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Primal World Beliefs

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Beck's insight—that beliefs about one's self, future, and environment shape behavior—transformed depression treatment. Yet environment beliefs remain relatively understudied. We introduce a set of environment beliefs—*primal world beliefs* or *primals*—that concern the world's overall character (e.g., *the world is interesting*, *the world is dangerous*). To create a measure, we systematically identified candidate primals (e.g., analyzing tweets, historical texts, etc.); conducted exploratory factor analysis ($N = 930$) and two confirmatory factor analyses ($N = 524$; $N = 529$); examined sequence effects ($N = 219$) and concurrent validity ($N = 122$); and conducted test-retests over 2 weeks ($n = 122$), 9 months ($n = 134$), and 19 months ($n = 398$). The resulting 99-item Primals Inventory (PI-99) measures 26 primals with three overarching beliefs—*Safe*, *Enticing*, and *Alive* (mean $\alpha = .93$)—that typically explain ~55% of the common variance. These beliefs were normally distributed; stable (2 weeks, 9 months, and 19 month test-retest results averaged .88, .75, and .77, respectively); strongly correlated with many personality and wellbeing variables (e.g., *Safe* and optimism, $r = .61$; *Enticing* and depression, $r = -.52$; *Alive* and meaning, $r = .54$); and explained more variance in life satisfaction, transcendent experience, trust, and gratitude than the BIG 5 (3%, 3%, 6%, and 12% more variance, respectively). In sum, the PI-99 showed strong psychometric characteristics, primals plausibly shape many personality and wellbeing variables, and a broad research effort examining these relationships is warranted.

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Public Significance Statement
Beliefs about a situation often impact thought and action. For example, in places seen as dangerous, one is more alert. What if the whole world is seen as dangerous? This study identifies and creates a tool to measure 26 fundamental beliefs about the world as a whole.

Keywords: beliefs, worldview, attribution, personality, primal world beliefs

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In the 1960s and 1970s, Beck based cognitive therapy on the premise that beliefs about the self, the self's future, and the self's external environment—what he called the *Cognitive Triad*—play a fundamental role in the etiology of depression (e.g., 1979). These beliefs concern basic judgments such as *I'm worthless* (a self-belief) or *my boss hates me* (an environment belief). His work inspired decades of improved clinical treatment for depression and other disorders (Hofmann, Asnaani, Vonk, Sawyer, & Fang, 2012). Expanding this insight into the cognitive roots of behavior, researchers found that shaping these beliefs increases aspects of quality of life, such as wellbeing and skill development (Dweck, Chiu, & Hong, 1995). However, while self-beliefs have received considerable attention, environment beliefs remain relatively neglected (Chen et al., 2016). This article introduces a class of environment beliefs that may influence wellbeing and personality.

A Definition in Historical Context

One of the earliest debates in Western philosophy concerned the world's overall qualities. For example, Heraclitus argued the world is defined by change, whereas Pythagoras suggested beauty (Kirk, Raven, & Schofield, 2011). After Socrates' turn inward to the unexamined life more or less changed the topic for many centuries, nineteenth-century thinkers came to see Weltanschauung (i.e., worldview)—an amalgam of religious, political, and moral doctrines—as determining behavior (Naugle, 2002). Koltko-Rivera (2004) identified 41 such beliefs. Examples concern the mutability of human nature and the purpose of sexual activity.

Within worldview, we focus on a subset of beliefs specific to the overall character of the world rather than particular topics within it—that is, only beliefs about everything. Instead of doctrine, our focus, like Beck's, is basic character such as *beautiful* or *dangerous*. Koltko-Rivera (2004) noted that such beliefs lack terminology. We call them *primal world beliefs*, or *primals*.

We conceive of primals as falling along continuous conceptual dimensions anchored by opposites such as *interesting* and *boring*. We propose six criteria to define primals more precisely (all but the fourth apply to beliefs in Beck's Triad). (a) Simple: Though linguistic and conceptual simplicity differ, primals usually take the form "the world is X" where X is one or two basic words concerning a single-faceted concept like *beautiful* or *dangerous*. (b) Adjectival: Rather than describing *how* or *why* the world came to be, primals describe what the world is like using "is" (i.e., predicate adjective) statements ascribing a current quality. (c) Goal-relevant: Dweck (2017, p. 698) uses the term *goal-relevant* to refer to perceived environmental conditions essential to the individual's interests, needs, or values. Goal-relevant qualities, like "safe," may ground the psychological relevance of more specific qualities, like "toxic." (d) Maximally General: Primals concern the world as a whole, and thus what is typical of most things and situations. Precise physical boundaries, such as *this* jungle or *that* solar system, are misleading. Instead, primals concern an individual's broadest psychologically meaningful habitat. (e) Automatic: Though sometimes explicit, primals are expected to operate primarily beneath cognitive awareness in the "System 1" family of cognitions (see Kahneman & Frederick, 2002). (f) Active: Like other beliefs, primals are expected to dynamically direct attention; organize, simplify, filter, and fill in information; and guide action. In sum, primals are one's implicit answers to the question "what sort of world is this?" The next section suggests the value of studying primals and a tentative model for establishing the validity of a primals inventory.

Theory and Literature

A half-century of research clearly indicates that various beliefs shape behavior and wellbeing—often dramatically (Hofmann et al., 2012). Researchers have also identified mechanisms, such as those associated with schemas and priors, which govern *how* beliefs shape behavior via ambiguity interpretation (Janoff-Bulman, 1989; McNamara, Green, & Olsson, 2006). In the context of fruitful literatures examining beliefs, Dweck (2008, 2017) recently suggested that as-yet unidentified beliefs may even shape major personality traits as well. She calls for the identification of promising beliefs followed by initial correlational research examining critical empirical benchmarks that—if met—would justify a broader phase examining causation, development, and other important issues. This measurement article introduces primals, examines these critical benchmarks, and leaves causation and other questions for a later date.

In our tentative model, primals operate like other beliefs. For example, some may see the world as a negative place. This view would inform a base-rate of negativity that might alter ambiguity interpretation toward seeing situations as miserable, meaningless, and getting worse. In worlds where fortunate events are considered exceptions, pessimism appears prudent and optimism naïve. Conversely, some may see the world positively: most situations are enjoyable, safe, and naturally tend to work out—the unknown hides further wonders. When misfortune is rare, pessimism appears profitless or paranoid, and optimism sensible. In sum, both pessimists and optimists might theoretically be realists who happen to disagree about what is real.

In addition to pessimism and optimism, many other personality and wellbeing-related variables may be shaped by primals. Rauthmann et al. (2014) and Dweck (2017) suggest that various environment beliefs and reactions to those beliefs could—over

time—aggregate into major personality traits. For example, the belief that a situation is dangerous should increase neurotic behaviors. If so, a belief that *the world as a whole* is dangerous should increase neuroticism scores. Likewise, curiosity, which makes little sense in contexts offering low return on attentional investment, may be part of a reaction to a belief that the world is actually full of fascinating things. Similarly, resistance to cultural change (i.e., social conservatism) may be part of a reaction to a belief that the world is deteriorating. Using the intuitive logic they suggested (given *X* environment, *Y* is prudent/natural; Rauthmann et al., 2014), we identified hundreds more hypotheses concerning how primals might shape outcomes. To establish convergent validity, we provide 30 such hypotheses in Table 2 along with correlational results from studies below.

All such hypotheses rest on the (perhaps counterintuitive) assumption that labels such as *neuroticism*, *curiosity*, and so forth may express less *who* we are and more *where* we think we are. The attribution literature commonly distinguishes between dispositional and situational influences (Harvey, Madison, Martinko, Crook, & Crook, 2014). Personality traits have historically been attributed to disposition (i.e., a biological or innate quality shaped by experience; e.g., Eysenck, 1963). Kelley's covariation model (1967) suggests why: dispositional theories appeal most when interpreting behavioral patterns that (a) persist across situations (i.e., low-distinctiveness); (b) remain consistent over time (i.e., high-consistency); and (c) vary across individuals (i.e., low-consensus). Put more plainly, when individuals behave consistently across situations, we assume the action expresses an innate person characteristic. Yet if primals are stable across situations and time—but vary across persons—this assumption is unjustified. In theory, individuals could spend decades compensating for (or capitalizing on) habitat-wide constraints described by one's primals while sharing actual habitats with those reacting to entirely different perceptions. Then, because (a) individuals may not realize others hold different primals; (b) individuals are biased by the Fundamental Attribution Error, which causes one to overestimate the role of disposition; and (c) patterns of behavior associated with personality traits exhibit Kelley's (1967) hallmarks of disposition (i.e., low-distinctiveness, etc.); individuals could en masse misinterpret the actions of others as an expression of *who* they are rather than the reasonable reaction to *where* they happen to think they are. In other words, the tentative model informing our measurement assumptions—and animating our interest in this topic—holds that many personality variables and wellbeing outcomes are driven in part by the (perceived) external situation rather than internal disposition. For this theory to be plausible (and for a broad research phase examining it to be justified), Dweck (2008, 2017) suggests certain critical benchmarks should be met. Primals must (a) be as stable within-persons as personality trait scores; (b) vary

Table 1
Standardized Cronbach's α For 26 PI Subscales in All Studies

Study / Subsample	S1	S2*	S3	S4	S5	S6 2-week	S6 9-month	S6 19-month	Total*
N	930	524	529	219	122	122	134	398	2,454*
Good	.97	.96	.97	.97	.97	.97	.97	.97	.97
Safe	.96	.93	.96	.95	.96	.95	.96	.96	.96
Enticing	.95	.94	.94	.94	.94	.94	.95	.94	.95
Alive	.90	.87	.86	.87	.91	.90	.89	.90	.89
Secondary Mean	.94	.91	.92	.92	.94	.93	.93	.93	.93
About Me	.85	**.67**	.83	.78	.85	.86	.87	.86	.84
Abundant	.85	.80	.83	.84	.82	.70	.87	.83	.84
Acceptable	.83	.77	.77	.84	.75	.74	.85	.82	.81
Beautiful	.84	.80	.82	.83	.79	.74	.80	.81	.82
Changing	.79	.73	.75	.83	.79	.76	.83	.82	.79
Cooperative	.84	.77	.84	.75	.81	.73	.81	.85	.84
Funny	.90	.83	.87	.83	.81	.83	.86	.89	.88
Harmless	.91	.82	.89	.89	.89	.88	.90	.90	.90
Hierarchical	.77	.76	.77	.77	**.69**	**.67**	.83	.80	.78
Improvable	.82	.79	.79	.80	.77	.79	.87	.83	.81
Intentional	.87	.79	.85	.82	.84	.82	.88	.88	.86
Interconnected	.87	.84	.81	.87	.82	.70	.88	.85	.85
Interesting	.85	.85	.85	.85	.86	.82	.87	.87	.86
Just	.82	.71	.74	.83	.85	.81	.87	.83	.81
Meaningful	.87	.86	.84	.82	.86	.81	.90	.88	.86
Needs Me	.91	.85	.92	.88	.90	.87	.90	.90	.91
Pleasurable	.91	.84	.88	.85	.88	.85	.89	.87	.89
Progressing	.92	*	.91	.91	.89	.89	.90	.92	.91
Regenerative	.86	.83	.83	.84	.79	.80	.89	.85	.85
Stable	.82	.80	.77	.79	.78	.70	.84	.83	.81
Understandable	.81	.80	.80	.78	.82	.76	.80	.78	.80
Worth Exploring	.81	.80	**.69**	.77	**.63**	**.64**	.78	.81	.77
Tertiary Mean	.85	.80	.82	.83	.81	.78	.86	.85	.84
Study Mean	.87	.82	.84	.84	.83	.80	.87	.86	.86

* Because Study 2 used an initial PI version (e.g., *Progressing* was measured with only one item), data from its 524 participants were not included in totals. Values falling below .70 have been bolded.

Table 2
30 Hypotheses Suggesting Primals' Potentially Pervasive Influence and Relevant Study 2 Results, Controlling for Age, Sex, Education, and Income (Standardized βs; N = 524)

Rationale		Hypotheses		Result
In environments seen as X . . .	*. . . Y is prudent/natural.*	*In worlds seen as (IV; primal) . . .*	*. . . (DV) will be higher/lower.*	β
Personality Psychology				
1. Positive, safe, and meaningful	Optimism	*Good*	Optimism	.66
		Safe		.59
		Enticing		.58
		Alive		.47
2. Abundant, beautiful, fascinating, and worth exploring	Curiosity and openness	*Enticing*	Curiosity (VIA)	.61
			Curiosity (CEI-II)	.46
			Openness (BFI)	.37
3. Dangerous and miserable	Worry and neuroticism	*Safe*	Neuroticism	−.43
		Pleasurable		−.45
4. Fascinating, fun, meaningful, and safe	Extraversion	*Safe*	Extraversion	.37
		Enticing		.39
5. Meaningful and responsive to effort	Tenacity and hard work	*Meaningful*	Grit	.38
		Improvable		.29
6. Abundant, beautiful, and made by someone to be thankful to	Gratitude	*Enticing*	Trait gratitude	.69
		Abundant		.63
		Alive		.44
Clinical Psychology				
7. Miserable, boring, meaningless, and with no role for you	Depression and withdrawal	*Pleasurable*	Depression	−.52
		Enticing		−.51
		Needs Me		−.44
8. Threatening, miserable, and punishing	Fear and anxiety	*Safe*	Anxiety	−.27
			Stress	−.39
9. Unexpectedly unsafe	Extreme stress	*Safe*	Post-traumatic stress	*
Positive Psychology				
10. Safe, meaningful, and positive	Pursuing friends and intimacy	*Good*	More friends	.24
			Closer friends	.51
11. Fun, meaningful, and worth exploring	Engaging ones surroundings	*Enticing*	Engagement in life	.57
		Meaningful		.49
12. Vile, dangerous, and decaying	Dissatisfaction	*Safe*	Life satisfaction	.51
		Regenerative		.48
13. Seeking your help	Achievement	*Needs Me*	Accomplishment	.52
14. Beautiful and full of intention and purpose	Having a sense of meaning	*Beautiful*	Meaning in life	.45
		Alive		.53
15. Positive, enjoyable, and predictable	Wellbeing and positive emotions	*Good*	PERMA wellbeing	.64
		Understandable		.40
16. Exciting	Zest	*Enticing*	Zest	No data
17. Positive and malleable	Hope	*Regenerative*	Hope	No data
18. Fascinating	Love of Learning	*Interesting*	Love of Learning	No data
Political Psychology				
19. Cooperative rather than cutthroat or Darwinian	Trusting people, institutions, etc.	*Safe*	Interpersonal trust	.52
		Cooperative		.50
20. Declining	Resisting change	*Progressing*	Conservatism	−.27
21. Hierarchical, fair, and where the best win	Right-wing authoritarianism	*Hierarchical*	Conservatism	.48
		Just		.34
22. Hierarchical, fair, and where the worst fail	Preferring harsh punishment	*Hierarchical*	Pro-harsh sentencing	.27
		Just		.14
23. Interconnected	Holistic concerns	*Interconnected*	Fearing climate change	.19
24. Hopeful and responsive to change efforts	Supporting political campaigns	*Good*	Pro-political activism	.34
		Improvable		.20
Vocational Psychology				
25. Worth exploring, meaningful, and meaningful	Better teaching outcomes and enjoyment	*Enticing*	Teaching success	No data
		Meaningful		No data
		Understandable		No data
26. Dangerous, bleak, and barren (vs. safe, inviting, and abundant)	Success in low-failure/high-risk jobs (vs. high failure/low-risk)	*Safe*	Policing success	No data
		Abundant	Sales success	No data
		Safe		No data
		Abundant		No data
27. Fair and responsive	Hard work	*Just*	Hard work	*
28. Those in authority see it	Advancement	The boss sees it	Chance of promotion	No data

(*table continues*)

Table 2 (*continued*)

Rationale		Hypotheses		Result
In environments seen as X . . .	*. . . Y is prudent/natural.*	*In worlds seen as (IV; primal) . . .*	*. . . (DV) will be higher/lower.*	β
Basic Information Processing				
29. Imbued with purpose and meaning by an active designer or force (See Spunt & Adolphs, 2015)	Social network activation w/o social stimuli	*Alive*	Social network activity in nonsocial contexts	No data
30. Numerous physical threats (See Eberhardt et al., 2004)	Increased false threat percepts	*Safe*	False threat percepts	No data

Note. Standardized βs can be interpreted as *r*s controlling for age, sex, education, and income. We do not correct for multiple comparisons because (a) our aim is to explore the scale of primals' influence and not draw conclusions about any one variable and (b) with effect sizes this large *p* is less instructive. We selected examples for illustrative purposes only; many additional (and stronger) effects are omitted.
* See the BJW literature and Janoff-Bulman (1989) for data relevant data to these hypotheses.

across persons; and (c) substantially covary with variables they are proposed to influence.

Studies below shed light on these benchmarks, as do two previously studied constructs that clearly qualify as primals. Belief in a just world (BJW) holds that the world is a place where one gets what one deserves and deserves what one gets (Lerner, 1980). Over 30 studies using several validated scales suggest significant relationships between BJW and many salient variables (e.g., Lipkus, 1991). These studies show that, causal or not, individuals act in ways that appear optimal, given their primals. In general, those high in BJW are more hardworking (since the world rewards effort), more prosocial (since the world rewards kindness), more successful (since they work harder and are nicer), and more likely to blame victims (since suffering results from sloth or unkindness). Over the years, strategies for measuring BJW scales have improved. Early scales involved a relatively large number of items concerning specific domains, such as sports or school (e.g., Rubin & Peplau, 1975). However, Lipkus (1991) found that using items concerning the world's more general character increased scale brevity and internal reliability.

The literature on belief in a dangerous world (BDW) is smaller, not connected to the BJW literature, and primarily focused on political ideology, especially right-wing authoritarianism. For example, BDW predicts conservatism (Duckitt, 2001). However, Perry, Sibley, and Duckitt's (2013) scale items focus on societal decline. More immediate aspects of danger, such as physical threat, are absent. Still, a few BDW studies shed light on primals more broadly. Two articles on split-second decision-making suggest BDW is a System 1 (i.e., automatic) process measurable via self-report (Miller, Zielaskowski, & Plant, 2012; Schaller, Park, & Mueller, 2003). Schaller, Park, and Faulkner (2003) found that darkness moderates BDW, suggesting ambiguity increases reliance on primals. Finally, the relationship between beliefs about the ubiquity of germs and one's personal susceptibility to infection suggests individuals think *their own* primals describe *everyone's* reality (Murray & Schaller, 2012).

Depending on standards for conceptual and nomological overlap, other constructs may be considered primals-related. Candidates include general self-efficacy (Chen, Gully, & Eden, 2001), mastery (Pearlin & Schooler, 1978), and constructs measured by Janoff-Bulman's (1989) World Assumptions Scale; Perry et al.'s (2013) Competitive Worldview scale; and Dweck et al.'s (1995) mindset scale. Studies below examine overlap between primals and these constructs.

In sum, though primals could theoretically play the pervasive role Dweck (2008, 2017) envisions, we know little. This is partly because primals have not been systematically identified. This article seeks to (a) systematically identify candidate primals; (b) determine their structure using factor analysis; (c) validate a Primals Inventory; (d) distinguish primals from other constructs; and (e) shed light on above benchmarks (variability, stability, and covariance).

Item Generation

Candidate Primals Identification

To identify, as nearly as practical, an exhaustive list of exclusive candidate primals, we used several mixed-method approaches to catalogue instances of world description across (a) groups—*who* said it—(b) era/location—*when*/*where* it was said—and (c) media—*how*/*why* it was said. In addition to explicit statements, we identified implicit options via a lexical approach. We selected methods based on coverage and convenience. Supplement 1 provides further details.

Textual analyses. We examined all mentions of *world*, *universe*, *everything*, *nothing*, and *life* in many of the world's most influential historical sources including 14 sacred texts, 100 novels, 100 films, 100 speeches, and 71 treatises. For each, we compiled chunks (i.e., quotes) comprised of the sentence surrounding the keyword, and coded chunks by candidate primal(s) via interrater agreement. The result was 1,727 instances of world description, sorted by candidate primal, source, era, geography, and so forth Next, we gleaned 80,677 tweets beginning with *The world is*, *The universe is*, or *Everything is* from a 2010–2013 "random 1% stream" database of 2.24 billion tweets (i.e., microblogs on twitter .com). We used natural language processing tools to identify the objects of these phrases and fed objects into Latent Dirichlet Allocation (Blei, Ng, & Jordan, 2003). This yielded 50 clusters (i.e., groups of similar phrases in similar contexts). To avoid reliance on explicit statements, we analyzed the 840 most frequently used adjectives in the Corpus of Contemporary American English, a 450-million-word database of 190,000 texts curated from five genres from 1990–2012. After removing words irrele-

vant to world description, we organized the 469 that remained into 17 topics.

Expert retreats and interviews. Ten American experts on beliefs, depression, and related topics met for three days at the University of Pennsylvania to discuss and identify candidate primals. Chinese partners at Tsinghua University identified Confucianism, Buddhism, Daoism, and traditional philosophy as central Chinese traditions; identified experts in each; interviewed them; and hosted a retreat in Beijing for these experts and Tsinghua psychologists.

Focus group discussions. We conducted 10 focus groups among Baltimore-area self-identified adherents of the world's four major religions (Christianity, Buddhism, Islam, and Hinduism). Tsinghua partners conducted two focus groups among Chinese graduate students in Beijing. We used semistructured, facilitated discussions to prompt spontaneous expressions of candidate primals.

Literature and theory review. To identify previously studied primals outside of psychology, experts wrote reviews in philosophy, cultural anthropology, art history, political science, and comparative religion. Additionally, discovering little psychological research identifying primals conducive to wellbeing, we used a set of steps to systematically identify candidate primals conducive to wellbeing, defined as 34 increased character strengths and emotions. For example, one step involved reviewing all measures for items suggesting an associated primal (e.g., *I find the world a very interesting place* from Peterson & Park, 2009).

Conceptual analysis. We synthesized these inputs in phases. In each phase we reviewed new inputs, edited a working classification of candidate primals, shared drafts with scholars, and incorporated feedback. Some drafts were merely lists. Others adopted creative conceptual architectures, like the periodic table of elements, to spot gaps. A list of 38 primals emerged in phase 4. Phases 5 and 6 identified no new candidate primals, suggesting saturation. To evaluate coverage, we estimated that our list captured >80% of world descriptions in each input. For example, 98% of the 1,727 gathered historical quotes we considered sufficiently represented. In sum, though inputs and lists of candidate primals can be interpreted and organized differently, our work suggested low return on further efforts to identify candidate primals.

Item Creation

Measuring 38 constructs at once was infeasible. Also, some candidate primals were infrequent, conceptually similar, or struggled to satisfy criteria. Using these considerations, we prioritized 25 candidate primals for initial measurement. We also stopped using acronyms (e.g., BJW) and began referring to candidate primals by adjectives (*Just*, *Beautiful*, etc.).

Adopting an approach similar to Lipkus (1991) discussed above, we generated an initial item pool of ~500 items (~20 per candidate primal) based on bounded definitions of each candidate primal; in situ language from the exploratory activities; items gleaned from other scales (e.g., *It's a dog-eat-dog world . . .* from Perry et al., 2013); and generic repeatable formats (e.g., "On the whole, the world is *X*"). Then, drawing on coauthors' scale-building and marketing backgrounds, we made assumptions regarding challenges particular to each candidate primal. For example, because we expected few to disagree with items such as *On the whole, the world is a beautiful place*, we increased difficulty for *Beautiful* items (e.g., *There is beauty everywhere, no matter where we look*). Aiming to reduce items to fewer than 250, we then shared items with scholars mentioned in the acknowledgments and piloted with 11 online and 13 in-person participants. The result was the 234 items administered in Study 1 (~9 per candidate primal, with ~4 reverse-scored). We wrote scale instructions to frame items as beliefs, rather than values, desires, or goals (see Table 4). Pilot participants interpreted instructions as intended.

Research Studies

What follows are descriptions of six studies approved by the University of Pennsylvania Institutional Review Board. Study 1, 2, and 3 employ factor analyses to explore and confirm the measurement model. Measuring an array of personality, clinical, and wellbeing variables, Study 2 also examines convergent, divergent, and incremental validity. Study 4 examines primals' connection to affect in response to a validity concern raised by Study 1 results. Study 5 examines concurrent, convergent, and discriminant validity. Study 6 examines test–retest reliability and stability over 2 weeks, 9 months, and 19 months.

We administered surveys on Qualtrics from October 2015 to March, 2017. Each included 5–10 attention checks. We discarded responses for failing validation with >1 incorrect check or duplicative IP addresses. Save for Study 3, we recruited samples via mTurk, which Paolacci and Chandler (2014) consider suitable for initial scale building since it provides cost-effective access to diverse samples. We ipsatized primals data to correct for agreement bias (Hicks, 1970). In checks, ipsatization aided factor interpretability, simple structure, and internal reliability while ipsatized versus nonipsatized factor scores correlated >.97. Reverse-scoring of items was done prior to analyses. See Supplement 2 for further factor analysis results; Supplement 3 for the final version of the Primals Inventory (PI-99); and Supplement 4 for further validity tables.

Study 1: Exploratory Factor Analysis

The goal of Study 1 was to determine the factor structure of 234 items via exploratory factor analysis (EFA). We had two broad expectations. First, since many candidate primals involve desirable (or undesirable) states, a general *Good* factor might explain substantial variance. Through item diversity, we hoped the most defining qualities of a *Good* implicit reality—beauty, justice, or something else—might reveal themselves. Second, we expected 234 items would collapse into a handful of factors (~5). We expected few of the 25 candidate primals to emerge as their own factor for seven reasons. (a) Items for each candidate primal concerned conceptual opposites that may not hang together. For example, we formulated the opposite of *Beautiful* as "ugly," but it could actually be something else like "disgusting" or "mundane." (b) We adopted a conservative approach of excluding factors lacking at least one salient reverse-scored item. After all, if *the world is improving* does not exclude *the world is declining*, validity is suspect. (c) Vague domain-general items may not allow numerous independent data patterns because such items were used

to measure many primals at once (Lipkus (1991) had measured one predefined primal). (d) Several candidate primals were conceptually similar (e.g., *Improvable* and *Progressing*). (e) We prioritized wording differences among items measuring each candidate primal, while items across candidate primals often shared similar language. (f) Item order was randomized between-participants. (g) Finally, randomization spread items over a large pool (234 items) concerning 50 ideas (25 pairs of conceptual opposites). Indeed, some of these obstacles were erected to purposefully minimize factor proliferation. Consequently, if EFA identified any predefined candidate primals as independent, reliable factors, it would imply an actual primal, and the factor should be retained.

Method and Participants

One thousand and ten participants completed 234 primals items; a 20-item affect measure (PANAS; Watson, Clark, & Tellegen, 1988); a 13-item social desirability scale (Li & Sipps, 1985); and 16 demographic questions. 930 Americans age 18 to 74 ($M = 36.7$, $SD = 11.7$) passed validation and received $2.25. Of these, 57% were female, 55% full-time workers, 79% white, 46% Christian, 41% nonreligious, 52% Democrat, 25% Republican, 51% college graduates, and 58% with household incomes >$40,000.

Data Analysis

To determine how many factors to extract, we used Minimum Average Partial analysis, parallel analysis, scree analysis, and "Bass-Ackwards" analysis (Goldberg, 2006). The latter involves serially extracting and analyzing factor solutions until one extracts the maximum number of reliable ($\alpha \geq .70$) and meaningful factors. In "Bass-Ackwards" analysis and subsequent EFAs we used PROMAX rotation, EQUAMAX prerotation, salience of .295 or .395, and maximized hyperplane count; these methods typically produced simpler structure. Oblique rotation was also considered appropriate given expected worldview coherence pressures. Because above analyses disagreed, we explored the possibility of a multilevel measurement model. Once we identified a factor structure (which required a second exploratory study), we retained items to optimize (a) factor representation, (b) α (all items must increase α), and (c) brevity. We also considered item-total correlations, means (i.e., difficulty), kurtosis, face validity, language variety, item parameter slope estimates, item characteristic curves, item information curves, test information curves, and relationships with affect and social desirability.

Results

Exploratory factor analysis suggested factor solutions at three levels of granularity. Scree analysis of all items (see Figure 1) suggested a one- or three-factor solution explaining 33% or 46% of the common variance, respectively. Compared to two- and four-factor solutions, they had fewer multiloading items, fewer nonloading items, more reliable scores, and more meaningful factors. We labeled the general factor *Good*. Its top-loading item was *On the whole, the world is an uncomfortable and unpleasant place* (reverse-scored) and *Pleasurable* items loaded highly. We labeled factors in the three-factor solution *Safe*, *Enticing*, and *Alive*.

However, Minimum Average Partial analysis, parallel analysis, and "Bass-Ackwards" analysis, pointed to numerous tertiary factors (28, 19, and 27, respectively). Seeking insight into how many factors to extract at this more granular level, we separately analyzed reverse- and forward-scored items. Again, scree analysis suggested the same one or three superordinate factors and the other analyses indicated many tertiary factors. Lacking indicator agreement on how many tertiary factors to extract, we used the above criteria and additional conservative criteria described below to create a preliminary subset of items for further exploratory purposes. This subset resulted from separate analyses of each of the 25 item sets associated with each candidate primal in order to select only four items—at least one of which had to be reverse-scored—per internally reliable, nonredundant candidate primal. Standardizing the number of items per candidate primal was helpful because low-loading and nonloading items were unequally shared among candidate primals in the full 234-item battery. We judged that only four items per candidate primal would discourage proliferation while still allowing factor emergence given strong signal from a latent variable. To ensure factors were not artifacts of highly correlating items, we deprioritized internal reliability and removed 17 top-loading items with item-total correlations above or near .80. These items could be added back once factor structure was clarified.

Due to these analyses, one candidate primal was dropped for failing to produce a set of items with $\alpha \geq .70$ (*Characterizeable*); two candidate primals were merged for being statistically redundant (*Pleasurable* and *Good*); and one candidate primal was dropped for lacking both salient forward- and reverse-scored items (*For Me*). Thus, the resulting subset had 88 items (four items per 22 candidate primals). For this subset, scree analysis again suggested one and three factors; Minimum Average Partial analysis suggested 15; parallel analysis suggested 17; and "Bass-Ackwards" analysis suggested 22. The 22-factor solution also produced *simple structure*, defined as 0 multiloaders, 0 nonloaders, and all factors with $\alpha \geq .70$. These factors reflected the 22 remaining predefined candidate primals. We further explored primals' superordinate structure by analyzing the 22 most representative items in each 4-item scale (scree analysis suggested 1 and three factors; Minimum Average Partial analysis: 3; parallel analysis: 4) and 22 scores on the 22 scales (i.e., a hierarchical EFA; scree analysis: 1 and 3 factors; Minimum Average Partial analysis: 3; parallel analysis: 6). Across 26 primals (one primary + three secondary + 22 tertiary scales), pairwise relationships between primals and social desirability were small ($M\ r = .18$, range: $-.08$ to .31). Some relationships with affect were larger (positive affect:

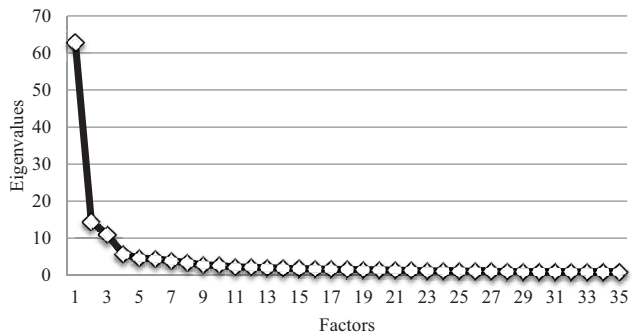

Figure 1. Scree plot of 234 primals items in Study 1.

M r = .27, range: −.01 to .45; negative affect: *M r* = −.22, range: −.39 to .10).

Discussion

Primals emerged at three levels of granularity. Each level makes steeper tradeoffs between variance explained and parsimony, with new factors emerging at more granular levels (and some at less). The primary primal *Good* (α = .97), largely defined by *Pleasurable* items—not *Beautiful* or *Just*—explained 45% of common variance among the 88-item subset. Secondary primals *Safe* (α = .96), *Enticing* (α = .95), and *Alive* (α = .90) explained 65%. Twenty-two tertiary factors (mean α = .87; *SD* = .05) slightly overextracted, explaining 105%.

As noted, we had not expected so many tertiary factors to emerge. To identify the exact number to extract, we created a subset of items for exploratory purposes. This involved various techniques that weakened tertiary factors to increase flexibility in the correlation matrix. (Once factor structure was clarified, high-performing items would be added back to strengthen psychometric characteristics.) These analyses required numerous decisions—a weakness of the approach—and brought clarity. Despite obstacles, a 22-factor solution produced simple structure with each factor including only four items, at least one of which was opposite-scored. Because one- and three-factor solutions underextracted variance, ignored meaningful complexity, lacked simple structure with numerous nonloading items, and poorly represented several tertiary factors—*Interconnected*, *Understandable*, *Acceptable*, *Hierarchical*, and *Changing*—we concluded that the most accurate solution was likely the improbable 22-factor solution. However, we were worried by slight overextraction, the possibility of overfitting, and low incremental validity for tertiary primals. We also wondered if the tertiary model would fall apart if only 4 items were administered per factor. Thus, with key questions remaining, we chose to delay settling on a final version of the Primals Inventory. Instead, we would use the 88-item subset that achieved simple structure for further exploratory purposes in Study 2. Study 1 results also raised a validity question concerning affect that Study 4 examines further.

Study 2: Confirmatory Factor Analysis and Validity

The main goal of Study 2 was to clarify factor structure so item-retention decisions could be finalized. For easier reading, Study 2 analyses, results, and discussions are organized by topic: (a) factor analyses; (b) an examination of the relative predictive utility of primary versus secondary versus tertiary primals; (c) convergent and divergent validity; and (d) incremental validity. Topics are followed by a general discussion of Study 2's main goal: finalizing the measurement model.

Method and Participants

Following primals items, 562 participants completed measures of BIG 5 personality traits (44-item BFI; John, Donahue, & Kentle, 1991); life satisfaction (5-item SWLS; Diener, Emmons, Larsen, & Griffin, 1985); depression, anxiety, and stress (21-item DASS-21; Antony, Bieling, Cox, Enns, & Swinson, 1998); positive emotions, negative emotions, engagement, relationships, meaning, accomplishment, health, and overall wellbeing (23-item PERMA-Profiler; Butler & Kern, 2016); curiosity (10-item CEI-II; Kashdan et al., 2009; 10-item VIA; Peterson & Park, 2009); grit (8-item Grit-S; Duckworth & Quinn, 2009); optimism (6-item LOT-R; Scheier, Carver, & Bridges, 1994); belief in a just world (6-item GBJWS; Lipkus, 1991); gratitude (6-item GQ-6; McCullough, Emmons, & Tsang, 2002); Machiavellianism, narcissism, and psychopathy (12-item "Dirty Dozen"; Jonason & Webster, 2010); growth mindset (4 items; Dweck et al., 1995); 24 political questions; mystical experiences (5-item DT subscale; Hood & Morris, 1983); and 27 demographic questions.

Five hundred twenty-four Americans, age 18 to 75 (*M* = 36.9, *SD* = 11.5), passed validation and received $2.10. Of these, 97% were native English speakers, 51% female, 78% white, 40% married, 40% Christian, 40% agnostic or atheist, 43% Democrat, 18% Republican, 51% college graduates, and 59% with household incomes >$40,000. 48 of 50 states were represented.

Confirmatory Analyses

We examined fit for one-, three-, and 22-factor models.

Analysis. As Schreiber, Nora, Stage, Barlow, and King (2006) recommend, we assessed fit with Confirmatory Factor Analysis (CFA) using thresholds of ≥.95 for Non-Normed Fit Index (NNFI) and Comparative Fit Index (CFI), and <.08 for Root Mean Square Error of Approximation (RMSEA). However, CFAs suggest artificially poor fit given (a) lengthy surveys (≥ ~30 items); (b) items correlating with >1 factor; and (c) complex models (Floyd & Widaman, 1995). Though we expected mediocre fit for 1- and 3-factor models (since they ignore tertiary variance), these three problems could be overcome by parceling items to distribute Study 1 PROMAX loadings and dimensionality, as Kishton and Widaman (1994) advise. However, since this was impossible for the 22-factor model, fit statistics were deemed uninformative. (The common 1:10 parameter to observation guideline (e.g., Schreiber et al., 2006) calls for 4,290 participants). Thus, we supplemented CFA with exploratory structural equation modeling; identical EFA procedures; and comparisons of item parameter slope estimates, item characteristic curves, item information curves, and test information curves. Administering only 4 items per tertiary primal also allowed another chance for tertiary primals to fail. If α remained acceptable, it would support tertiary-level extraction.

Results. CFA indicated acceptable fit for 1- and 3-factor models and other analyses supported tertiary extraction. NNFI, CFI, and RMSEA were, respectively, .980, .984, and .061 for the 1-factor model and .956, .964, and .072 for the 3-factor model. A 22-factor exploratory structural equation model would not converge, suggesting the need for a larger sample. EFA revealed 1-, 3-, and 22-factor solutions nearly identical to those in Study 1. Minimum Average Partial analysis and parallel analysis again suggested many factors (15 and 23) while scree analysis again suggested 1 and 3. A 1-factor solution explained 39% of the common variance, a 3-factor solution 57%, and a 22-factor solution 96%. Mean α was .96 for primary, .91 for secondary, and .80 for tertiary scales (range: .67 to .86, SD = .07; only *About Me* fell below .70).

Discussion. CFA indicated adequate fit for one- and three-factor models. The other analyses largely confirmed the 22-factor solution, which no longer overextracted common variance. Also, despite obstacles, α remained acceptable (>.70) for nearly all four-item tertiary factors. These results suggested a measurement model should include primary, secondary, and tertiary factors.

Predictive utility of tertiary versus secondary versus primary primals. We were interested in the possibility of dropping the primary, secondary, or tertiary levels from our model for the sake of simplicity. Thus, we compared the predictive utility of each level in exploratory regression analyses examining a variety of dependent variables (DVs).

Analysis. We created several three-way prediction contests using all 21 nonprimals scales as DVs and three atheoretical methods for predictor variable selection. DVs included personality and wellbeing indicators (extraversion, agreeableness, conscientiousness, neuroticism, openness, curiosity measured in two ways, Machiavellianism, psychopathy, narcissism, optimism, grit, trait gratitude, growth mindset, interpersonal trust, life satisfaction, transcendent experiences, overall PERMA wellbeing, depression, anxiety, and stress). Predictor variables were selected from either 1 primary, 3 secondary, or 22 tertiary primals, as well as age, sex, race, education, marital status, employment status, family income, personal income, parental SES, personal SES, religiosity, spirituality, religion, conservatism, party affiliation, number of friends, English as a second language, U.S.A. resident, and Body Mass Index. The first of our atheoretical predictor-variable selection methods was the nonparsimonious *kitchen sink* method, in which we simultaneously entered primals and all other predictor variables. Second, in a *reduced* method, we included only significant variables from the *kitchen sink* model ($p < .05$). Third, in a *ridge regression* method, we iteratively entered and removed variables from the kitchen sink method to identify the model that optimized parsimony according to the "lambda 1-SE" criterion from the R package *glmnet* (Friedman, Hastie, & Tibshirani, 2010). Using Bayesian Information Criterion (BIC), a fit index that penalizes overfitting, we ranked primary, secondary, or tertiary models 1st, 2nd, and 3rd by how well DVs were predicted. Raftery (1995) suggests BIC reductions of 0–2, 2–6, 6–10, and ≥10 denote *weak*, *positive*, *strong*, and *very strong* evidence of improved fit, respectively.

Results. No level of granularity underperformed the others. Across contests (21 DVs × 3 methods of predictor variable selection = 63 contests), primary models provided the best fit 22 times, second best 23 times, and worst 18 times. Secondary models were best 10 times, second best 36 times, and worst 17 times. Tertiary models were best 31 times, second best 9 times, and worst 23 times. Mean BIC difference between best and second-best models was 15.6 ($SD = 19.1$) and between best and worst was 45.3 ($SD = 28.0$), denoting *very strong* evidence of improved fit.

Discussion. Our examination of relative predictive utility found no basis for discarding any level of granularity. Though BIC typically provided *very strong* evidence that one level of granularity was considerably more useful in predicting specific DVs than others, primary models were worst about as often as they were best or second best; tertiary models were most often best *and* worse; and secondary primals were a compromise, usually not worst or best. All were useful.

Convergent and Divergent Validity

Analysis. To assess convergent and divergent validity, we examined pairwise correlations between the 26 PI scales and 115 personality, clinical, wellbeing, and demographic variables.

Results. Results suggest convergent validity. Strong examples include the four relationships proposed in the theory section: *Good* and optimism, $r = .67$, $p < .001$; *Safe* and neuroticism, $r = -.44$, $p < .001$; *Enticing* and VIA curiosity, $r = .61$, $p < .001$; and *Progressing* and conservatism, $r = -.14$, $p < .001$. Table 2 highlights 40 additional examples. Results also suggest divergent validity. Examples include *Alive* and Body Mass Index ($r = -.03$) and *Funny* and family income ($r = .01$). No relationships violated directional assumptions (+, −, or orthogonal). A few surprises occurred when correlations were higher or lower than expected. In the most extreme cases, Machiavellianism covaried with *Cooperative* less than expected ($r = -.11$ $p = .01$) and trait gratitude covaried with *Good* slightly more than expected, $r = .68$, $p < .001$.

Discussion. Across the board, study participants reported behaviors that, causal or not, appear optimal given their primals. In addition to validating our PI interpretations, these results shed light on one of Dweck's (2008, 2017) critical benchmarks for whether a belief could exert a pervasive influence on personality: does the belief substantially covary with variables it theoretically influences? Though such relationships provide no evidence of causality, substantial and largely expected patterns of covariance were observed (see Table 2 for many examples).

Incremental Validity

We have proposed as part of our tentative measurement model that primals, like other beliefs, may influence behaviors associated with major personality traits yet are distinct from those traits. To explore overlap with these traits (and primals' relative predictive power at the primary, secondary, and tertiary level), we pitted primals against the well-known Big Five Inventory in a series of exploratory regression analyses.

Analysis. For each non-BIG 5 DV used above, we fit a *baseline* model using the 19 remaining demographic variables as predictors. Adding to this baseline, we fit a *BIG5-only* model, three *primals-only* models (at each level of granularity), and three *BIG5-and-primals* models (at each level of granularity) with all variables added simultaneously. We compared model fit using Bayesian Information Criterion (BIC), likelihood ratio tests, and standardized r^2.

Results. Primals usually predicted DVs better than the BIG 5 or improved on the BIG 5. Likelihood ratio tests (all *p's* < .05) showed (a) 47 of 48 *primals-only* models fit better than demographic *baseline* models (secondary primals did not help predict narcissism); and (b) 43 of 48 *BIG5-and-primals* models fit better than *BIG5-only* models (no primals models helped predict grit; only the tertiary model helped predict Machiavellianism). As Table 3 shows, 21 of these 43 models had BIC differences >10. Finally, based on BIC, *primals-only* models outperformed the *BIG5-only* models outright in 11 of 48 cases. Notably, *Good* alone explained 1.6% more variance in growth mindset and 3.3% more in life satisfaction (BIC differences were 10.9 and 49.0, respectively). *Safe*, *Enticing*, and *Alive* explained 11.5% more variance in

Table 3
Incremental Validity of Primals When Added to BIG 5 Based on Bayesian Information Criterion (BIC) Decrease and Percentage of Additional Variance Explained

	BIC Decrease			% Additional variance explained°		
16 Dependent variables	Primary	Secondary	Tertiary	Primary	Secondary	Tertiary
Depression	44.8	33.2	−41.8	4.9	4.7	6.7
Anxiety	−1.9	−8.1	−92.6	.4	.9	2.5
Stress	−1.6	−5.6	−96.1	.3	.9	1.5
Curiosity (CEI-II)*	22.2	12.7	−72.5	3.1	3.2	4.4
Curiosity (VIA)*	55.5	57.0	−22.9	6.0	7.1	8.6
Trait Gratitude	120.5	147.4	66.5	11.6	14.5	15.7
Grit	−2.9	−13.8	−119.5	.1	.1	−.5
Growth Mindset	10.0	4.8	−59.1	2.5	3.3	8.3
Life Satisfaction	60.3	49.3	−31.6	7.2	7.2	8.8
Machiavellianism	−6.2	−13.8	−100.2	.2	.2	1.6
Psychopathy	−1.8	−3.8	−74.0	.4	1.1	3.6
Narcissism	−.7	−.3	−83.8	.6	2.0	3.7
Optimism	98.1	86.7	4.6	7.7	7.7	8.7
Overall Wellbeing	86.5	78.0	10.3	6.9	7.0	9.0
Transcendence	−2.1	21.1	15.7	.5	5.7	18.4
Trust	40.7	80.9	4.5	6.2	12.4	14.7

Note. All models include demographics. See Supplement 4 for full results.
° Based on standardized r^2. * We used the Curiosity and Exploratory Inventory-II (CEI-II) and the Values in Action (VIA) curiosity subscale.

trait gratitude and 6.2% more in interpersonal trust (BIC differences were 134.8 and 56.5, respectively).

Discussion. Primals are different from—and in some cases much better predictors than—the BIG 5. Primals explained substantial variance over and above the BIG 5 when predicting 90% of DVs, including several well-studied variables like wellbeing and depression. Notably, primary and secondary *primals-only* models outperformed the BIG 5 when predicting life satisfaction, trait gratitude, growth mindset, and interpersonal trust.

Study 2 General Discussion

As noted, we had created Study 2's version of the Primals Inventory for further exploratory purposes in a new sample. In light of evidence supporting the primary, secondary, and tertiary factor models and convergent, divergent, and incremental validity at each level of granularity, we decided to retain all levels. Thus, returning to Study 1 data, we made final item-retention decisions based on original criteria, such as prioritizing α. This resulted in (a) exchanging some items for higher-loading, higher-intercorrelating items and (b) adding fifth items to a few weaker tertiary scales. To finalize superordinate scales, we examined one- and three-factor solutions of the full 234-item battery to ensure top-loading items with variance specific to superordinate primals were included. As a result, we retained one item for *Good* and two for *Enticing* (top-loading items for *Safe* and *Alive* were already among tertiary scale items). The result was the final 99-item version of the Primals Inventory (PI-99) in Table 4. Among final items, the 22-factor solution still had 0 multiloading items and 0 nonloading items (i.e., simple structure; salience was .295). The 3-factor solution had 0 multiloaders and 27 nonloaders and the 1-factor solution had 28 nonloaders (salience was .395). Hyperplane count was optimized at 1,874 for the 22-factor solution ($k = 3$) and 91 for the 3-factor solution ($k = 3$). For PROMAX loadings, see Supplement 2. To gauge if final decisions strengthened psychometric characteristics without altering factor structure or meaning, studies below include another CFA, a test-retest comparing PI-99 scores to Study 2 scores, and further validity checks.

Study 3: A Second Confirmatory Factor Analysis

Because mTurk has limitations as a sample, Study 3 aimed to replicate results elsewhere.

Method and Participants

We copied items, validation checks, and format from Study 1. 580 participants participated for no compensation via authentichappiness.com, where one of ~8 rotating banner headlines invited study participants over 18 months. 529 Americans, age 18 to 77 ($M = 43.4$, $SD = 15.2$) passed validation. Of these, 88% were native English speakers, 77% female, 48% full-time workers, 74% white, 42% Christian, 33% agnostic or atheist, 35% Democrat, 11% Republican, 65% college graduates, and 76% with household incomes >$40,000.

Analysis

We conducted confirmatory procedures identical to Study 2.

Results

Results largely mirrored Study 1 and 2. Mean α for 26 PI-99 subscales was .84 (range: .69 to .97). NNFI, CFI, and RMSEA were .963, .970, and .090 for the one-factor solution and .968, .974, and .067 for the three-factor solution. EFA produced expected one-, three-, and 22-factor solutions (though without simple structure) that explained 36%, 50%, and 86% of common variance, respectively. Minimum Average Partial analysis and parallel analysis again suggested numerous factors (between 15 and 56). Scree

Table 4
The Final 99 Item Primals Inventory (PI-99)

Instructions: Below are very general statements about the world—not the world we wish we lived in, but the actual world as it is now. Please share your sense of agreement or disagreement. When in doubt, go with what initially **feels true of the real world**. There are no wrong answers. There's no need to overthink. [Item order was randomized for each participant. Response options were *strongly agree*, *agree*, *slightly agree*, *slightly disagree*, *disagree*, and *strongly disagree*.]

About Me vs. not about me
- Whatever is happening around me often feels related to me or something I've done.[A]
- Much of what happens around me feels like it's because of me or related to me somehow.[A]
- My first instinct about events happening around me is that they're unrelated to me or anything I've done.[*A]
- When unsure why something is happening, I often suspect it's got something to do with me.
- My first instinct about things happening around me is that they have to do with me or something I've done.[A]

Abundant vs. barren
- The world is an abundant place.[GE]
- Life overflows with opportunity and abundance.[GE]
- The world feels like a barren place with few opportunities.[*GE]
- The world is an abundant place with tons and tons to offer.[GE]

Acceptable vs. unacceptable
- The world needs to be continually improved rather than accepted.[*]
- Rather than accepting things as they are, the world needs to be improved as much as possible.[*]
- It's usually better to accept a situation than try to change it.
- Most situations in life need to be improved, not accepted.[*]

Beautiful vs. ugly
- Nearly everything in the world is beautiful.[GE]
- Though some things are incredibly beautiful, they're few and far between.[*GE]
- There is beauty everywhere, no matter where we look.[GE]
- In life, there's way more beauty than ugliness.[GE]

Changing vs. static
- Everything feels like it's shifting and changing.
- Everything feels like it's constantly moving, changing, and up in the air.
- Everything feels like a whirl of constant change.
- I feel like everything changes all the time.
- The world is a place where most things stay pretty much the same.[*]

Cooperative vs. competitive
- Instead of being cooperative, life is a brutal contest where you got to do whatever it takes to survive.[*GS]
- For all life—from the smallest organisms, to plants, animals, and for people too—everything is a cut-throat competition.[*GS]
- Instead of being cooperative, the world is a cut-throat and competitive place.[*GS]
- The world runs on trust and cooperation way more than suspicion and competition.[GS]

Funny vs. not funny
- The world is hilarious; if we aren't laughing, we aren't paying attention.[GE]
- Laughing a ton makes sense because life is hilarious and humor is everywhere.[GE]
- While some things are humorous, most of the time the world is not that funny.[*G]
- There's humor in everything.[GE]

Harmless vs. dangerous
- On the whole, the world is a safe place.[GS]
- Real danger is everywhere; even if we don't notice it.[*GS]
- Most things and situations are harmless and totally safe.[GS]
- I tend to see the world as pretty safe.[GS]
- On the whole, the world is a dangerous place.[*GS]

Hierarchical vs. nonhierarchical
- Most things can be organized into hierarchies, rankings, or pecking orders that reflect true differences among things.
- Humans, animals, plants, and pretty much everything else can be organized by how important or good they are.
- Most things aren't better or worse. It's hard to organize the world into hierarchies, rankings, or pecking orders that reflect true differences.[*]
- Most things in the world could be ranked in order of importance.
- Things are rarely equal. Most plants and animals, and even people, are better or worse than one another.

Improvable vs. too hard to improve
- It's possible to significantly improve basically anything encountered in life.[G]
- Most situations seem really difficult if not impossible to improve.[*G]
- No matter who you are, you can significantly improve the world you live in.[GE]
- In most situations, making things way better is absolutely possible.[GE]
- Most things and situations are responsive, workable, and totally possible to improve.[GE]

Intentional vs. unintentional
- Events happen according to a broader purpose.[A]
- What happens in the world is meant to happen.[A]
- Everything happens for a reason and on purpose.[A]
- Events seem to lack any cosmic or bigger purpose.[*A]
- The universe doesn't care if events happen one way or another.[*A]

Interconnected vs. atomistic
- Every single thing is connected to everything else.
- Most things are basically unconnected and independent from each other.[*]
- Though things can appear separate and independent, they really aren't. Instead, all is one.
- The world is a place where everything is completely interconnected.

Interesting vs. boring
- The world is a somewhat dull place where plenty of things are not that interesting.[*GE]
- Most things in life are kind of boring.[*GE]
- It feels like interesting and exciting things surround us all the time.[GE]
- While some things are interesting, most things are pretty dull.[*GE]

Just vs. unjust
- On the whole, the world is a place where we get what we deserve.[G]
- Life will find ways to reward those who do good and punish those who do bad.[GA]
- The world is a place where working hard and being nice pays off.[GS]
- If someone is generous and kind, the world will be kind back.[GS]
- The world is a place where we rarely deserve what we get.[*GS]

Meaningful vs. meaningless
- The world is a place where most everything matters.[GE]
- Nothing really matters all that much.[*GE]
- Most things are pointless and meaningless.[*GE]
- The world is a place where things just don't matter.[*GE]

Needs Me vs. doesn't need me
- The universe needs me for something important.[GA]
- Life has an important part for me to play.[GA]
- It feels like the world doesn't really need me for anything.[*GA]
- The world needs me and my efforts.[GA]

Pleasurable vs. miserable
- Life offers more pain than pleasure.[*GS]
- On the whole, the world is a good place.[GS]
- Life in this world is usually pain and suffering.[*GS]
- Life offers way more pleasure than pain.[GS]
- Most things in the world are good.[GS]

(*table continues*)

Table 4 (*continued*)

Progressing vs. declining
- On the whole, the world is getting worse.[*GS]
- It feels like the world is going downhill.[*GS]
- Though the world has problems, on the whole things are definitely improving.[GS]
- It feels like the world is getting better and better.[GS]

Regenerative vs. degenerative
- Though sometimes situations get worse, usually they get better.[GS]
- Most things have a habit of getting worse.[*GS]
- The usual tendency of most things and situations is to get better, not worse.[GS]
- Over time, most situations naturally tend to get worse, not better.[*GS]

Stable vs. fragile
- The world is a place where things are fragile and easily ruined.[*GS]
- It takes a lot for things to fall apart.[GS]
- Most things and situations are delicate and easily destroyed.[*GS]
- Most situations are delicate. Though they may be fine now, things could easily unravel.[*GS]

Understandable vs. too hard to understand
- Most everything is easy enough to understand.[G]
- The world is a confusing place where many skills and subjects are too hard to figure out.[*G]
- Lots of things in the world are too confusing and difficult to understand.[*G]
- The world is easy enough to understand.[G]

Worth Exploring vs. not worth exploring
- I feel everything is worth trying, learning about, or exploring further.[GE]
- To be honest, though some things are worth trying and exploring, most things aren't.[*GE]
- Everything deserves to be explored.[GE]
- Unfamiliar things and places are usually worth trying or checking out.[GE]

Enticing additional items
- No matter where we are or what the topic might be, the world is fascinating.[GE]
- No matter where we are, incredible beauty is always around us.[GE]

Good additional item
- On the whole, the world is an uncomfortable and unpleasant place.[*G]

Note. Copyright 2018 by Jeremy D. W. Clifton.
[G] 71 *Good* items. [S] 29 *Safe* items. [E] 28 *Enticing* items. [A] 14 *Alive* items. [*] 39 reverse-scored items.

plot analysis suggested three and perhaps four. A four-factor solution included *Safe*, *Enticing*, and *Alive* and a factor of *Hierarchical, Interconnected*, and *Changing* items with PROMAX loadings ranging from .49 to −.62 ($\alpha = .77$).

Discussion

Study 3 replicated the PI-99's factor structure in a non-mTurk sample that participated without monetary incentive and was comparatively older, less likely to be employed, wealthier, more educated, and had a higher percentage of women and non-native English speakers. Exceptions included a RMSEA on the one-factor model slightly above threshold; an α for one of 26 primals (*Worth Exploring*) slightly below .70 at .69; and an intriguing (if remote) possibility of a fourth secondary primal concerning nonhierarchy, connection, and flux.

Study 4: Validity—Exploring the Relationship Between Primals and Affect

Are PI scores partially driven by ambient emotion? Perhaps *Good* or *Safe* scores merely reflect the sort of day one is having or the mood one is in. As noted, Study 1 found small and some moderate correlations with affect. Among potential explanations, we explored the possibility that, since PANAS followed the PI in Study 1, perhaps reflecting on primals alters affect rather than affect altering PI scores. Indeed, some study participants noted that taking the PI-99 altered their mood; reflection on evaluative beliefs should theoretically alter affect; and the covariance pattern among primals was consistent with this view. For example, if ambient emotion drove PI scores, *Good* should presumably be most related to affect. Instead, among all 26 primals, *Needs Me* best predicted positive affect despite attenuation (less reliable scales are inherently less able to correlate highly with other variables). Yet, *Needs Me* was comparatively less related to *Good* (15th in Study 1) and third variables likely to serve a mediational role (see Study 2). Thus, we designed Study 4 is an exploratory randomized experiment examining the role of sequence effects on positive affect and PI scores, especially *Good* and *Needs Me*.

Method and Participants

Two hundred thirty participants answered the PI-99, PANAS, and 10 demographic questions. 219 participants age 19 to 70 ($M = 38.4$, $SD = 12.3$) passed validation and received $0.75. Of these, 55% were female, 79% white, 47% Christian, 44% secular, 39% Democrat, 23% Republican, and 63% with household incomes >$40,000. We randomly assigned 120 participants to a PI-first condition and 99 to a PANAS-first condition. Compared to the PI-First condition, the PANAS-first condition was more Christian (55% to 41%) and specifically Catholic (32% to 11%); white (85% to 74%); and Republican (30% to 17%).

Analyses

After checking if Study 1 results replicated in the PI-first condition, we compared relationships between primals and positive affect in the PI-first condition to those in the PANAS-first condition, focusing on *Good* and *Needs Me*. Since only effect-size differences >.24 would be statistically significant ($p < .05$), nonsignificant results may yield insights, especially if consistent across primals.

Results

Among those taking the PI-99 first, there was typically a larger relationship between affect and PI-99 scores. Results from the PI-first condition largely replicated Study 1 results, including substantial covariance between positive affect and (*Good*, $r = .46$, $p < .001$ and *Needs Me*, $r = .47$, $p < .001$). In

the PANAS-first condition, these relationships dropped by .15 and .14, respectively, though changes were not significant (*Good*: $z = 1.26$, $p = .21$; *Needs Me*: $z = 1.21$, $p = .22$). We observed significant differences for *Worth Exploring*, $r = .26$, $z = 1.98$, $p = .048$ and *Intentional*, $r = .25$, $z = 1.99$, $p = .047$ and marginally significant changes in *Stable*, $r = .25$, $z = 1.85$, $p = .064$.

Discussion

Results suggest brief reflection on one's primals may influence emotion without determining it, suggesting part of the relationship observed in Study 1 is due to a sequence effect. However, before conclusions can be drawn, this study should be replicated in a larger, non-mTurk sample (specifically, one less used to taking surveys). By examining stability, Study 6 also sheds light on the relationship between primals and states, including affect.

Study 5: Convergent, Concurrent, and Discriminant Validity

Our literature review noted that nomological overlap with related constructs (including two previously studied primals) should be explored once primals are measurable. Study 5 examines these points of overlap to further validate our interpretation of PI-99 scores.

Method and Participants

Two hundred thirty-one Americans completed the PI-99 and 10 demographic questions. 191 passed validation, received $0.10, and were invited two weeks later to take a survey which included the PI-99 and measures of Justice, Luck, Controllability, Randomness, and Benevolence (32-item WAS; Janoff-Bulman, 1989); belief in dangerous and competitive worlds (20-item SWS-R; Perry et al., 2013); incremental theories of intelligence, morality, self, and world (12-items; Dweck et al., 1995); general self-efficacy (8-item NGSES; Chen et al., 2001); mastery (7-item Pearlin Mastery Scale; Pearlin & Schooler, 1978); and purpose, comprehension, and mattering (15-item MEMS; George & Park, 2017). Of 144 completing the second survey, 122 participants age 18 to 74 ($M = 35.4$, $SD = 12.4$) passed validation, receiving $2. Of these, 44% were female, 52% white, 52% Christian, 22% nonreligious, 39% Democrat, 23% Republican, 64% college graduates, and 57% with household incomes >$40,000.

Analyses

To assess concurrent, convergent, and discriminant validity, we examined if pairwise correlations between primals and 19 additional variables violated directional assumptions or were much higher or lower than expected. Results are organized by construct.

Results and Discussion

As in Study 2, no correlations violated directional assumptions and effect sizes showed discriminant validity. In what follows, $p < .001$ unless stated otherwise.

Belief in a Just World. The expectation that BJW and *Just* are the same latent variable was supported. Among tertiary primals, *Just* best predicted WAS's Justice subscale at .75. (Lipkus's (1991) BJW scale correlated with PI-94's 4-item *Just* scale at .74 in Study 2).

Belief in a Dangerous World. Though *Safe* and BDW ostensibly concern the same latent variable, we expected Perry et al.'s (2013) BDW scale to target *Progressing* and somewhat neglect *Safe* and *Safe*-related tertiary primals. As expected, BDW predicted *Progressing* at −.72, which was more than *Safe* (−.68) and *Safe*-related tertiary primals: *Pleasurable* (−49), *Regenerative* (−.53), *Harmless* (−.67), *Cooperative* (−.59), *Stable* (−.39), and *Just* (−.34).

World Assumptions Scale. Janoff-Bulman's (1989) WAS includes five relevant scales. We thought Benevolence would concern the same latent variable as *Safe* (not *Good*) and that Justice, Controllability, Luck, and Randomness would be largely (but not completely) explained by *Just*. After all, a just world is by definition a controllable, nonrandom place where one is not perpetually unlucky. As expected, *Just* was the tertiary primal that best predicted all four scales: Justice (.75), Controllability (.53), Luck, (.49), and Randomness (−.49). Further studies might explore the unique contributions of WAS scales in more detail.

Competitive-Jungle Worldview Scale. Because CJWS items include many value statements, we expected it would be related to but distinct from *Cooperative*, which was supported. *Cooperative* correlated with the CJWS at .58.

Improvable-related measures. Numerous constructs may seem related to *Improvable*, including mastery, global self-efficacy, and four forms of incremental theory. However, since a belief about the malleability of an environment could differ from a *self* belief about one's own ability to change it, we expected *Improvable* would be related to yet distinct from these measures, which was supported. *Improvable* was the primal best predicting mastery (.64) and general self-efficacy (.59). Incremental theories were much less related (intelligence: $r = .23$, $p = .01$; personality: $r = .24$, $p = .008$; morality: $r = .31$, $p = .005$; world: $r = .23$, $p = .01$).

Discussion

In addition to further evidence of convergent and discriminant validity, Study 5 indicates the gap in the nomological network mirrors the gap our literature review suggested. In sum, two primals have been studied—though BDW may be mislabeled—and several related constructs correlate with (but are distinct from) primals. It is also worth noting that whereas *Safe* is related to the two previously studied primals, *Enticing* and associated tertiary primals are particularly virgin territory.

Study 6: Test-Retest Reliability and Stability

Study 6 examined test-retest correlations across 2 weeks, 9 months, and 19 months.

Method and Participants

The 2-week test-retest sample was the same sample used in Study 5. We created a 9-month sample (March to Dec. 2016) by randomly inviting 250 participants from Study 2 ($N = 524$). Of 136 who completed the second survey, 134 people, age 20 to 72 ($M = 38.6$, $SD = 12.5$), passed validation and received $1.25. They were 54% female, 85% white, 44% Christian, 45% secular,

Table 5
PI-99 Test-Retest Pearson Correlations Across 2 Weeks, 9 Months, and 19 Months

Primal	2 Weeks (n = 122)*	9 Months (n = 134)*	19 Months (n = 398)
Good	.90	.76	.78
Safe	.90	.74	.75
Enticing	.85	.77	.77
Alive	.89	.75	.79
About Me	.66	.31	.48
Abundant	.84	.66	.67
Acceptable	.68	.63	.46
Beautiful	.64	.58	.67
Changing	.52	.50	.59
Cooperative	.74	.59	.66
Funny	.67	.64	.70
Harmless	.77	.62	.69
Hierarchical	.60	.64	.58
Improvable	.60	.71	.65
Intentional	.86	.80	.82
Interconnected	.73	.70	.65
Interesting	.70	.70	.62
Just	.80	.70	.71
Meaningful	.81	.66	.68
Needs Me	.78	.68	.74
Pleasurable	.86	.71	.71
Progressing	.77	.68	.67
Regenerative	.72	.62	.61
Stable	.63	.55	.59
Understandable	.61	.48	.61
Worth Exploring	.68	.58	.65

Note. All relationships were significant at $p < .001$.
* Irregular payment structure in the 2-week sample and the use of different versions of the PI in the 9-month sample likely suppressed coefficients.

46% Democrat, 21% Republican, 58% college graduates, and 63% with household incomes >$40,000. We created a 19-month sample (Oct. 2015 to May 2017) by inviting all Study 1 participants (N = 930). Of 406 who completed the second survey, 398 people, age 21 to 75 (M = 41.3, SD = 12.2) passed validation and received $2. They were 55% female, 79% white, 49% Christian, 45% secular, 46% Democrat, 24% Republican, 59% college graduates, and 63% with household incomes >$40,000.

Analysis

For each primal, we examined rs between time 1 and time 2 in Table 5.

Results

PI-99 scores showed test–retest reliability and stability. The 2-week, 9-month, and 19-month test-retest coefficients were, respectively, .90, .76, and .78 for *Good*; averaged .88, .75, and .77 for secondary primals; and averaged .71, .62, and .65 for tertiary primals. In 19-month retest voluntary comment boxes, several participants also noted the impact of major recent events. For example: (a) *If Hillary Clinton had won, I'd be answering totally differently*. (b) *The world is a lot scarier since your last survey what with Trump and his vile cohort*. (c) *This was terrible timing. The terror attack in Manchester last night is weighing heavily on Turkers' minds today as reflected in our message boards and makes us think the world is unsafe. Keep that in mind when you wonder why we have all become negative and depressed.*

Discussion

PI-99 scores were remarkably stable over time. In addition to item randomization, which should lower test-retest coefficients by altering item context each time, minor study design flaws likely suppressed results in two of three retests. First, seeking retention in the 2-week retest, we underpaid at Time 1, overpaid at Time 2, and data quality suffered. Compared to Studies 1, 2, and 4, it took 16 times longer to recruit fewer participants who were 3 times more likely to fail validation; mean α fell .06 across PI-99 scales. Second, we suspect that many of the 19 subscales that appeared more stable over 19 months than 9 months only did so because the 9-month retest compared alternate versions of the inventory (differences between Study 2's initial version of the PI and the finalized PI-99 affected 19 of 26 subscales). Thus, the 19-month retest is likely the most accurate. It also involved the largest sample.

General Discussion

This article supports two strong conclusions. First, the Primals Inventory had excellent psychometrics for these online samples. Second, primals met critical benchmarks that indicate a broader research phase is justified.

The Primals Inventory

Because previous research has not systematically defined or identified primals, we suspected that many remained unspecified. To establish content validity, we used various methods to identify candidate primals across groups, eras, and media. For example, our textual analyses involved examining 358 highly influential historical texts, analyzing 80,677 tweets, and sorting the 840 most-used adjectives in American English. Study 1 revealed a three-level model—one primary, three secondary, and 22 tertiary primals—that was replicated in one mTurk and one nonmTurk sample (Study 2 and 3). Each level trades parsimony for variance explained (~35% vs. ~55% vs. ~90%). We retained all levels for psychometric and incremental validity reasons.

Across nearly 3,000 study participants, PI-99 subscales showed remarkably high internal reliability (see Table 1). Mean α was .97 for *Good*, .96 for *Safe*, .95 for *Enticing*, and .89 for *Alive*. Though each tertiary scale had only 4–5 items (including at least one opposite-scored item) and items were fairly vague and randomized across 95 other items measuring 25 other constructs, they performed very well (M = .86). At a respectable .77, the four *Worth Exploring* items were least reliable.

Though PI-99 items might appear subject to whim, they were not. Across three retests, we were surprised—shocked even—by the stability we observed (see Table 5). For example, the 19-month test-retest spanned the 2016 U.S.A. election season, the first 125 days of the Trump presidency, the naming of a special counsel on Russia, and the 2017 Manchester terror attack (the retest came the next day). Unprompted, several participants noted these events strongly shaped their responses. Item randomization also meant sequence effects weakened results. Furthermore, participants were not ever aware of their Time 1 scores, what particular constructs were measured, nor how many. Yet, among nearly 400 partici-

pants, 22 short intermixed tertiary scales were stable 19 months later (M = .65). Most notably, *Good* (.78), *Safe* (.75), *Enticing* (.77), and *Alive* (.79) scores were approximately as stable as BIG 5 traits (e.g., John et al., 1991) which, just behind IQ, are among the most stable variables psychologists measure (Conley, 1984).

Across studies, PI-99 subscales showed high convergent, divergent, and discriminant validity. We examined well over 2,000 relationships with other variables (Studies 2 and 5) as well as the 26 × 26 correlation matrix of PI-99 subscales (325 relationships) that was largely unchanged across all eight samples. None of these relationships violated our directional expectations (+, −, unrelated). Despite many small and some moderate relationships between affect and primals found in Study 1, Studies 4 and 6 suggested ambient emotion unlikely exerts a substantial influence on PI-99 scores. PI-99 scores were also not driven by social desirability.

PI-99 subscales showed incremental validity and predictive utility, even compared to BIG 5 scores. Table 2 provides 35 examples of moderate and large effects (see Supplement 4 for many others). For example, controlling for age, sex, education, and income, *Good* predicted optimism at β = .66; *Safe* predicted neuroticism at β = −.43; *Enticing* predicted VIA curiosity at β = .61; *Hierarchical* predicted conservatism at β = .48; *Pleasurable* predicted depression at β = −.52; and *Alive* predicted meaning in life at β = .53. No pairwise relationship with a DV was large enough to suggest construct redundancy. The strongest was .71 between *Enticing* and trait gratitude. When predicting 16 DVs in Study 2, 98% of 48 models that included primals performed better than demographics-only models; 90% of BIG 5 models were significantly improved by adding primals (49% by large margins); and 23% of primals models outperformed BIG 5 models outright. *Good* alone and *Safe*, *Enticing*, and *Alive* alone out-predicted the BIG 5 when it came to trait gratitude, interpersonal trust, growth mindset, and life satisfaction by average margins 5 times larger than Raftery's (1995) convention for *strong evidence* of a superior model. If nothing else, the PI-99 can help psychologists make predictions.

Though the PI-99 showed excellent psychometrics, it also has serious limitations. It is not yet validated outside limited online American samples. Since some primals identified in the qualitative process were not measured, other primals may exist at the tertiary level (considered fairly likely) or primary or secondary levels (considered less likely). A larger sample is needed for the 22-factor exploratory structural equation model to converge. The 2-week and 9-month test-retests suffered from methodological irregularities, including comparing different versions of the PI. Further studies should more deeply explore the relationship between primals and affect, employ alternative measurement methods such as experience sampling, and use postsurvey cognitive interviews to determine how participants interpret their own PI scores.

Pervasive Influence Is Plausible

Our second conclusion concerns next steps. After decades of research confirming Beck's (e.g., 1979) insight that beliefs shape behavior, Dweck (2008, 2017) suggested that as-yet unidentified beliefs likely shape major personality traits and that "the most important next step" (2008, p. 394) is to identify these beliefs and conduct initial correlational research to see if a broader research phase is justified. This article has introduced a category of beliefs, identified 26 of them, and found that, in the samples we gathered, these beliefs met three critical correlational benchmarks. (a) Primals were stable; people appear to spend years—perhaps decades—holding the same primals. (b) Primals vary considerably from person to person; PI scores vary on 26 fairly normal, unimodal distributions, suggesting individuals often profoundly disagree, perhaps without realizing the extent of disagreement. (c) Primals are highly predictive, often above and beyond BIG 5 traits; we found expected patterns of relationships, many large, between primals and over 100 personality, clinical, wellbeing, political, religious, and demographic variables. In short, primals behave in the nomological net *as if* they play a pervasive role in shaping behavior and wellbeing. Thus, a broader research phase is justified.

In the meantime, what should we make of widespread disagreement about the nature of a situation we all share (i.e., the world)? Perhaps primals are an expression of *who* a person is—different dispositions lead to different behaviors *and* beliefs. Another option is to extend Beck's (e.g. 1979) insight that beliefs shape behavior. Indeed, both primals and disposition are theoretically capable of explaining considerable variance in behaviors like neuroticism and curiosity that vary across persons yet are consistent across circumstances (i.e., Kelley's (1967) low-consensus, low-distinctiveness, and high-consistency behaviors). Though not purely exclusive, these options are genuine alternatives because beliefs differ from disposition in crucial ways. For example, beliefs are usually more malleable than disposition (e.g., Dweck, 2008), may influence wellbeing independent of disposition, may arise for various nondispositional reasons (including the situation itself), and may be adopted despite disposition (e.g., dispositional optimists often see situations as bad). Thus, at this early stage, agnosticism is prudent. After all, if Jack discovered that Jill profoundly disagrees with him about the nature of a situation, and Jill's actions—actions Jack formerly attributed to Jill's character—are fully consistent with her perspective, Jack would be arrogant to assume Jill's perceptions are mere projections. Furthermore, discounting the role of beliefs about a situation may be a predictable and preventable mistake. In the article coining the term, Ross (1977) famously warns psychologists of committing *the fundamental attribution error* by assuming dispositional causes when situational constraints will do—or in this case *perceived* constraints.

Whatever future research brings, considering the adage to 'never judge someone until you've walked a mile in their shoes,' upon discovering deep disagreement about the basic character of our world, perhaps a first step toward better understanding others is to visit their perceived worlds. The next section briefly describes how the world may seem to those scoring low and high on the three key primals: *Safe*, *Enticing*, and *Alive*.

A Brief Tour of Implicit Worlds

Those low on *Safe* see a Hobbesian world defined by misery, decay, scarcity, brutality and dangers of all sorts. Base rates for hazards—from germs to terrorism to getting stabbed in the back—are generally higher. In response to chronic external threats, they remain on high alert, often viewing the nonvigilant as irresponsible. Those high on *Safe* see a world of cooperation, comfort,

stability, and few threats. To them, things are safe until proven otherwise, vigilance appears neurotic, risk is not that risky, and, in general, people should calm down.

Those low on *Enticing* inhabit dull and ugly worlds where exploration offers low return on investment. They know real treasure—truly beautiful and fascinating things—is rare and treasure-hunting appropriate only when it's a sure bet. Those high on *Enticing* inhabit an irresistibly fascinating reality. They know treasure is around every corner, in every person, under every rock, and beauty permeates all. Thus, life is a gift, boredom a misinformed lifestyle choice, and exploration and appreciation is the only rational way to live.

Those low on *Alive* inhabit inanimate, mechanical worlds without awareness or intent. Since the universe never sends messages, it makes no sense to try to hear any. Those high on *Alive* sense that everything happens for a purpose and are thus sensitive to those purposes. To them, life is a relationship with an active universe that animates events, works via synchronicity, communicates, and wants help on important tasks.

Likewise, we expect other primals and combinations of primals suggest particular life approaches. For convenience, Figure 2 lists all primals the PI-99 measures, presents the structure we found across studies, shows where *Safe*, *Enticing*, and *Alive* fit, and displays their histograms.

Future Directions

With primals reasonably well-measured and their influence plausible but undemonstrated, many important and fascinating questions follow. For example, cognitive therapy aims to equip clients to argue against automatic thoughts such as *my colleague is out to get me* (Beck, 1979). However, if primals like *the world is competitive* feed such thoughts, it may be more effective to target the underling primal than the symptomatic belief. For wellbeing and basic research purposes, we see eight areas as most urgent:

1. Clinical Psychology—Which primals contribute to which disorders? Can altering primals help? Can cognitive therapies be improved by addressing primals more directly?
2. Personality Psychology—When primals change, does personality change? Do traits like optimism drive PI-99 scores or does *Good* drive optimism?
3. Developmental Psychology—Where do primals come from? When do they emerge? How do they vary over a lifetime? How do environmental conditions shape them?
4. Social Psychology—How do primals impact familial and work relationships? Are primals self-sustaining? Are primals self-fulfilling? Are primals contagious?
5. Positive Psychology—Are certain primals preconditions for certain character strengths? Can we increase wellbeing aspects like meaning, and trust by altering primals?
6. Organizations—Do some work contexts, like policing, alter primals over time? Which primals engender success or failure? Do teams with diverse primals perform better?
7. Politics—To what extent are various political views grounded in primals? Is political persuasion more likely when underlying primals are addressed directly?
8. Culture and Groups—Do primals differ across cultures and explain any group differences? Could understanding the primals of out-groups facilitate conflict resolution?

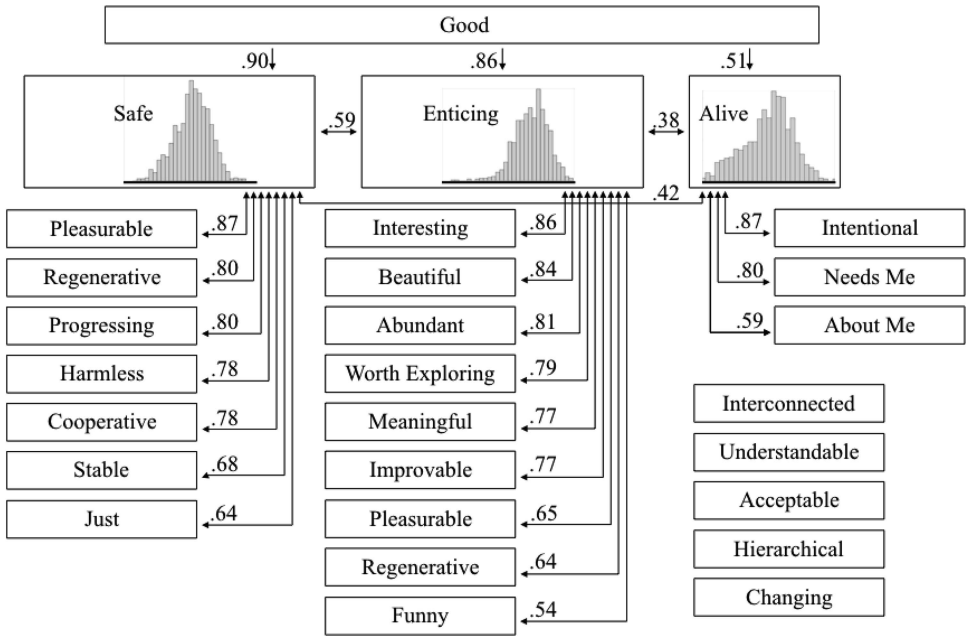

Figure 2. Primals' basic structure with Study 1 (N = 930) relationships and select histograms. Note five tertiary primals are largely independent; this is not a strictly hierarchical model.

Conclusion

Primals have been historically understudied. In this article, we sought to chart all major primals and produce a psychometrically strong measure. Rather than assuming those who share our planet share our primals, we can use the Primals Inventory to see the world from the perspective of others in order to better understand their actions. Thus far, our use of the PI-99 suggests primals vary from person to person, are stable, and are highly predictive of numerous behaviors. One explanation that deserves further investigation is that, broadly speaking, human action may not express *who* we are so much as *where* we think we are and much of what we become in life—much joy and suffering—may depend on the sort of world we think this is.

References

American Film Institute. (1998). *AFI's 100 greatest American movies of all time*. Retrieved from www.afi.com/100years/movies.aspx

American Movie Classics. (2015). *All time box office top 100*. Retrieved from www.filmsite.org/boxoffice.html

Antony, M. M., Bieling, P. J., Cox, B. J., Enns, M. W., & Swinson, R. P. (1998). Psychometric properties of the 42-item and 21-item versions of the Depression Anxiety Stress Scales in clinical groups and a community sample. *Psychological Assessment, 10,* 176–181. http://dx.doi.org/10.1037/1040-3590.10.2.176

Baird, F. E., & Kaufmann, W. A. (Eds.). (2000). *Philosophic classics: From Plato to Derrida* (4th ed.). Upper Saddle River, NJ: Prentice Hall.

Beck, A. T. (1979). *Cognitive therapy and the emotional disorders*. New York, NY: Penguin.

Blei, D. M., Ng, A. Y., & Jordan, M. I. (2003). Latent dirichlet allocation. *Journal of Machine Learning Research, 3,* 993–1022.

Butler, J., & Kern, M. L. (2016). The PERMA-Profiler: A brief multidimensional measure of flourishing. *International Journal of Wellbeing, 6,* 1–48. http://dx.doi.org/10.5502/ijw.v6i3.526

Chen, G., Gully, S. M., & Eden, D. (2001). Validation of a new general self-efficacy scale. *Organizational Research Methods, 4,* 62–83. http://dx.doi.org/10.1177/109442810141004

Chen, S. X., Lam, B. C. P., Wu, W. C. H., Ng, J. C., Buchtel, E. E., Guan, Y., & Deng, H. (2016). Do people's world views matter? The why and how. *Journal of Personality and Social Psychology, 110,* 743–765. http://dx.doi.org/10.1037/pspp0000061

Conley, J. (1984). The hierarchy of consistency. *Personality and Individual Differences, 5,* 11–25. http://dx.doi.org/10.1016/0191-8869(84)90133-8

Cuddy, A. J., Fiske, S. T., & Glick, P. (2008). Warmth and competence as universal dimensions of social perception: The stereotype content model and the BIAS map. *Advances in Experimental Social Psychology, 40,* 61–149. http://dx.doi.org/10.1016/S0065-2601(07)00002-0

Diener, E., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The Satisfaction With Life Scale. *Journal of Personality Assessment, 49,* 71–75. http://dx.doi.org/10.1207/s15327752jpa4901_13

Duckitt, J. (2001). A dual-process cognitive-motivational theory of ideology and prejudice. *Advances in Experimental Social Psychology, 33,* 41–113. http://dx.doi.org/10.1016/S0065-2601(01)80004-6

Duckitt, J., Wagner, C., du Plessis, I., & Birum, I. (2002). The psychological bases of ideology and prejudice: Testing a dual process model. *Journal of Personality and Social Psychology, 83,* 75–93. http://dx.doi.org/10.1037/0022-3514.83.1.75

Duckworth, A. L., & Quinn, P. D. (2009). Development and validation of the short grit scale (grit-s). *Journal of Personality Assessment, 91,* 166–174. http://dx.doi.org/10.1080/00223890802634290

Dweck, C. S. (2008). Can personality be changed? The role of beliefs in personality and change. *Current Directions in Psychological Science, 17,* 391–394. http://dx.doi.org/10.1111/j.1467-8721.2008.00612.x

Dweck, C. S. (2017). From needs to goals and representations: Foundations for a unified theory of motivation, personality, and development. *Psychological Review, 124,* 689–719. http://dx.doi.org/10.1037/rev0000082

Dweck, C. S., Chiu, C. Y., & Hong, Y. Y. (1995). Implicit theories and their role in judgments and reactions: A world from two perspectives. *Psychological Inquiry, 6,* 267–285. http://dx.doi.org/10.1207/s15327965pli0604_1

Eberhardt, J. L., Goff, P. A., Purdie, V. J., & Davies, P. G. (2004). Seeing black: Race, crime, and visual processing. *Journal of Personality and Social Psychology, 87,* 876–893. http://dx.doi.org/10.1037/0022-3514.87.6.876

Eysenck, H. J. (1963). Biological basis of personality. *Nature, 199,* 1031–1034. http://dx.doi.org/10.1038/1991031a0

Fetzer Institute. (1999). *Multidimensional measurement of religiousness/spirituality for use in health research*. Kalamazoo, MI: John E. Fetzer Institute.

Floyd, F. J., & Widaman, K. F. (1995). Factor analysis in the development and refinement of clinical assessment instruments. *Psychological Assessment, 7,* 286–299. http://dx.doi.org/10.1037/1040-3590.7.3.286

Friedman, J., Hastie, T., & Tibshirani, R. (2010). Regularization paths for generalized linear models via coordinate descent. *Journal of Statistical Software, 33,* 1–22. http://dx.doi.org/10.18637/jss.v033.i01

George, L. S., & Park, C. L. (2017). The Multidimensional Existential Meaning Scale: A tripartite approach to measuring meaning. *The Journal of Positive Psychology, 12,* 613–627. http://dx.doi.org/10.1080/17439760.2016.1209546

Goldberg, L. R. (2006). Doing it all bass-ackwards: The development of hierarchical factor structures from the top down. *Journal of Research in Personality, 40,* 347–358. http://dx.doi.org/10.1016/j.jrp.2006.01.001

Hardy, G. (2014). *Sacred texts of the world*. Retrieved from www.thegreatcourses.com

Harvey, P., Madison, K., Martinko, M., Crook, T. R., & Crook, T. A. (2014). Attribution theory in the organizational sciences: The road traveled and the path ahead. *The Academy of Management Perspectives, 28,* 128–146. http://dx.doi.org/10.5465/amp.2012.0175

Hicks, L. E. (1970). Some properties of ipsative, normative and forced-choice normative measures. *Psychological Bulletin, 74,* 167–184. http://dx.doi.org/10.1037/h0029780

Hofmann, S. G., Asnaani, A., Vonk, I. J. J., Sawyer, A. T., & Fang, A. (2012). The efficacy of cognitive behavioral therapy: A review of meta-analyses. *Cognitive Therapy and Research, 36,* 427–440. http://dx.doi.org/10.1007/s10608-012-9476-1

Hood, R. W., Jr., & Morris, R. J. (1983). Toward a theory of death transcendence. *Journal for the Scientific Study of Religion, 22,* 353–365. http://dx.doi.org/10.2307/1385773

Hunt, S. M., & Bhopal, R. (2004). Self report in clinical and epidemiological studies with non-English speakers: The challenge of language and culture. *Journal of Epidemiology and Community Health, 58,* 618–622. http://dx.doi.org/10.1136/jech.2003.010074

Li, A. Z., & Sipps, G. J. (1985). Cross-validation of a short form of the Marlowe-Crowne Social Desirability Scale. *Journal of Clinical Psychology, 41,* 236–238. http://dx.doi.org/10.1002/1097-4679(198503)41:2<236::AID-JCLP2270410217>3.0.CO;2-H

Janoff-Bulman, R. (1989). Assumptive worlds and the stress of traumatic events: Applications of the schema construct. *Social Cognition, 7,* 113–136. http://dx.doi.org/10.1521/soco.1989.7.2.113

John, O. P., Donahue, E. M., & Kentle, R. L. (1991). *The Big Five Inventory—Versions 4a and 54*. Berkeley: University of California, Institute of Personality and Social Research.

Jonason, P. K., & Webster, G. D. (2010). The dirty dozen: A concise measure of the dark triad. *Psychological Assessment, 22,* 420–432. http://dx.doi.org/10.1037/a0019265

Kahneman, D., & Frederick, S. (2002). Representativeness revisited: At-

tribute substitution in intuitive judgment. In T. Gilovich, D. Griffin, & D. Kahneman (Eds.), *Heuristics of Intuitive judgment: Extensions and applications* (pp. 49–81). New York, NY: Cambridge University Press.

Kashdan, T. B., Gallagher, M. W., Silvia, P. J., Winterstein, B. P., Breen, W. E., Terhar, D., & Steger, M. F. (2009). The Curiosity and Exploration Inventory-II. Development, factor structure, and psychometrics. *Journal of Research in Personality, 43,* 987–998. http://dx.doi.org/10.1016/j.jrp.2009.04.011

Kelley, H. H. (1967). Attribution theory in social psychology. *Nebraska Symposium on Motivation, 15,* 192–238.

Kirk, G. S., Raven, J. E., & Schofield, M. (2011). *The Presocratic philosophers: A critical history with a selection of texts* (2nd ed.). Cambridge, England: Cambridge Press.

Kishton, J. M., & Widaman, K. F. (1994). Unidimensional versus domain representative parceling of questionnaire items: An empirical example. *Educational and Psychological Measurement, 54,* 757–765. http://dx.doi.org/10.1177/0013164494054003022

Koltko-Rivera, M. E. (2004). Psychology of worldviews. *Review of General Psychology, 8,* 3–58. http://dx.doi.org/10.1037/1089-2680.8.1.3

Lerner, M. J. (1980). *The belief in a just world*. New York, NY: Plenum Press. http://dx.doi.org/10.1007/978-1-4899-0448-5

Lipkus, I. (1991). The construction and preliminary validation of a global belief in a just world scale and the exploratory analysis of the multidimensional belief in a just world scale. *Personality and Individual Differences, 12,* 1171–1178. http://dx.doi.org/10.1016/0191-8869(91)90081-L

Lipkusa, I. M., Dalbert, C., & Siegler, I. C. (1996). The importance of distinguishing the belief in a just world for self versus for others: Implications for psychological well-being. *Personality and Social Psychology Bulletin, 22,* 666–677. http://dx.doi.org/10.1177/0146167296227002

Lucas, S. E., & Medhurst, M. J. (2008). *Words of a century: The top 100 American speeches, 1900–1999*. Oxford, England: Oxford University Press.

Magill, F. N., & Roth, J. K. (1991). *Masterpieces of world philosophy*. New York, NY: Harper Collins.

Mayer, F. S., & Frantz, C. M. (2004). The connectedness to nature scale: A measure of individuals' feeling in community with nature. *Journal of Environmental Psychology, 24,* 503–515. http://dx.doi.org/10.1016/j.jenvp.2004.10.001

McCullough, M. E., Emmons, R. A., & Tsang, J. A. (2002). The grateful disposition: A conceptual and empirical topography. *Journal of Personality and Social Psychology, 82,* 112–127. http://dx.doi.org/10.1037/0022-3514.82.1.112

McNamara, J. M., Green, R. F., & Olsson, O. (2006). Bayes' theorem and its applications in animal behaviour. *Oikos, 112,* 243–251. http://dx.doi.org/10.1111/j.0030-1299.2006.14228.x

Miller, S. L., Zielaskowski, K., & Plant, E. A. (2012). The basis of shooter biases: Beyond cultural stereotypes. *Personality and Social Psychology Bulletin, 38,* 1358–1366. http://dx.doi.org/10.1177/0146167212450516

Murray, D. R., & Schaller, M. (2012). Threat(s) and conformity deconstructed: Perceived threat of infectious disease and its implications for conformist attitudes and behavior. *European Journal of Social Psychology, 42,* 180–188. http://dx.doi.org/10.1002/ejsp.863

Naugle, D. K. (2002). *Worldview: The history of a concept*. New York, NY: Eerdmans Publishing.

Norwegian Book Club. (2002). *Library of world literature*. Retrieved from www.bokklubben.no

Paolacci, G., & Chandler, J. (2014). Inside the Turk: Understanding Mechanical Turk as a participant pool. *Current Directions in Psychological Science, 23,* 184–188. http://dx.doi.org/10.1177/0963721414531598

Parks, A. C., Della Porta, M. D., Pierce, R. S., Zilca, R., & Lyubomirsky, S. (2012). Pursuing happiness in everyday life: The characteristics and behaviors of online happiness seekers. *Emotion, 12,* 1222–1234. http://dx.doi.org/10.1037/a0028587

Pearlin, L. I., & Schooler, C. (1978). The structure of coping. *Journal of Health and Social Behavior, 19,* 2–21. http://dx.doi.org/10.2307/2136319

Perry, R., Sibley, C. G., & Duckitt, J. (2013). Dangerous and competitive worldviews: A meta-analysis of their associations with Social Dominance Orientation and Right-Wing Authoritarianism. *Journal of Research in Personality, 47,* 116–127. http://dx.doi.org/10.1016/j.jrp.2012.10.004

Peterson, C., & Park, N. (2009). Classifying and measuring strengths of character. In S. J. Lopez & C. R. Snyder (Eds.), *Oxford handbook of positive psychology* (2nd ed., pp. 25–33). New York, NY: Oxford University Press.

Pew Research Center. (2012). *The global religious landscape*. Retrieved from www.pewforum.org/2012/12/18/global-religious-landscape-exec/

Pew Research Center. (2015). *America's changing religious landscape*. Retrieved from www.pewforum.org/2015/05/12/americas-changing-religious-landscape/

Raftery, A. E. (1995). Bayesian model selection. *Sociological Methodology, 25,* 111–163. http://dx.doi.org/10.2307/271063

Rauthmann, J. F., Gallardo-Pujol, D., Guillaume, E. M., Todd, E., Nave, C. S., Sherman, R. A., . . . Funder, D. C. (2014). The Situational Eight DIAMONDS: A taxonomy of major dimensions of situation characteristics. *Journal of Personality and Social Psychology, 107,* 677–718. http://dx.doi.org/10.1037/a0037250

Ross, L. (1977). The intuitive psychologist and his shortcomings: Distortions in the attribution process. *Advances in Experimental Social Psychology, 10,* 173–220. http://dx.doi.org/10.1016/S0065-2601(08)60357-3

Rubin, Z., & Peplau, L. A. (1975). Who believes in a just world? *Journal of Social Issues, 31,* 65–89.

Russell, B. (1945). *A history of western philosophy*. New York, NY: Simon & Schuster.

Schaller, M., Park, J., & Faulkner, J. (2003). Prehistoric dangers and contemporary prejudices. *European Review of Social Psychology, 14,* 105–137. http://dx.doi.org/10.1080/10463280340000036

Schaller, M., Park, J. H., & Mueller, A. (2003). Fear of the dark: Interactive effects of beliefs about danger and ambient darkness on ethnic stereotypes. *Personality and Social Psychology Bulletin, 29,* 637–649. http://dx.doi.org/10.1177/0146167203029005008

Scheier, M. F., Carver, C. S., & Bridges, M. W. (1994). Distinguishing optimism from neuroticism (and trait anxiety, self-mastery, and self-esteem): A reevaluation of the Life Orientation Test. *Journal of Personality and Social Psychology, 67,* 1063–1078. http://dx.doi.org/10.1037/0022-3514.67.6.1063

Schreiber, J. B., Nora, A., Stage, F. K., Barlow, E. A., & King, J. (2006). Reporting structural equation modeling and confirmatory factor analysis results: A review. *The Journal of Educational Research, 99,* 323–338. http://dx.doi.org/10.3200/JOER.99.6.323-338

Shikibu, M. (1976). *The tale of Genji* (E. Seidensticker, Trans.). New York, NY: Knopf.

Spunt, R. P., & Adolphs, R. (2015). Folk explanations of behavior: A specialized use of a domain-general mechanism. *Psychological Science, 26,* 724–736. http://dx.doi.org/10.1177/0956797615569002

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology, 54,* 1063–1070. http://dx.doi.org/10.1037/0022-3514.54.6.1063

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