** (continued)

Area of impact	Study
Performance	<ul style="list-style-type: none"> <li>• Hypothesis: actively creating novel distinctions and sonically portraying them during the performance of orchestral music is preferable to attempting to recreate a past performance</li> <li>• Results: attention to novel distinctions and subtle nuances appears to alter the process of creative ensemble performance leading to music that is more enjoyable to perform and hear</li> <li>• Mindfulness-inducing intervention: Individual attention to novel distinctions in performance</li> </ul>
<i>Educational</i>	
Teaching (Langer (1993))	<ul style="list-style-type: none"> <li>• Hypothesis: these studies compare the effects of a conditional versus absolute form of teaching</li> <li>• Results: presenting information in a conditional rather than absolute manner improves retention and creativity in subsequent use of information. Novelty makes concentration more attractive. Results indicate that confident but conditional instruction was most effective in provoking subsequent mindfulness</li> <li>• Mindfulness-inducing intervention: offering instruction that is:               <ol style="list-style-type: none"> <li>1. Conditional: material taught with uncertainty</li> <li>2. Confident: erect posture, eye contact, unhalting speech</li> </ol> </li> </ul>
Learning Langer and Brown (1992)	<ul style="list-style-type: none"> <li>• Hypothesis: if education were viewed as a process that is never finished, it might enhance students' ability to perceive change as positive (representative of opportunity rather than dread) and make learning more fun</li> <li>• Results: by always spending time achieving/seeing/learning something, drawing distinctions, making connections, no moment is more valuable than another, promoting mindfulness</li> <li>• Mindfulness-inducing intervention: drawing distinctions on previously unappreciated events</li> </ul>
<i>Cognitive</i>	
Multitasking	<ul style="list-style-type: none"> <li>• Hypothesis: media multitasking will be improved through increasing mindful flexibility</li> <li>• Results: Improvement of media multitasking by increasing mindful flexibility. Higher trait mindfulness - &gt; greater tolerance of ambiguity, complexity in thinking style, and positive affect and less negative affect, suggesting that individuals who tend to remain implicitly or explicitly aware of multiple perspectives of a situation are better at media multitasking</li> <li>• Mindfulness-inducing intervention: state mindfulness induction: encouraging novel distinction making and flexibility</li> </ul>
Vision	<ul style="list-style-type: none"> <li>• Hypothesis: these experiments show that vision can be improved by manipulating mindsets</li> <li>• Results: mindset manipulation can counteract physiological limits imposed on vision               <ul style="list-style-type: none"> <li>– Study 1: implicit mindsets stronger effect than explicit manipulation of motivation</li> <li>– Study 2: mindset regarding athleticism vs. sheer exercise arousal influences vision</li> </ul> </li> </ul>

(continued)

**Table 1** (continued)

Area of impact	Study
	<ul style="list-style-type: none"> <li>– Study 3: improved vision with reversed eye chart over traditional chart</li> <li>• Mindfulness-inducing intervention:               <ol style="list-style-type: none"> <li>1. Experientially becoming a pilot in flight simulator</li> <li>2. Viewing self as athlete over nonathlete</li> <li>3. Reading reversed eye chart</li> </ol> </li> </ul>
Attention Levy et al. (2001)	<ul style="list-style-type: none"> <li>• Hypothesis: the aim of this study was to examine whether a mindful intervention, based on noticing distinctions, could be used to improve the attention of older individuals</li> <li>• Results: distinction drawing also increased liking for the stimuli. The findings suggest that if older individuals want to increase attention and recall, rather than focus their attention, they may want to find ways to vary their attention</li> <li>• Mindfulness-inducing intervention: Noticing 3–5 distinctions</li> </ul>
Memory Langer et al. (1979)	<ul style="list-style-type: none"> <li>• Hypothesis: increasing the cognitive demand of environment and then varying the extent to which participants were motivated to attend to and remember these environmental factors can improve memory</li> <li>• Results: improvement on standard short-term memory tests, including probe recall and pattern recall, as well as in improvement in alertness, mental activity, and social adjustment</li> <li>• Mindfulness-inducing intervention:               <ol style="list-style-type: none"> <li>1. Varying degree of reciprocal self-disclosure</li> <li>2. Varying positive outcomes based on attention/memory</li> </ol> </li> </ul>
<i>Social</i>	
Stereotyping	<ul style="list-style-type: none"> <li>• Hypothesis: this study assessed whether mindfulness can prevent automatic stereotype-activated behaviors related to the elderly</li> <li>• Results: the results show that greater mindfulness predicted greater walking speed, indicating a decrease in the effect of the automatic stereotype-activated behavior</li> <li>• Mindfulness-inducing intervention: active categorization (of photographs)</li> </ul>
Marriage Burpee and Langer (2005)	<ul style="list-style-type: none"> <li>• Hypothesis: this study investigated the relationships among mindfulness, marital satisfaction, and perceived spousal similarity</li> <li>• Results: significant relationship between mindfulness and marital satisfaction with no significant relationship between perceived spousal similarity and marital satisfaction. Implications for mindfulness in building and maintaining happy marital relationships and general well-being</li> <li>• Mindfulness-inducing intervention:               <ul style="list-style-type: none"> <li>– Drawing distinctions across situations</li> <li>– Acknowledging the existence of alternative perspectives</li> <li>– Recognizing that disadvantages may also be advantages</li> </ul> </li> </ul>
Uncertainty Langer and Piper (1987)	<ul style="list-style-type: none"> <li>• Hypothesis: this study conducted three experiments to assess the hypothesis that mindlessness could be prevented with a simple linguistic variation</li> </ul>

(continued)

**Table 1** (continued)

Area of impact	Study
	<ul style="list-style-type: none"> <li>• Results: significantly more of the subjects in the conditional group gave a creative response (learned to consider objects more flexibly: could be versus is). A conditional understanding of the world seems to prevent mindlessness</li> <li>• Mindfulness-inducing intervention: (Un)conditional—(un)familiar grouping</li> </ul>
Divorce Newman and Langer (1981)	<ul style="list-style-type: none"> <li>• Hypothesis: this study was conducted to explore the possible relationship between postdivorce adjustment and the attributions divorced women give for the failure of their marriages</li> <li>• Results: divorced women who attributed their divorces to interactive rather than personal factors were more active, more socially skilled, happier, more optimistic, and less likely to blame themselves rather than outside forces for failures</li> <li>• Mindfulness-inducing intervention:               <ul style="list-style-type: none"> <li>– Reattribution techniques:</li> <li>– Person attribution - &gt; interactive attribution</li> </ul> </li> </ul>
Agency	<ul style="list-style-type: none"> <li>• Hypothesis: this study was intended to determine whether the decline in health, alertness, and activity that generally occurs in the aged in nursing home settings could be slowed or reversed by choice and control manipulations</li> <li>• Results: improved alertness, active participation, and a general sense of well-being. Higher health and activity patterns, mood, and sociability, lower mortality rates</li> <li>• Mindfulness-inducing intervention: utilizing opportunities for control over ongoing daily events versus momentary, experimentally created tasks</li> </ul>
<i>Clinical</i>	
Autoregulation Delizonna et al. (2009)	<ul style="list-style-type: none"> <li>• Hypothesis: an experiment was conducted to test the hypothesis that mindful attention to change regarding heart rate (HR) would result in greater control over HR</li> <li>• Results: the results suggest that mindfulness, instantiated here as attention to variability, is a means to increasing control</li> <li>• Mindfulness-inducing intervention: daily monitoring requiring attention to HR fluctuations</li> </ul>
Exercise Crum and Langer (2007)	<ul style="list-style-type: none"> <li>• Hypothesis: this study tests whether the relationship between exercise and health is moderated by one's mindset</li> <li>• Results: the results suggest that mindfulness, instantiated here as attention to variability, is a means to increasing control</li> <li>• Mindfulness-inducing intervention: daily monitoring requiring attention to HR fluctuations</li> </ul>
Addiction Margolis and Langer (1990)	<ul style="list-style-type: none"> <li>• Hypothesis: we hypothesize that a mindful addict would consider more aspects of the addiction than a mindless addict and therefore be more likely to consider both negative and positive aspects of the addiction</li> <li>• Results: a mindful analysis may help the addict and therapist to devise treatments and behaviors that allow the addict to quit the addiction, but retain the positive benefits associated with the addiction</li> </ul>

(continued)

**Table 1** (continued)

Area of impact	Study
Anxiety Langer et al. (1975)	<ul style="list-style-type: none"> <li>• Mindfulness-inducing intervention: attention to positive effects - &gt; quit mindfully versus negative effects- &gt; stigma- &gt; abstinence - &gt; mindless relapse</li> <li>• Hypothesis: this study hypothesized that a mindful coping device would decrease pre- and postoperative stress compared with simply supplying information and reassurance before surgery</li> <li>• Results: interventions resulted in reduced preoperative stress and postoperative pain relievers/sedatives vs. no effect from preparatory information</li> <li>• Mindfulness-inducing intervention:               <ul style="list-style-type: none"> <li>– Cognitive reappraisal of anxiety-producing event</li> <li>– Calming self-talk</li> <li>– Cognitive control through selective attention</li> </ul> </li> </ul>
Bias Langer and Abelson (1974)	<ul style="list-style-type: none"> <li>• Hypothesis: labels affect clinicians’ judgments</li> <li>• Results: interviewee was described as fairly well adjusted by behavioral therapists regardless of his label, but for more traditional (analytic) therapists, when labeled “patient,” the interviewee was described as significantly more disturbed than he was when labeled “job applicant”</li> <li>• Mindfulness-inducing intervention: Labeling - &gt; sharp differential effects</li> </ul>

## Mindfulness Expanded—Via Projection onto Different Planes of Being

Mindfulness is intimately connected with ‘choicefulness’ (Langer 1989; Moldoveanu and Langer 1999)—and specifically relates to the state in which the subject perceives to have a genuine choice as to the interpretation, schema, frame, representation, feeling, attentional focus, and representation that she can use to make sense of a ‘raw’ situation, a set of qualia or ‘raw feels’, or of a predicament—or to causally interact with her environment or with others. Choicefulness presupposes the availability of a genuine option set that allows for selection. Not all choices are created equal: choosing between interpreting an interpersonal slight as a mishap caused by low blood sugar or a wilful attempt to harm is different than a choice between flexing and extending your right bicep.

Models of rational choice normally assume intentionally produced physical behaviors to form the range of choosable actions or behavioral options, whereas researchers that have used the conceptual toolkit of ‘mindfulness’ and ‘mindfulness interventions’ generally focus on mental events, activities and entities as forming the space of choosable options. To facilitate a productive dialog between ‘mindfulness’ people and ‘rational choice’ people, let me separate out the space in which the choicefulness corresponding to mindful states and ‘mindful attending’ or tuning-in occurs into several different subspaces, or, planes of being, thus:

## The Perceptual Plane

*S* can choose to attend to pre-interpreted stimuli (redness, pink after image, sharp smell) in various sequences that can be constructed via shifts of the gaze (scanning an image or a scene), movements of head and body (influencing the pattern of auditory, olfactory, or proprioceptive stimuli) or movements of the tongue (influencing the pattern of gustative stimuli); as well as by shifting the focus of attention to and from various senses, and various sensed stimuli.

## The Representational Plane

*S* can choose linguistic (phrases, sentences) or non-linguistic representations of mental content (memory, fantasy) or perceptual content ('reality') that vary with respect to intended purpose (relational, structural, dynamic), explanatory nature (causal, functional, teleological), ontology (the specific objects of the representation taken to refer to 'real' entities), resolution (e.g., Google maps), and various measures of complexity (of which there at least 25 as of 2015—spanning the natural, social and information sciences).

## The Inferential Plane

*S* can choose among different forms of inference (from particular to particular cases, particular to general cases, and general to particular cases), which in turn may rest on a choice among different forms of logic (inductive, deductive, abductive; two valued or three valued; definite or vague, or fuzzy).

## The Physical Action (Behavioral) Plane

A subject, *S*, can be said to choose—and experience herself as choosing, among bodily motions that are trajectories of limb and organ in *4-D* space (3 spatial dimensions + 1 time dimension) and are constrained by the number and degrees of freedom of joints and muscles under voluntary control (e.g.,: wrists, forearms, hips, etc). *S* can 'choose' to sit, stand, squirm, blink, wink, and so forth, thus creating distinctions among various bodily positions and states. We can think of freely chosen novel sequences of bodily actions as 'drawing new distinctions', even though the phrase seems to point to the perceptual and cognitive spheres, as follows: a 'distinction' is perceived difference which can be induced not only by cognitively or perceptually 'setting apart' two or more entities, but also by



behaviourally creating new states of body and mind that are meaningfully different among them;

## The Visceral/Affective Plane

*S* can choose from among different (psychologically) ‘accessible’ emotional states (anger, contempt, irony, rage) that are individually compatible with a given set of visceral sensations or internal physiological states (e.g., heightened temperature and heart rate), immediate stimulus patterns (e.g., the utterance by *T* of a word towards *S* which *S* believes *T* knows *S* will find insulting), and applicable social norms and conditions (‘what will *U*, who has heard *T*, think, say or do if *S* were to evince the feeling of...?’)

## Projecting the Construct of Mindfulness on Different Planes, and Privileging Two of These Planes

‘Mindfulness’—in its choicefulness-inducing, active distinction-drawing form—thus has intelligible projections onto each of these planes of being of a person. However, it is not irrelevant that mindfulness-inducing interventions in the Western tradition stress ‘drawing of new distinctions’ of the perceptual and conceptual kind—such as those among shades of red in red stop lights or blood clots, or the color of the eyes of the same person in various moods, under various lightings and at various times of the day, among different ‘kinds of anger’ (hot versus ‘red-hot’ versus ‘white-hot’) that one might experience at different people during the course of a day, or among the different kinds of networks (i.e., types of connections linking nodes, e.g.: trust, information flow, information sharing, friendship, interaction frequency) one can construct or recognize among people seated together at an executive table—which are properly the domain of high- and low-level perception as well as ‘mental representation’ and inference.

The prototypically ‘mindful’ state of relating to a percept or concept in terms of the **variation** of its *qualia* and diversity of its instantiations, respectively, entails an ability of the subject to ‘switch’ from a generality-and-similarity-seeking mode of perception, representation and inference, to an anomaly-and-difference-seeking mode, in which difference, divergence and dissimilarity among objects, persons, and events usually or habitually seen to conform to stable categories and lawlike generalizations are brought to the fore of conscious awareness. It makes sense therefore for mindfulness research to focus on the degrees of freedom and ‘sources of choicefulness’ that the subject has in these specific planes of being: for while it is true that a subject can make distinctions *implicitly* by acting (e.g., by privileging a member of a group over others by controlling one’s gaze) or by feeling (for instance, by allowing anger to boil up into rage in the presence of some people

but not others)—such examples often rest on antecedent choices to treat different people or different feelings differently according to context—which refers us back to the perceptual, representational and inferential planes.

## **Rational Choice Models Deconstructed and Expanded to Connect to Mindfulness Constructs**

Contemporary rational choice models of human action or behavior (depending on whether they relate to a person as a subject or an object) postulate behaviors as outcomes of choices—irreversible behavioral commitments to a course of action—which are deterministic outcomes of *decisions*. Decisions are more complicated objects: they are either real or attributable *mental events* (again, depending on whether the model is used to describe matters from the standpoint of an actor or an observer) that form the basis for the commitments embodied in choice. In the ‘expected value optimization’ variant of rational choice models are themselves the outcome of a process that can be parsed into: the specification and enumeration of the payoffs or utilities associated with different actions conditional on various states of the world, the specification and enumeration of the probabilities or degrees of belief that the decision maker associates with the different states of the world, and the computation of the weighted sum of the probabilities of various states of the world and the utilities of the actions which could bring about those states.

The model is deceptively simple as an *explanandum* of human behavior: if you believe it is nearly certain it will rain today and you value not getting wet more than you do getting wet, and you have the option to choose between taking an umbrella and not taking an umbrella, then you will (and, *should*: the distinction will shortly become very important) take an umbrella along. That you will do that which you should do according to the mode is a prediction of the theory of rational choice that underlies it; and that you should do that which the model predicts a rational person *would* do is a prescription of the same theory—a compact explanatory and justificatory circle upon which we must work to create the conceptual space for the sort of ‘active distinction-drawing’ that characterizes mindful states of being.

To create this space, it helps to sleuth out the conceptual underpinning of rational choice models—the set of rules or axioms that a rational persons degrees of belief and utilities must obey if she to be deemed truly rational. Her utilities depend for their existence and uniqueness on the way in which her preferences behave: they must be complete, transitive, and acyclic (Moldoveanu 2011) as a logical prerequisite for the existence of an objective function that functions as a metric of value or utility.

This is the first point at which choicefulness-oriented, active novel-distinction drawing may come into the picture. Novel distinctions multiply objects and events: the recognition of subtle differences in shades of red creates (at least) two different ‘reds’. If someone’s preferences are ‘complete’ in the sense that they specify the choice someone would make between any two (and by extension any *N*) different choosable objects or options (or possible worlds), then they would need to take into

account any hitherto ‘undrawn’ distinctions that create new objects or states of the world—on pain of incoherence. In this case the mindful drawing of novel object-generating distinctions *should* only be exercised when it is expected by the chooser to generate an object or option or possible that is strictly preferred to any that is currently available.

Mindful distinction-drawing leading to new object and option-formation also comes into play when we consider the axiomatic condition rational choice models place on the *independence* of choices from irrelevant options. If, for instance, one prefers walking to work to driving and driving to taking a cab, then one should walk when there is a strike by all cab (and Ueber) drivers—all other things being equal. But of course the strike may reduce the number of cars on the street and make driving preferable to walking. The rational choice modeler will object that in this case the real value and cost of driving have not been taken into account from the beginning: had they been, no violation of the independence condition would result. Yet, there is no injunction the rational choice axioms that bids the decision maker to consider *all* information in the formation of the option set and the calculation of the value to her of all of the different options—whereas the basic premise of mindfulness-inducing interventions is that multiplying the perspectives under which a situation is seen or represented or interpreted will be strictly beneficial to the decision maker (in the case of the walk-drive-cab predicament, making the distinction between the state of the world in which there are no cabs around and the state of the world in which there are).

Rational choice models incorporating the maximization of subjective expected utility also rely on a grammar or structure of admissible beliefs of the decision maker—a structure that again can be interpreted as normative/prescriptive or descriptive depending upon the way we use the resulting models. Beliefs are represented as a set of events or states of the world that are either explicitly or indexically represented, and a set of numerical weights associated with them, which are governed by the axioms of probability theory, and include conditions such as additivity, finite sub-additivity, independence, identity, and completeness.

Mindful distinction-drawing comes into play right away at the level of the specification of the ‘state set’ of the probability space in which beliefs are specified. Making finer distinctions regarding either events (in the case of semantic state spaces) or the propositions that are true if and only if certain events come to pass (in the case of syntactic state spaces multiplies the state space of events, and allows for greater levels of choicefulness at the level of the representation of ‘that which is the case’. The ‘normal’—e.g. Bayesian, inductive—kinematics of the belief space of the decision maker in response to new information is at a loss to accommodate the process by which new ‘data’ (or, implicit or explicit representations of events) multiply the number of possible or admissible state space (the space of possible events): the spread or entropy of the ‘rational inductivist’ is meant to decrease and narrow, not increase or broaden, as a result of new information.

Once again, there is no ‘epistemic objective function’ within rational choice models [other than starting out with the priori probabilities that best represent a state of maximal ignorance, which for some situations may be maximal entropy (Jaynes

2001)] that guides the kinematics of the ‘belief function’ that the decision maker should follow in the direction of the ‘increasing spread of possibility’ that mindfulness interventions point to. (In fact the two strands of thinking take us into precisely different directions on this specific point: by separating sharply between mental behaviors and physical behaviors and between beliefs and desires, rational choice models seem to advocate for a sort of ‘rational mindlessness’ in the pursuit of decisions, or to rule out the kind of state space expansion that comes from mindful distinction drawing as irrational.

This sort of difficulty can only be addressed by substantively modifying a core modeling assumption of the rational choice framework—which is the demarcation between mental and physical behavior. As Thomas Schelling has pointed out, whatever we end up consuming or enjoying—whatever ends up forming the argument of the utility function of rational choice models—is something that happens ‘in the mind’. The representations of events, the representations of objects, and the representation of the choosable options that represent the ‘lotteries’ of rational choice models are all mental objects. The process of deciding—‘intuitively’ or by the algorithmic weighting of probabilities of outcomes with the payoffs of these outcomes—is just as much a mental process as that by which one draws new distinctions and forms new objects and events. If we bring the rational choice model ‘into the mind’ of the decision maker and we take into consideration her ‘mental behavior’ as susceptible to maximization-oriented explanations, then we can engineer a genuine dialog between the two strands of inquiry, uneasy as that dialog might turn out to be. We see, for instance, that state space expansion—via mindful drawing of novel distinctions—and state space contraction—via the reduction of the informational weight we attach to that which seems ‘unlikely’—are mental choices that could very much be subject to the same maximizing framework as that which has populated economics and decision theory textbooks for over a century. ‘Novel distinctions’ create ‘new constructs’, or entities—as we might expect. To wit:

***Mindful Rationality: Doing Better by ‘Seeing’ (Believing, Wanting, Choosing Among) More Options (for Believing, Wanting, and Seeing)***

First, how should be incorporate the empirically validated benefits of mindful distinction drawing itself? Rational choice models are famously ‘end-statist’ in their modeling commitments: what matters (or, ‘should matter’ to the normative user) to the decision maker is only the **end state or the outcome** of his or her choices and subsequent states of affairs. The nature and value of the **process** by which the decision is made by inference does not ‘count’ into the calculus of utilities on which the decision is made, and which determines the ‘rationality’ of the decision maker.

But evidence for both higher performance and greater levels of well-being arising from the distinction-drawing that results from conceptual and perceptual

transformations and shifts seems clear and difficult to controvert. Let us make a distinction—and thereby introduce a new entity—to deal with this difficulty: we will specify ‘mindful rationality’ to specifically unpacking and accounting for the process by which mindful distinction drawing can enhance the overall well-being of the decision maker, even as it has no or even negative impact on the net present expected value of the outcome of her choice. ‘Mindful rational choice’ models, therefore, will explore the incorporation of an ‘exploration value variable’ in the specification of their objective functions, one whose value **increases**—rather than decreasing—with the spread of the state space that results from the active drawing of distinctions, precisely on account of the spreading property.

What could the ‘mindfully rational decision maker’s objective function’ look like? Well, it will range not only over the specifically anticipated outcomes of her choice (or, the decision maker’s subjective experience of these outcomes), but, additionally, over the rate of emergence and cardinality of the number of choosable options (actions, behaviors), alternative states of the world that comprise the state space of the decision maker’s beliefs, and the number of different or alternative state spaces—or, ontologies—that individually support the same base of ‘facts’ or ‘propositions’ that the decision maker believes to be true. Both ‘cardinality’ and ‘emergence rate’ are important components of the value function: they give us both outcome and process measures for the ‘active distinction-drawing’ that characterizes mindful states.

## *Two Objections, Answered*

The picture may look to many to be too good to be true. Upon reflection, some may formulate their difficulties in one or both of the following two ways.

**Objection 1** “But wait!”—one might say: “Is it not the case that, just as there is empirical evidence for mindfulness-inducing interventions leading to significant benefits for individuals, there is an equally imposing gamut of evidence for individuals’ aversion to risk, uncertainty, ambiguity—precisely the sort of variables that are wont to increase with the multiplication of choosable options? And, is there not also specific evidence that shows humans find it more rather than less difficult to make decisions when the number of choosable options increases rather than decreasing? The answer to both questions is ‘yes’, but the inference that these findings negate the positive value that one places on the active multiplication of entities in decision models is false. The aforementioned ‘gamut’ of empirical evidence is gathered in experimental and empirical settings in which the components of the subjects’ utility functions are (a) determined by the experimented (or postulated by the empiricist)—not shaped by the subject; (b) identical with the ‘experimental score’ assigned to the (forced decision or forced choice) task the subject is asked to engage in (or, generally, ‘how well’ the subject performed the decision task) and (c) constrained by the specific parameters and variables of the decision or choice task (which are specifically *not* under any influence from the experimental

subject). While it is conceivable—and even desirable—that novel methods for imaging the states and dynamics of the brain and autonomic nervous systems of people can reveal a lot about the ‘marginal disutilities’ of such experimental paradigms, the central point that can be made right away is that such experimental paradigms seem designed to preclude or foreclose people’s options to significantly expand the space of behaviourally relevant entities and associated variables, which they can do in ways ranging from the creative reinterpretation of the decision task description, to the generation of alternative interpretations of the relationship between subject and experimenter that are off-script, to the revaluation of task and decision-specific outcomes (such as, for instance, experiencing the utility of positive ironic detachment in the case of ‘negative outcomes’; and the self-contempt for one’s own lemming-like conformity in the case of ‘negative’ outcomes).

**Objection 2** ‘But wait!’—one might say again—‘are you really confident that the kinds of novel entities generated by the sort of active distinction drawings that you think humans could and even should value are sufficiently *numerous founded* or *meaningful*? It could make sense to think about various incommensurable ways of describing an inner city mass uprising (using causal, functional or teleological models that specify the brain–body states of the participants, the social function of the gathering and the individual incentives of each participant, respectively—and thus presenting ways of ‘seeing’ them differently and creating different state spaces for decision models), but describing a chair as a collection of  $10^{10}$  chairs, embedded into one another, each one molecule-deep layer shorter, shallower and narrower than the next—seems absurd.’

There are two answers to this objection: the first is that some state space and payoff space inflations will seem absurd specifically to one who evaluates them through the end-statist prism of ‘will they help X make a better decision?’—for instance, by sharpening her subjective probability distribution function over states of the world or by profitably expanding her state space *so she makes a better decision by the criteria she has started out with*. But we made three moves that jointly could well justify inflationary approaches to state spaces even if the ‘new states’ do not make a net positive contribution to the decision maker’s standard utility function: we made *mental events* and states and sequences of mental events and states plausible arguments of utility functions; we made mental behavior and mental operations plausible *choosable options*—alongside ‘exclusively physical’ (the term does not really make sense) behaviors; and we made the rate at which new distinctions and associated concepts and percept arise in the mind of the decision maker and the number of newly generated entities a net positive part of her utility or objective function. ‘Speculative inflation’ need not generate ‘meaningful’ or ‘well-founded’ entities for it to be ‘useful’—and therefore ‘rationally’ pursued.

The second answer is in fact a challenge to the objector. It proceeds as follows: ‘You (the objector) seem to be speaking from the position of someone who has already ‘gotten’ (constructed or discovered) the right ontology for decision acts and scenarios, and the right language system for representing the ‘predicament’ of the decision maker (or, for that matter of her observer) and the right, or, a unique,

mapping from percepts to concepts to sentential structures that ‘represent what is the case.’

*Choicefulness* as a property of a mental state and process is induced by the radical indeterminacy of two mappings: one from the set of raw feels of perception onto the set of propositional structures we use to speak of ‘facts’, and one from the objects and entities we take to be ‘real’ onto the set of propositions we hold to be true. If it were the case that perceptual, categorial and representational entities are *under-determined* by the collective set of stimuli we provide to nerve endings, then ‘mindful choice’ among aspects of representations, inferences and perceptions would make functional sense from the point of view of an organism trying to adapt and survive by perceiving or conceptualizing or speaking about an ‘it’: ‘others’ could see this ‘it’ very differently, in which case it makes sense to see ‘it’ in more than one possible way. Moreover, these indeterminacies are implicit in the way we have set up the links between words and concepts and ‘the world’—to wit.

### ***Relativity of an Ontology with Respect to a Propositional ‘Fact Base’ Putnam (1981)***

One source of ‘mental options’ that ground the possibility of genuine mental choicefulness arises from the choice of representation language in which ‘facts’ are articulated: it is possible, in particular, for any set  $F$  of facts articulated in a language, to construct a different language that leaves the truth value of these facts unchanged (Putnam 1981) Let  $L$  be the language with ( $n$ -adic) predicates  $F_1, F_2, \dots, F_k$  (not necessarily monadic) and  $I$  represent an interpretation (an assignment of an intension to every predicate of  $L$ ). Then if  $I$  is nontrivial in the sense that at least one predicate has an extension which is neither empty nor universal in at least one possible world, there exists a second interpretation  $J$  which disagrees with  $I$ , but which makes the same sentences true in every possible world as  $I$  does. The proof proceeds as follows: Let  $W_1, W_2, \dots$ , be a well-ordering of all possible worlds, and  $U_i$  be the set of possible individuals which exist in the world  $W_i$ . Let  $R_{ij}$  be the set which is the extension of the predicate  $F_i$  in the possible world  $W_j$  according to  $I$  (if  $F_{ij}$  is  $n$ -adic, then  $R_{ij}$  will be the set of  $n_i$ -tuples, where  $n_i$  is the number of argument places of  $F_i$ ). The structure  $\langle U_j; R_{ij}(i = 1, 2, \dots, k) \rangle$  is the ‘intended model’ of  $L$  in the world  $W_j$  relative to  $I$  (i.e.  $U_j$  is the universe of discourse of  $L$  in the world  $W_j$ , and (for  $i = 1, 2, \dots, k$ )  $R_{ij}$  is the extension of the predicate  $F_i$  in  $W_j$ ). If at least one predicate, say,  $F_u$ , has an extension  $R_{uj}$  which is neither empty nor all of  $U_j$ , select a permutation  $P_j$  of  $U_j$  such that  $P_j(R_{uj}) \neq R_{uj}$ . Otherwise, let  $P_j$  be the identity. Since  $P_j$  is a permutation, the structure  $\langle U_j; P_j(R_{ij})(i = 1, 2, \dots, k) \rangle$  is isomorphic to  $\langle U_j; R_{ij}(i = 1, 2, \dots, k) \rangle$  and so is a model for the same sentences of  $L$  (i.e., for the sentences of  $L$  which are true under  $I$  in  $W_j$ ). Let  $J$  be the interpretation of  $L$  which assigns to the predicate  $F_i(i = 1, 2, \dots, k)$  the following intension: the function  $f_i(W)$  whose value at any possible world  $W_j$  is  $P_j(R_{ij})$ . In

other words, the extension of  $F_i$  in each  $W_j$  under the interpretation  $J$  is defined to be  $P_j(R_{ij})$ . Since  $\langle U_j; P_j(R_{ij})(i = 1, 2, \dots, k) \rangle$  is a model for the same set of sentences as structure  $\langle U_j; R_{ij}(i = 1, 2, \dots, k) \rangle$  (by the isomorphism), the same sentences are true in each possible world under  $J$  as under  $I$ , and  $J$  differs from  $I$  in every world in which at least one predicate has a nontrivial extension.

### ***The Indeterminacy of Inductive Projection: Time-Scrambled Predicates***

(Goodman 1954) Projection from a finite set of known instances to either an unknown instance or an infinite set of instances is under-determinate because the mind that projects has options arising from the construction of the predicates it is attempting to project (Goodman 1954). In the standard example, grue emeralds are emeralds that are green on or before time  $t$  in the future and blue thereafter. Bleen emeralds are emeralds that are blue on or before time  $t$  in the future and green thereafter. Therefore, if an emerald is observed and found to be blue at  $T < t$ , then it will confirm both the hypothesis ‘this emerald is blue’ and the hypothesis ‘this emerald is bleen’. If an emerald is observed and found to be green at  $T < t$ , then it will confirm both the hypothesis ‘this emerald is green’ and the hypothesis ‘this emerald is grue’. The projecting mind therefore has a genuine choice that arises between blue-green ‘coordinates’ and grue-bleen ‘coordinates’. One might object that ‘grue’ and ‘bleen’ are pathological predicates, because they link the name of a predicate to the time of an observation, whereas ‘properly’ projective predicates have no intrinsic temporal structure. Leaving aside the prevalence of predicates that explicitly incorporate temporal dynamics in their constitutive definitions (‘bipolar’), the objection does not resolve the genuine relativity of projectible predicates: from the perspective of someone who is used to the language of Grue and bleen, it is **blue** and **green** that impermissibly couple time into the definition of a predicate, as follows: Green emeralds are emeralds that are grue on or before time  $t$  and bleen thereafter; blue emeralds are emeralds that are bleen on or before time  $t$  and grue thereafter.

### ***Rational Mindfulness: ‘Seeing’ More (Broadly and Deeply) by Optimizing ‘Seeing’***

The first route bringing mindfulness-talk in dialog with rationality-talk harnesses rationality to mindfulness by making the benefit of mindful states of being part of the objective function of the rational decision maker and uncovering the indeterminacies that lie hidden in the state space formalism that rational choice models rely on. The second route harnesses mindfulness to rational choice models by exploring ways in which the state space expansion that mindfulness-inducing manipulations



bring about can enhance the performance of ‘rational decision makers’ in ecologically plausible settings.

Jaynes (2001) has already shown us how ‘maximum entropy-priors’ can help solve the technical problem of choosing degrees of belief so as to reflect states of maximal ignorance about the outcome of choice how maximal entropy methods can even be deployed to help us assign degrees of ignorance to stochastic variables we know to be deterministically related (since we cannot be simultaneously equally ignorant of the value of  $X$  and the value of  $Z = I/X$ ). But it has not addressed the problem of generating the maximally open-ended or ‘ignorant’ state spaces that allow for maximal openness or adaptivity of the decision maker not only to the occurrence of all the events that she deems possible or conceivable, but to expanding her own horizon of **conceivability** and her range of interpretive schemata for the interpretation of the outcomes of her decisions. Moreover, Bayesian models of epistemic rationality normally assume that once a state space has been ‘settled upon’ by the decision maker—or even more tenuously, by her observer—subsequent ‘data’ can (or ‘should’) only be used to ‘fix belief’—not to broaden the space of possible states of the world and of the subject.

The multiplication of viable epistemic states (states of mind that seek to represent both what is possible and how likely what is possible is to occur) that mindful distinction-drawing enables. It functions at three different levels—prior, present-perfect and posterior, relative to a decision model and associated decision process as follows:

*Prior:* drawing new distinctions to make sense of immediate predicaments and situations—both via the low-level control of sensory actuators (‘gaze control’) and the control of high level vision, attention and the representational languages and ‘alphabets’ on which representation lies extends the ‘envelope of conceivability’ of outcomes for the decision agent and increases the adaptiveness of the decision algorithms that she uses to guide her subsequent actions;

*Present-perfect.* Augmenting the entropy-minimizing objective function that regulates Bayesian kinematics of epistemic states with an entropy-increasing term that uses new data to generate alternative representations, explanations and justifications similarly increases the adaptiveness of the decision process while at the same time acknowledging the orientation of the decision maker’s mind and body toward some action or choice;

*Posterior: the ‘Happiness Machine’.* Active distinction-drawing at the level of the nature and interpretation of events allows the decision maker to ‘re-value’ outcomes by reinterpreting what they mean to her in light of an expanded repertoire of concepts—including self-concepts—that together supply positive utility ‘no matter what’ the outcome may be. The work of Langer and her coworkers on the mindful reframing of outcomes thus predates and subsumes subsequent work on the imperfection of ‘affective forecasting’ and the structure of a ‘psychological immune system’ that preserves positive affect in the face of failure—and in fact elucidates the cognitive structure of such an immune system.

## Concluding Words

The work of cognitive psychologists such as Simon, Kahneman, and Tversky have made significant contributions to the very large stream of thinking guided by rational choice and rational belief models and schemata. Nevertheless, their work is more limited in scope than the work on mindful concept and percept formation and state space expansion of Langer and her coworkers. The Westernized, distinction-drawing formulation of ‘mindfulness’ which Ellen Langer’s work has spawned and stimulated stands to make an even greater contribution to rational choice modeling—provided that the conceptual toolkit of rational choice models is itself duly expanded. I have given a few reasons for why it should be—and suggested ways in which this expansion can proceed.

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