

PERSONALITY PROCESSES AND INDIVIDUAL DIFFERENCES

Why Do People Believe in a “True Self”? The Role of Essentialist Reasoning About Personal Identity and the Self

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Why do many people come to believe that they and others have a *true self*? We hypothesized that this belief emerges because people routinely rely on essentialist reasoning to understand personal identity and the self. Across eight studies, we found that (a) the features that participants attributed to the true self resembled the features typically attributed to essences (e.g., immutability, informativeness, inherence; Studies 1–4); (b) endorsement of belief in true selves correlated with endorsement of other essentialist beliefs (Study 5); and (c) experimental manipulations of essentialist beliefs in domains other than the self spilled over and affected participants' endorsement of belief in true selves (Studies 6–8). These findings advance theory on the origins and functions of beliefs about the true self, suggesting that these beliefs are, in part, a specific downstream consequence of the broader tendency to explain phenomena in the world in terms of underlying essences.

Keywords: identity, lay theories, psychological essentialism, self-concept, true self

Psychological essentialism is the widespread tendency to assume that various entities have a fundamental reality or true nature (i.e., an *essence*; Gelman, 2003). The majority of research on essentialism has examined people's reasoning about the essences of *kinds* of things—the idea that members of certain categories, such as bears, trees, extroverts, and so forth, all share certain internal features that make them what they are. In the present studies, we consider the possibility that essentialism also influences how people reason about individual identity. Specifically, we propose that people rely on essentialism when thinking about what makes an individual (including themselves) who they are and that, as a result, people come to believe that each individual has an underlying true nature, colloquially labeled the *true self*. In other words, we claim that essentialist reasoning contributes to the emergence of a key element of the causal-explanatory frameworks with which people make sense of the social world: namely, the belief that a true self exists within each person.

The current studies tested a series of specific predictions derived from this overarching hypothesis (see Table 1). From the claim

that belief in true selves develops in part via essentialist reasoning, we derived predictions about how people should conceive of the nature of the true self, as well as about the circumstances under which people should endorse the existence of true selves more or less strongly. Specifically, we predicted (a) that people should assume that true selves (both their own and in general) are similar in nature to other perceived essences (Studies 1–4), (b) that endorsement of belief in true selves should be empirically associated with endorsement of other essentialist beliefs (Study 5), and (c) that experimental manipulations of participants' endorsement of other essentialist beliefs should affect their endorsement of belief in true selves (Studies 6–8). As detailed below, the results of the present studies were consistent with these predictions, thereby providing support for the proposal that motivated them: namely, that essentialist reasoning contributes to the emergence of the belief that true selves exist.

To clarify our terminology, we use the term *belief in true selves* as shorthand for the belief that the true self is an ontologically real entity present in each individual. In contrast, when we talk about people's beliefs about the *nature* of the true self, we intend to refer to the specific features that people attribute to the true self (e.g., immutability).

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Data, materials, and additional information about this research are publicly available on the Open Science Framework at <https://osf.io/zw98f/>. A preregistration for a direct replication of Study 8 can also be found on OSF at <https://osf.io/s62fh/>.

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Psychological Essentialism: A Prevalent Intuitive Explanatory Strategy

People tend to assume that a range of categories are defined by deep, causally powerful properties—that is, essences (Gelman, 2003). This essentialist assumption, which is present across cultures (e.g., Gelman, 2003; Dar-Nimrod & Heine, 2011), applies not just to biological categories (such as animal species; Springer

Table 1
The Overarching Hypothesis and Six Empirical Predictions That Follow From It

HYPOTHESIS: The belief that a true self exists within each person emerges in part because people apply essentialist reasoning to personal identity and the self.

1. Predictions about the presumed nature of true selves: Within-subject approach

Prediction 1.1: The features that participants attribute to true selves, whether their own (Studies 1, 2, and 4) or true selves in general (Study 3), should resemble the features typically attributed to essences, such as immutability (Studies 1 and 2), as well as discreteness, informativeness, inherence, consistency, and biological nature (Studies 3 and 4).

Prediction 1.2: The features that participants attribute to true selves should resemble the features typically attributed to essences more strongly than the features that participants attribute to comparison self-concepts (namely, actual selves; Studies 2 and 4).

2. Predictions about the presumed existence of true selves: Individual-differences approach

Prediction 2.1: Participants' endorsement of belief in true selves and of essentialist beliefs about the self (i.e., self-essentialist beliefs) should each correlate with their endorsement of essentialist beliefs in other domains (e.g., social groups; Study 5).

Prediction 2.2: Participants' endorsement of belief in true selves should correlate with participants' endorsement of essentialist beliefs about the self (i.e., self-essentialist beliefs). This correlation should be stronger than the two sets of correlations tested under Prediction 2.1 (Study 5).

3. Predictions about the presumed existence of true selves: Experimental approach

Prediction 3.1: Experimental manipulations of participants' endorsement of essentialist beliefs in other domains (e.g., personality or gender) should affect their endorsement of essentialist beliefs about the self (i.e., self-essentialist beliefs; Studies 6 and 7).

Prediction 3.2: Experimental manipulations of participants' endorsement of essentialist beliefs in other domains (e.g., gender or race) should affect their endorsement of belief in true selves (Studies 7 and 8).

Note. As clarified in the main text, we use the term *belief in true selves* to refer to the belief that the true self is an ontologically real entity present in each individual. In contrast, when we talk about the *nature* of the true self, we intend to refer to the specific features that people attribute to the true self (e.g., immutability). Finally, *self-essentialist beliefs* are beliefs about the self that are essentialist in character even though they do not reference the true self per se. Bold text indicates the principal hypothesis and each major subset of predictions.

& Keil, 1989) but also to social groups (such as gender and race; Haslam, Rothschild, & Ernst, 2000; Williams & Eberhardt, 2008). To hold an essentialist conception of gender, for example, is to conceive of gender as tracking a natural, biological distinction that separates humans into fundamentally different kinds of people. Membership in an essentialized category is perceived as highly informative about individual category members. Knowing that a person is a man, for instance, is commonly used as a basis for inferences about that person's personality, interests, and likely behavior—the types of qualities that are seen as following from the essence of manhood. At the same time, an essentialist folk understanding of this category may be relatively vague and unspecified, simply amounting to the conviction that there is some deep, nonobvious internal property shared by all men. This internal *something* is fundamental to being a man, and explains the observable features and behavior of men and their apparent differences from nonmen. As this example illustrates, essentialism is a broad explanatory strategy that results in a distinctive conceptual structure—namely, one in which concepts are organized around assumed essential properties.

Essentialism is cross-culturally prevalent, with Henrich, Heine, and Norenzayan (2010) acknowledging it as one of a small number of psychological phenomena with a robust evidence base outside of WEIRD (Western, Educated, Industrialized, Rich, and Democratic) populations. For example, essentialist beliefs regarding personality (e.g., the belief that the recipient of an organ transplant might acquire some of the donor's personality traits) were endorsed in both American and Indian samples (Meyer, Leslie, Gelman, & Stilwell, 2013). Evidence of essentialist thinking has even been found in more traditional, small-scale societies such as the Vevo of Madagascar (Astuti, 2001; Astuti, Solomon, & Carey, 2004) and the Menominee nation of Wisconsin (Waxman, Medin, & Ross, 2007). Although cultural forces no doubt influence conceptual development (e.g., Waxman et al., 2007; Chandler, 2000), this evidence implies that essentialism is a universal tendency of human cognition.

Although essentialism is an intuitive explanatory strategy (e.g., Salomon & Cimpian, 2014), it is important to note that the accuracy of essentialist folk beliefs is questionable. Essentialist reasoning allows people to *feel like* they understand the structure of the world. Still, the benefits of essentialism to one's subjective sense of understanding do not guarantee accuracy. Throughout intellectual history, philosophical and scientific theories have shifted away from essentialism in many domains (e.g., Ereshefsky, 2017; Richardson, 2013; Stubblefield, 1995; Zack, 2014), whereas folk beliefs have not kept pace. Thus, although essentialist belief-formation processes may have some psychological benefits for the individual, they by no means result in perfectly accurate representations of reality. We now review some of the evidence on people's beliefs about the true self, with an eye toward highlighting their similarity to the essentialist beliefs described above.

A Brief Overview of the Literature on True Selves

An emerging literature is documenting the folk psychology of the *true self*, which refers to a person's authentic identity. The folk concept of true selves is implicit in everyday talk about “who you *really are*,” “being yourself,” and “finding yourself.” These phrases imply the existence of a fundamental component of a person's identity that defines them as an individual. In other words, these colloquialisms suggest that who someone is as a whole is understood to revolve around a central core of identity-conferring properties. Indeed, imagery depicting a core-like entity expanding within the bounds of a larger entity activates feelings of authenticity (Landau et al., 2011), implying that people may actually cognitively represent the true self in this manner. These phrases also reflect an understanding of the true self as deep and thus potentially nonobvious (but knowable in principle). A person's behavior in a given moment may or may not be a direct expression of who they really are, and people may have to undergo

some process of self-discovery to find their true selves (for more in-depth discussions of the true self as a psychological construct, see Schlegel & Hicks, 2011; Strohminger, Knobe, & Newman, 2017; and De Freitas, Cikara, Grossmann, & Schlegel, 2017).

The literature on true-self beliefs has also shown that these beliefs are widespread and psychologically consequential. For example, people tend to strongly agree that true selves are “real” (Schlegel, Vess, & Arndt, 2012) and should be followed when making major life decisions (Schlegel, Hicks, Davis, Hirsch, & Smith, 2013). These beliefs also have downstream consequences for well-being. For example, Schlegel and colleagues have consistently found that simply feeling you *know* your true self predicts the experience of meaning in life (Schlegel, Hicks, Arndt, & King, 2009; Schlegel, Hicks, King, & Arndt, 2011; Schlegel et al., 2012) and greater satisfaction with one’s decisions (Schlegel et al., 2013). Consistent with these findings, research on the related construct of *authenticity* (i.e., feeling like you know and express your true self; Kernis & Goldman, 2006; Wood, Linley, Maltby, Baliousis, & Joseph, 2008) has revealed strong positive associations between self-reported authenticity and well-being (e.g., Bettencourt & Sheldon, 2001; Heppner et al., 2008; Kernis & Goldman, 2006; Sheldon, Ryan, Rawsthorne, & Iardi, 1997; see also Rivera, Christy, Kim, Vess, Hicks, & Schlegel, 2019).

The literature on the true self has made substantial progress in understanding how people make judgments about their own and others’ true selves, and in elucidating some of the consequences of these beliefs. However, the literature to date has not interrogated the *origins* of these beliefs. Given the evidence that beliefs about the true self are widespread and consequential, it is important to understand how they arise. Addressing this question may shed light on how and why beliefs about the true self function as they do, which has implications both for basic questions about the nature of the self-concept, and for more applied questions about how these beliefs might be harnessed to promote well-being.

Our Proposal: Conceptual and Empirical Considerations

Here, we advance the hypothesis that people come to believe that they and others possess a true self in part as a result of engaging in essentialist reasoning about personal identity and the self. At a conceptual level, the belief in true selves seem essentialist almost by definition. The idea of true selves entails, at a minimum, that people possess some properties that are more fundamental or essential to their identity than others. Philosophically, this may be all that is needed to characterize belief in true selves as an essentialist viewpoint (Robertson & Atkins, 2018). However, the mere fact that beliefs about the true self fit the definition of essentialist beliefs is not sufficient grounds to claim that essentialist reasoning *gives rise* to these beliefs; in principle, the similarity between essentialist beliefs and beliefs about the true self could be coincidental. The present studies were designed to directly test our empirical claim about the causal role of essentialist reasoning in the emergence of belief in true selves. Before laying out our empirical strategy in more detail, we review prior findings that are consistent with the current hypothesis.

Essentialist Reasoning Is Applied to Individuals as Well, Not Just Kinds

Although much of the essentialism literature has focused on how people reason about categories, some evidence suggests that essentialism may extend to reasoning about individual entities as well. For example, Kashima et al. (2005) found that individual identity is generally perceived as consistent and stable (both important features of essentialist reasoning), even in cultures with a more communal orientation. Further, Haslam, Bastian, and Bissett (2004) found that people endorse essentialist conceptions of many personality traits, regarding these traits as innate, stable dispositions that distinguish between fundamentally different kinds of people (e.g., introverts vs. extraverts). Further, those traits regarded as most essence-like were also judged to be more defining of individual identity, suggesting a potential link between essentialism about kind-level and individual-level identities. For example, if the trait of *compassion* is understood in an essentialist fashion as defining a distinct kind of person, Haslam et al.’s findings indicate that possession of this trait (i.e., membership in the category “compassionate people”) will tend to be seen as a fundamental and defining feature of each compassionate person’s identity as well.

This evidence suggests that essentialist reasoning extends to how people conceive of individuals as well. Because the true self is a feature of an individual, not a category, this evidence is broadly consistent with the present hypothesis that people come to believe that a true self exists within each person in part because they apply essentialist reasoning to personal identity and the self.

Beliefs About the Nature of the True Self Resemble Beliefs About the Nature of Essences

There are several clues in the recent literature on the true self suggesting that people attribute to the true self many of the features they attribute to essences. For instance, people seem to believe that a person *discovers* their true self rather than creating it (Schlegel et al., 2012; see also Bench, Schlegel, Davis, & Vess, 2015). Conceiving of the true self as preexisting entity that must be discovered closely parallels essentialist understandings of natural kinds as having a nonobvious internal basis.

Similarly, private internal states (e.g., thoughts and feelings) are regarded as more useful for knowing what a person is “really like” than information about overt behavior (Andersen & Ross, 1984; see also Johnson, Robinson, & Mitchell, 2004). In fact, the true self is often represented via the metaphor of a core-like entity inside a larger container (Lakoff & Johnson, 1999; Moser, 2007; Landau et al., 2011). The assumption that the true self is internal to the person parallels findings from the essentialism literature—people typically locate essential properties inside the entities in question (e.g., Gelman & Wellman, 1991).

In another parallel with the broader essentialism literature, people seem to employ beliefs about the true self in an explanatory fashion. For example, adolescents begin to distinguish between true and false selves to explain the sometimes radical changes they observe in their own behavior across different contexts (e.g., Ullman, 1987). Relatedly, Chandler and colleagues (Chandler, 2000; Chandler, Lalonde, Sokol, & Hallett, 2003) report evidence that the notion of an essential, enduring self is used in Western

cultures specifically to explain discrepancies in behavior over the life span in a way that preserves the continuity of personal identity. This evidence illustrates how people rely on true selves to explain and make sense of experiences in psychologically consequential ways (see also Newman, De Freitas, & Knobe, 2015).

Note, however, that beliefs about the true self are not an exclusively Western phenomenon. In fact, another point of correspondence between the literatures on beliefs about the true self and essentialist beliefs is the emerging evidence that beliefs about the true self are cross-culturally prevalent (e.g., De Freitas et al., 2018; Kim, Rivera, Schlegel, & Hicks, 2019; see also Kashima et al., 2005). For instance, there is a substantial level of cross-cultural agreement not just that true selves exist but also that people ought to follow them when making important decisions (Kim et al., 2019). Indeed, the current hypothesis implies that the cross-cultural prevalence of beliefs about the true self is at least partially explained by the prevalence of essentialism.

Overview of Specific Predictions

Stated succinctly, our hypothesis is that *people develop a belief that there exists a true self within each person in part because they apply essentialist reasoning to personal identity and the self*. From this overarching hypothesis, we derived six specific predictions that can be grouped into three conceptually related pairs (see Table 1 for the full list). The first pair of predictions concern people's beliefs about the *nature* of true selves: Do people attribute similar features to true selves as they do to other essences (Predictions 1.1 and 1.2)? The second and third pair of predictions concern the extent to which people endorse a belief in the *existence* of true selves (i.e., in their ontological reality). Does endorsement of belief in true selves correlate with endorsement of other essentialist beliefs, including about the self (Predictions 2.1 and 2.2)? Moreover, do experimental manipulations of participants' endorsement of essentialist beliefs in other domains affect their endorsement of essentialist beliefs about the self, as well as their belief in the existence of true selves per se (Predictions 3.1 and 3.2)? We now go on to unpack these three pairs of predictions.

Predictions 1.1 and 1.2 rest on the following logic: If the belief that a true self exists within each person emerges partly because people apply essentialist reasoning to personal identity and the self, then some of the same features that people attribute to essences should also be attributed to true selves. In other words, people's beliefs about the nature of the true self should resemble their beliefs about the nature of essences. Observing this similarity is a basic requirement of our hypothesis that belief in true selves emerges because people apply essentialist reasoning to make sense of individual identity and the self. An additional implication is that the features that people attribute to the true self should resemble those of essences more strongly than the features that people attribute to other self-concepts—for example, the actual or behavioral self (i.e., how one actually behaves in daily life; Prediction 1.2).

The four remaining predictions concern the extent to which participants endorse a belief in the true self (i.e., endorse the belief that the true self is an ontologically real entity present in each individual). The two pairs of predictions within this set differ mainly in their methodological approach: Predictions 2.1 and 2.2 rely on an individual-differences approach, whereas Predictions 3.1 and 3.2 rely on an experimental approach.

Although essentialism is a widespread cognitive tendency, there are still meaningful individual differences in the degree to which people rely on it (e.g., Haslam et al., 2000; Salomon & Cimpian, 2014). If belief in true selves is a product of essentialist reasoning about identity and the self, then we should see that endorsement of essentialist beliefs in other domains (which are also a product of essentialist reasoning) correlates with endorsement of belief in the true self (e.g., “Every person has a true self”; Prediction 2.1). Another facet of this prediction is that endorsement of essentialist beliefs in other domains should also correlate with endorsement of beliefs about the self that are essentialist in character even though they do not reference the true self per se (e.g., “I have certain basic characteristics that define my identity”). We term these *self-essentialist beliefs*. Finally, if belief in true selves is a product of essentialist reasoning about identity and the self, then endorsement of belief in true selves should correlate with endorsement of self-essentialist beliefs. In fact, the relationship between belief in true selves and self-essentialist beliefs should be stronger than either of these variables' independent relationships with essentialist beliefs in other domains (Prediction 2.2).

The last pair of predictions (Predictions 3.1 and 3.2) also concern participants' endorsement of belief in true selves, but focus more specifically on the hypothesized *causal* link between essentialist reasoning and endorsement of this belief. Prediction 3.1 concerns the claim that essentialist reasoning is applied to identity and the self: If this domain is amenable to essentialist reasoning, then experimental manipulations of essentialist beliefs in other domains may spill over and affect endorsement of essentialist beliefs about the self (i.e., self-essentialist beliefs). Prediction 3.1 is important because it tests whether there is a common reasoning process that leads people to arrive at essentialist beliefs across different domains (as would be expected with the type of process-oriented hypothesis under investigation). Finally, Prediction 3.2 extends this logic to belief in true selves per se. Specifically, this prediction is that experimental manipulations of essentialist beliefs in other domains will affect participants' endorsement of belief in true selves (i.e., the belief that true selves are ontologically real entities present in all individuals).

We used a variety of methodological approaches across eight studies to test these predictions, triangulating on the idea that belief in true selves emerge as a stable part of people's conceptual repertoire in part because people apply essentialist reasoning to identity and the self. To enable other researchers to build on this work, we have made the materials and data sets for all studies publicly available on the Open Science Framework (OSF): <https://osf.io/zw98f/>.

Studies 1A and 1B: Are True Selves Perceived as Immutable?

If belief in true selves emerges as a result of applying essentialist reasoning to identity and the self, true selves should display the features typically attributed to essences. Studies 1A and 1B tested the prediction that, like other essences (e.g., Haslam et al., 2000; Haslam et al., 2004), true selves are thought to be immutable (Prediction 1.1, Table 1). To test this prediction, we asked participants to rate the extent to which a variety of personal characteristics were components of their true selves. Participants then imagined their lives 30 years in the future (Study 1A) or in a different period of history (Study 1B) and rated the extent to which these characteristics were likely to stay the

same. We expected that the degree to which a characteristic was a part of the true self would positively predict the judged likelihood of that characteristic remaining unchanged in the future or in an alternative historical period.

Method

Studies 1A and 1B, and all subsequent studies, were conducted with the approval of the Institutional Review Board at Texas A&M University. These studies were run under protocol 2013-0742D, “Well-Being and Beliefs About Human Nature, Self, and World.”

Participants. Participants in Study 1A were 156 undergraduate students at Texas A&M University (52 men, 102 women, 2 not reporting gender) who participated in the study for partial completion of course requirements for an introductory psychology course. Ages in the sample ranged from 18 to 22 ($M = 18.67$, $SD = .91$). The sample was primarily White (78.4%).

In Study 1B, participants were 170 undergraduate students at Texas A&M University (109 female, 61 male). Ages in the sample ranged from 18 to 24 ($M = 18.86$, $SD = 1.18$). Most participants in the Study 1B sample identified as White (74.7%).

Unless otherwise noted in a study’s Method section, sample sizes were determined heuristically, with the goal of meeting or exceeding a certain minimum sample size. The minimum sample sizes sought were informed by the design of each study. For the within-subjects studies (Studies 1–4), a minimum sample size of 100 was sought. For the between-subjects correlational studies (Studies 5A and 5B), a minimum sample size of 200 was sought. For the between-subjects experimental studies (Studies 6–8), the largest sample attainable was sought. Target sample sizes were sought within the constraints imposed by the semester schedule (for studies involving undergraduate samples) and by limits on available monetary resources for participant payments (for studies involving online samples).

Materials and procedure. Across all studies, materials were administered using Qualtrics web-based survey software. Participants completed the study on computers in private cubicles (except in studies using Mechanical Turk samples; see below). The order in which materials are described reflects the order in which they were completed.

True-self ratings. Participants in both studies were asked to indicate the extent to which 40 personal characteristics were part of their own true self. The characteristics were derived from prior research on essentialism (Haslam et al., 2004) and personal identity (Strohinger & Nichols, 2014) and included moral character (e.g., “empathy for the suffering of others”), personality traits (e.g., “shyness”), knowledge and memories (e.g., “traumatic memories”), desires and preferences (e.g., “enjoyment of blues music”), and basic cognitive and perceptual capacities (e.g., “color vision”). The full list of characteristics is available in the materials on OSF. Participants indicated their agreement with two separate statements for each characteristic. One of these items (adapted from Haslam et al., 2004) was, “This characteristic is a central aspect of my identity—it defines who I really am.” The other item was a face-valid statement developed by the authors (“This characteristic is important for defining my true self”). Responses were made on a 7-point scale (1 = *Strongly Disagree*, 7 = *Strongly Agree*; $r_{1A} =$

.86, $p_{1A} < .001$, $r_{1B} = .78$, $p_{1B} < .001$) and were averaged within each trait ($M_{1A} = 4.52$, $SD_{1A} = .51$, $M_{1B} = 4.63$, $SD_{1B} = .47$).

“Life in the Future” (Study 1A) and “Alternative Historical Period” (Study 1B) reflection task. Next, participants were instructed to engage in a “creative hypothetical reflection exercise.” In Study 1A, participants were asked to think realistically about what their lives might be like 30 years in the future (see Appendix A for the full prompts). In Study 1B, participants were asked to imagine they had lived in a different period of history. They were free to choose the specific period and were encouraged to be creative. Participants in both studies were asked to think about the topic for two minutes, and the study did not advance to a new screen until two minutes had elapsed. On the next screen, participants were asked to write a short story about what their lives might be like in the scenario they had been imagining (i.e., 30 years from now in Study 1A and the chosen alternative historical period in Study 1B). The button to advance to the next screen did not become active until three minutes had elapsed, and participants were encouraged to spend at least that long on the writing task.

Immutability ratings. Following the reflection task, participants completed 40 items corresponding to the personal characteristics for which they had provided true-self ratings. In Study 1A, these items asked, “Thirty years from now, how likely is it that you will be exactly as [characteristic] as you are now?” In Study 1B, these items asked, “If you had lived in a different historical period, how likely is it that you would be exactly as [characteristic] as you are now?” Responses were made on a 7-point scale (1 = *Very Unlikely*, 7 = *Very Likely*; $M_{1A} = 4.57$, $SD_{1A} = .78$, $M_{1B} = 4.20$, $SD_{1B} = .81$).

Additional measures. Across all studies, participants completed exploratory measures that are tangential to our hypotheses and will not be discussed in the current report (e.g., the Meaning in Life Questionnaire [Steger, Frazier, Oishi, & Kaler, 2006], the Authenticity Scale [Wood et al., 2008]). After completing these measures, participants were debriefed on-screen and informed that they were free to leave.

Results and Discussion

Study 1A. To assess within-person relationships between true-self and immutability ratings for each characteristic, we conducted hierarchical linear modeling using HLM7 software (Raudenbush, Bryk, Cheong, Congdon, & du Toit, 2011). This multilevel modeling technique accounts for the lack of independence among repeated within-person observations. Two levels were included in this analysis. Level 1 represented the ratings of each of the 40 characteristics nested within individuals, and Level 2 represented differences between individuals. Of the 156 participants, 153 had data that was sufficiently complete to be included in HLM analyses (i.e., they had composite scores on all variables included in the model). All predictors were group-mean centered to control for between-person differences in mean levels of the variables (Bryk & Raudenbush, 1992; Fleeson, 2007). No Level-2 predictors were included in these models. Following guidelines from Rosenthal, Rosnow, and Rubin (2000), we used the obtained t and df to calculate effect size r coefficients.

First, we estimated an unconditional model (with no predictors) to calculate the intraclass correlation coefficient (e.g., Snijders & Bosker, 1999). According to this model, approximately 5% of the variance in stability ratings was at Level 2 (between individuals),

whereas approximately 95% of the variance was at Level 1 (within individuals, between characteristics). These results indicate that different participants' average immutability ratings were largely similar to one another, but that individual participants' ratings varied widely across the 40 characteristics.

We next estimated a model using restricted maximum likelihood estimation, including participants' true-self ratings as predictors of immutability ratings for each characteristic. Both the intercept and the slope were estimated as random effects (by subject). Results of this model revealed a significant positive relationship between true-self and immutability ratings ($\beta = .15$, $SE = .02$, $t = 8.89$, $p < .001$, $r = .58$, 95% CI [.56, .60]), such that characteristics regarded as parts of the true self were seen as more likely to be stable into the future, on average. The estimate of the variance component for this slope was statistically significant ($SD = .13$, $\chi^2 = 255.25$, $p < .001$), indicating that individuals differed in the extent to which they ascribed immutability to the content of their true selves.

These results are consistent with the prediction that the features people attribute to the true self resemble the features they attribute to essences (Prediction 1.1). Immutability is a core feature of essences, and the results of Study 1A suggest that this feature also characterizes how people conceive of (their own) true selves.

Study 1B. As in Study 1A, HLM was used to estimate the average within-person relationship between true-self ratings and immutability ratings across the 40 personal characteristics. Of the 170 original participants, 169 had data that were sufficiently complete to be included in HLM analyses. An unconditional model indicated that approximately 14% of the variance in stability ratings was found at Level 2, whereas the remaining 86% was found within persons at Level 1.

As in Study 1A, we observed a positive relationship between true-self ratings and immutability ratings ($\beta = .12$, $SE = .02$, $t = 7.27$, $p < .001$, $r = .49$, 95% CI [.47, .51]). Also mirroring Study 1A, a statistically significant variance component for this slope ($SD = .12$, $\chi^2 = 256.07$, $p < .001$) indicated the presence of meaningful individual differences in ascription of immutability to the true self.

These results provide converging support for the claim that people's beliefs about the nature of true selves are similar to their beliefs about the nature of essences (Prediction 1.1, Table 1). The more a characteristic was tied to the true self, the more likely participants were to think that it wouldn't change in the future (Study 1A) and that it would have been the same even if they lived in a different historical period (Study 1B). Mirroring reasoning about other essences, people tend to believe (their own) true selves will remain the same, even across fairly radical changes in context. Essences are assumed to be immutable over time and across situations, and—as these data suggest—so are true selves.

Study 2: Are True Selves Perceived as More Immutable Than Other Selves?

The results of Studies 1A and 1B leave open the question of whether the true self is any more essence-like than other self-concepts. Although the relationships observed in Studies 1A and 1B suggest that the more a characteristic is tied to the true self, the more it is perceived as immutable, it is in principle possible that the same relationship would be observed for all self-descriptive characteristics, whether or not they are specifically regarded as part of the *true* self. As such, in Study 2 we introduced the *actual* self, or how one actually

behaves in daily life, as a standard of comparison for the true self. The actual self has been used as a comparison for the true self in a number of prior investigations (e.g., Bargh, McKenna, & Fitzsimons, 2002; Schlegel et al., 2009), and it is useful in this capacity because statements about it are readily understandable and because it has no necessary relationship to the true self (i.e., a person's true self and actual self may overlap to a high degree, or not at all). We expected that the features attributed to true selves will be more similar to those typical of essences than the features attributed to actual selves (Prediction 1.2, Table 1).

In addition, this study required participants to consider whether the characteristics of their true and actual selves were present 10 years in the past, providing a test of whether the true self is perceived as immutable in retrospection as well as in prospecting (Study 1A) and counterfactual reflection (Study 1B). Thus, Study 2 also provides an additional test of Prediction 1.1 (i.e., that people perceive their own true selves as immutable, like essences) with a different approach. Although people's reports about what they were like in the past may be grounded in reality to a greater extent than prospecting and counterfactual reasoning, there is ample evidence that autobiographical memories are susceptible to bias and motivated reasoning and thus often inaccurate (e.g., Conway & Pleydell-Pearce, 2000; Sanitioso, Kunda, & Fong, 1990; Kennedy, Mather, & Carstensen, 2004; Wilson & Ross, 2003). As such, it is likely that participants' reports of the characteristics they possessed in the past will be informed by their implicit theories about the nature of (true) selves, rather than simply being veridical recollections of the characteristics they actually possessed. We predicted that true-self characteristics would be perceived as having been present in the past to a greater extent than actual-self characteristics, which would support Prediction 1.2 (see Table 1).

Method

Participants. Participants were 153 American adults (83 women, 70 men) recruited from Amazon's Mechanical Turk platform (MTurk; Buhrmester, Kwang, & Gosling, 2011). The sample was mainly White (81.7%), and ages ranged from 18 to 72 ($M = 33.72$, $SD = 11.92$). Each participant received a \$1.75 payment.

Materials and procedure.

Self-descriptor listing task. Participants were asked to list 10 words describing their true self and 10 words describing their actual self. Participants were provided the following definitions for true and actual selves, respectively: "Your true self is who you really are at the most basic level or at the 'core.' It is who you really are even if you aren't able to express this self in all your daily activities," and "Your actual self is how you actually behave in daily life, even if you sometimes do things that aren't representative of who you really are."

"Life in the Past" reflection task. After completing the trait-listing task, participants were asked to spend two minutes thinking about what their lives had been like 10 years ago. They were encouraged to recall this time in their life as accurately as possible (see Appendix A for the full prompt). As in Study 1, this 2-min reflection period was followed by a period of no less than three minutes in which participants wrote about the same topic.

Immutability ratings. After the reflection task, participants were asked to rate the extent to which each of the true-self and actual-self characteristics they had previously listed had been

present in them 10 years ago on a 7-point scale (1 = *Not present at all*, 7 = *Fully present*). They were instructed to use their current levels of each trait as a reference point, such that a response of “fully present” reflects a level comparable to one’s current level of the trait in question. Finally, participants completed exploratory measures and demographic items before being debriefed and given their MTurk completion codes.

Results and Discussion

Primary analysis: Are true selves more immutable than actual selves? A paired-samples *t* test was conducted to compare participants’ immutability ratings for their true-self and actual-self characteristics. This analysis revealed a difference approaching statistical significance, such that true-self characteristics ($M = 5.32$, $SD = 1.12$) were rated as having been present 10 years ago to a greater extent than actual-self characteristics ($M = 5.13$, $SD = 1.24$), $t(152) = 1.94$, $p = .054$, $d = .16$, 95% CI $[-.003, .32]$. While this result did not meet conventional significance criteria, the direction of the difference was consistent with our hypothesis. Further, given that people’s true and actual selves tend to overlap to some extent (e.g., Schlegel et al., 2009; Sheldon & Gunz, 2009; and see the supplemental results on OSF), comparing these two self-concepts was a relatively conservative test of the idea that the true self exhibits more features of essences than the actual self. It is also possible that, because participants’ current levels of the characteristics in question were used as the standard for judging that a characteristic was fully present in the past, this may have truncated some of the variability in past-self ratings since participants were not able to indicate if they felt a trait was *more* evident in the past than in the present.

Additional exploratory analyses: Moderation by similarity between true and actual self. To account for potential overlap between participants’ descriptions of their true and actual selves, two coders divided the lists into three categories reflecting low ($n = 26$), moderate ($n = 61$), or high ($n = 66$) degrees of overlap (average measures ICC = .68, indicating satisfactory reliability between coders [Fleiss, 1986]; all discrepancies resolved by the first and second authors). This categorical variable was entered as a between-subjects factor in a mixed ANOVA, with self-concept (true vs. actual) entered as a within-subject factor and immutability ratings as the dependent measure.

This analysis revealed main effects of both self-concept, $F(1, 150) = 11.83$, $p = .001$, partial $\eta^2 = .07$, 90% CI $[.02, .15]$, and of true-self/actual-self similarity, $F(2, 150) = 5.98$, $p = .003$, partial $\eta^2 = .07$, 90% CI $[.02, .14]$, such that the true self was rated as more immutable than the actual self, and immutability ratings were higher among participants whose true and actual selves were more similar, respectively. However, these effects were qualified by a significant interaction between self-concept and true-self/actual-self similarity, $F(2, 150) = 7.96$, $p = .001$, partial $\eta^2 = .10$, 90% CI $[.03, .17]$ (see Figure S1 in the additional results on OSF for a plot of this interaction). Bonferroni-adjusted tests indicated that the simple effect of self-concept was statistically significant at low levels of overlap ($M_{\text{difference}} = 1.01$, $p < .001$) but not at moderate ($M_{\text{difference}} = .10$, $p = .489$) or high ($M_{\text{difference}} = .05$, $p = .727$) levels of overlap.

This interaction suggests that true selves are more like essences than actual selves are (consistent with Prediction 1.2, Table 1), pro-

vided these two selves are relatively distinct in a perceiver’s mind. In cases where the true self and actual self share more content, the two concepts are equally similar to essences (at least in terms of their perceived immutability). These cases might be instances of authenticity, where people feel that they are able to express their true selves in their everyday behavior. In these cases, it is probably still the true self that drives the ascription of immutability to the actual self. That is, the actual self is judged to be immutable in these cases because it is a direct expression of the true self.

Study 3: Beyond Immutability: Do True Selves Display Other Features of Essences?

The first two studies suggest that people tend to regard (their own) true selves as relatively immutable (Prediction 1.1) and as more immutable than their actual selves (Prediction 1.2). However, immutability is only one feature of essences. In Study 3, we broadened our focus to include a total of six features of essences, following Haslam et al.’s (2004) studies on essentialist beliefs about personality traits. Specifically, in addition to immutability, this study focused on *discreteness* (i.e., possession of the essence is seen as an all-or-nothing affair; either one has it or one does not), *informativeness* (i.e., seeing the essence as having inductive utility to predict and explain behavior), *consistency* (i.e., the belief that the essence will be expressed similarly over time and across situations), *inherence* (i.e., seeing the essence as a deep, foundational aspect of personhood), and *biological basis* (i.e., understanding the essence as being rooted in a person’s biological nature).

Study 3 also departed from Studies 1 and 2 in that items were phrased to refer to true selves in general, rather than to participants’ own true selves. This allowed us to examine whether features of essences are attributed to the general idea of the true self. Evidence for this prediction would suggest that belief in true selves is not attributable to egocentric motivations to conceive of one’s *own* identity in certain ways (e.g., as immutable; Quoidbach, Gilbert, & Wilson, 2013).

We predicted that the extent to which people perceive a given characteristic as central to true selves (in general) will covary with the extent to which they perceive that characteristic to exhibit the six features of essences. For example, if a participant believes shyness is important for defining a person’s true self, that participant should also perceive shyness as immutable, discrete, informative, consistent, inherent, and biologically based (Prediction 1.1).

Method

Participants. Participants were 124 undergraduates at Texas A&M University (60 women, 63 men, one not reporting gender). Ages ranged from 18 to 23 ($M = 19.16$, $SD = .99$). The sample was predominantly White (74.2%).

Materials and procedure.

Ratings for the six features of essences. Participants were first presented with a series of 40 personal characteristics, largely identical to those presented in Studies 1 and 2 (see the supplemental materials on OSF). Each characteristic was presented in bold text at the top of the page, followed by a series of items. The items were adapted from Haslam et al. (2004) and assessed one of the six previously described features of essences:

1. *Immutability*: “It is easy to change this characteristic; it is not a fixed attribute of the person” (reverse-coded, $M = 3.94$, $SD = 1.78$).
2. *Discreteness*: “People either have this characteristic or they do not, and those that do have it are a distinct kind of person” ($M = 5.07$, $SD = 1.56$).
3. *Informativeness*: “This characteristic has broad ramifications; it influences people’s behavior in a wide variety of situations and in many aspects of their lives” ($M = 5.42$, $SD = 1.32$).
4. *Consistency*: “People who have this characteristic will tend to display it in a consistent manner, showing it in different situations and with different people” ($M = 5.40$, $SD = 1.29$).
5. *Inherence*: “This characteristic is a deeply-rooted part of the personality; it lies deep within the person and underlies the person’s behavior” ($M = 4.85$, $SD = 1.54$).
6. *Biological Basis*: “To what extent is this characteristic based on a person’s biological or genetic make-up?” ($M = 33.64$, $SD = 30.15$).

All items had a 7-point response scale (1 = *Strongly disagree*, 7 = *Strongly agree*), with the exception of the Biological Basis item, which required participants to estimate a percentage value between 0% and 100%. These six dimensions were the primary predictors in our analyses.

True-self ratings. Two items similar to those used in Studies 1 and 2 were included to assess the extent to which each characteristic was regarded as part of true selves in general (“This characteristic is a central aspect of a person’s identity; if you have it, it defines who you really are” and “This characteristic is important for defining a person’s true self”). Responses to both items were made on a 7-point scale (1 = *Strongly disagree*, 7 = *Strongly agree*), and the two items, $r = .79$, $p < .001$, were averaged ($M = 4.41$, $SD = 1.58$).

Finally, participants completed exploratory measures and demographic items prior to being debriefed.

Results and Discussion

As in Studies 1A and 1B, we used HLM to estimate the average within-person relationships between ratings of the extent to which each characteristic was part of the true self and the extent to which it possessed the six features of essences. No Level-2 predictors were included in any of the models we estimated. First, an unconditional model revealed that 18% of the variance in true-self ratings was at Level 2 (between-persons), with the remaining 82% at Level 1 (within-person, between characteristics).

Given the high multicollinearity among the essence-feature ratings (all but one of the bivariate correlations were significant, with r s ranging from .01 to .60, average $r = .25$), we ran a series of six separate models using restricted maximum likelihood estimation to calculate the average within-person relationship between ratings of centrality to the true self and of similarity to each feature of essences.¹ In each of these models, the true-self rating was entered

as an outcome variable, and the rating for one of the six features of essences (centered within persons) was entered as a predictor. Beta coefficients and t and p values for these analyses are presented in Table 2.

In general, results were consistent with Prediction 1.1—significant positive relationships were observed between the extent to which characteristics (e.g., shyness) were rated as being part of a person’s true self and the extent to which these characteristics were thought to possess five out of the six features of essences.² The exception was the biological basis dimension. This null finding raises the interesting possibility that the true self may not be perceived to be a biological essence. However, we should also note that the relationship between true-self ratings and biological-basis ratings may have been underestimated as a result of the inclusion of basic perceptual faculties (namely, color vision, sense of smell, and the ability to feel pain) among the 40 personal characteristics. On average, participants regarded these characteristics as highly biologically based ($M = 79.6\%$), but did not regard them as particularly important to the true self ($M = 3.26$). As such, we reran the HLM models excluding the data for these three basic faculties. In this modified data set, there was a significant positive relationship between biological-basis ratings and true-self ratings, $\beta = .011$, $SE = .001$, $t = 7.80$, $p < .001$, $r = .59$, 95% CI [.57, .61].³ This exploratory finding indicates that, when it comes to more complex psychological characteristics such as personality traits, characteristics thought to be part the true self may be seen as more biologically based as well.

¹ We also computed a model using restricted maximum likelihood estimation in which ratings on all six features of essences were entered simultaneously as predictors of true-self ratings. In this model, ratings of all six features were significantly related to true-self ratings. Four of these relationships were in the predicted direction, with greater similarity to essences (specifically, on the discreteness, informativeness, consistency, and inherence features) predicting higher true-self ratings. However, relationships were opposite to predictions for the immutability and biological basis features; both of these features exhibited a weak negative relationship with true-self ratings in the simultaneous model. Given the multicollinearity between the predictors in this model, caution is warranted in interpreting these results. A table including the beta coefficients, t and p values, and effect size r coefficients for this analysis is available on OSF, as are the raw HLM output files.

² The estimated variance components for the slopes between true-self ratings and each feature of essences were statistically significant in each of the separate HLM models (SD s $> .01$, χ^2 s > 280.95 , $ps < .001$), indicating the presence of meaningful individual differences in the extent to which these features are ascribed to the true self. These estimates virtually all remained statistically significant in the simultaneous model mentioned in Footnote 1, and in the separate and simultaneous models after the removal of the basic cognitive/perceptual faculties from the data (see Footnote 3). The one exception to this was the variance component for the biological-basis feature in the simultaneous model with the basic faculties removed, which was non-significant ($SD = .004$, $\chi^2 = 138.38$, $p = .121$). See the HLM output files on OSF for each model’s exact variance component estimates.

³ The effect sizes for the remaining features of essences were remarkably similar across both analyses (with and without the three basic faculties), with one exception: The effect size for immutability in the model excluding basic faculties was also notably larger than in the model including all characteristics, $\beta = .15$, $SE = .022$, $t = 6.62$, $p < .001$, $r = .51$, 95% CI [.49, .53]. In addition, a simultaneous model including all predictors in one analysis (analogous to the model described in Footnote 1) revealed significant positive relationships for four of the features of essences (discreteness, informativeness, consistency, inherence), a non-significant positive relationship for biological basis, and a nonsignificant negative relationship for immutability (tables and outputs for all these analyses are available on OSF).

Table 2
Predicting Centrality to the True Self on the Basis of Similarity to Essences Along Six Dimensions

Essence feature	β	t	p	r [95% CI]
Immutability	.04	2.09	.039	.19 [.16, .22]
Discreteness	.35	12.19	<.001	.74 [.73, .75]
Consistency	.54	21.10	<.001	.89 [.89, .90]
Informativeness	.59	25.18	<.001	.92 [.92, .92]
Inherence	.72	39.72	<.001	.96 [.96, .96]
Biological basis	-.0004	-.31	.758	.00003 [-.03, .03]

In summary, Study 3 goes beyond Studies 1 and 2, which focused just on immutability, and suggests that people attribute *multiple* features of essences to the true self (in general). Specifically, the characteristics that people see as part of a person's true self tend to also be perceived as immutable, discrete, informative, consistent, inherent, and (perhaps) biologically based. In addition, whereas Studies 1 and 2 examined participants' conceptions of their own true selves, Study 3 examined the general concept of true selves, in the abstract. As such, the results of the present study suggest that this more general conception of the nature of true selves also resembles the beliefs that people have about the nature of essences.

Study 4: Comparing the True Self and the Actual Self With Respect to the Six Features of Essences

In Study 4, we compared the extent to which the six features of essences examined in Study 3 are attributed to the true and actual self. We expected that participants will judge the true self to be more similar in nature to an essence (i.e., more likely to display the six features of essences) than the actual self (Prediction 1.2, Table 1).

Method

Participants. Participants were 121 adults (65 women, 56 men) recruited from MTurk and paid \$1.50 each. The sample was largely White (77.7%) and ranged in age from 18 to 69 years ($M = 33.99$, $SD = 11.42$).

Materials and procedure.

Self-descriptor listing task. Participants completed the same listing task used in Study 2, in which they generated two 10-word lists describing their true self and actual self.

Ratings for the six features of essences. In the next part of the study, participants rated the 20 self-descriptors with respect to the six features of essences examined in Study 3. However, the original items were modified to refer to participants' own selves (e.g., for Immutability: "It would be easy to change this characteristic—it is not a fixed attribute of myself;" reverse-coded). Responses to all items were recorded on a 7-point scale (1 = *Strongly disagree*, 7 = *Strongly agree*) with the exception of the Biological Basis item, which required participants to estimate a percentage value between 0% and 100%. Each of the 20 participant-generated descriptors was displayed at the top of its own page, followed by the six features of essences. Descriptors were presented in a randomized order. After completing these ratings, participants completed several other exploratory measures and demographic items before being debriefed.

Results and Discussion

Primary analysis: Do true selves resemble essences more than actual selves? A multivariate analysis of variance (MANOVA) was conducted, with self-concept (actual vs. true) as a within-subject factor and the ratings of whether the self-descriptors exhibited each of the six features of essences as the dependent measures. Results of this analysis are presented in Table 3. A significant omnibus effect of self-concept was observed, $F(6, 115) = 10.78$, $p < .001$, partial $\eta^2 = .36$, 90% CI [.22, .43], such that the descriptors listed for the true self received higher ratings across the six features of essences than did the descriptors listed for the actual self.

Univariate tests revealed that the true-self descriptors were more similar to essences than the actual-self descriptors for five of the six features investigated (Immutability, Discreteness, Informativeness, Inherence, and Biological Basis), $F_s(1, 120) > 7.27$, $ps < .008$, partial η^2 s $> .05$. Results for Consistency did not meet conventional significance criteria, $F(1, 120) = 3.37$, $p = .069$, partial $\eta^2 = .03$, 90% CI [.00, .09], but this difference was also in the predicted direction.

Additional exploratory analyses: Moderation by similarity between true and actual self. As in Study 2, we examined the possibility that these effects were moderated by the degree of similarity between participants' true and actual selves. Following the same coding scheme, 45 participants were classified as *low similarity*, 43 as *moderate similarity*, and 33 as *high similarity* (average measures ICC = .73; all discrepancies between coders resolved by the first and second authors). This categorical variable was entered as a between-subjects factor in a mixed MANOVA, with self-concept (true vs. actual) entered as a within-subject factor

Table 3
Comparing the True Self to the Actual Self Along Six Dimensions of Perceived Similarity to Essences

Essence feature	F	p	AS mean	TS mean	Cohen's d [95% CI]
Immutability	24.17	<.001	4.38	4.76	.45 [.26, .63]
Discreteness	18.83	<.001	4.62	4.94	.39 [.21, .58]
Consistency	3.37	.069	5.13	5.28	.17 [-.01, .35]
Informativeness	7.27	.008	5.45	5.59	.25 [.06, .43]
Inherence	57.75	<.001	4.95	5.57	.69 [.49, .89]
Biological basis	16.82	<.001	35.51	40.16	.37 [.19, .56]

and the self-descriptor ratings for the six features of essences as dependent measures.

The results of this analysis suggest that the true self was more similar to an essence than the actual self among participants with lower (vs. higher) levels of true-self/actual-self similarity, $F(12, 228) = 3.19, p < .001$, partial $\eta^2 = .14$, 90% CI [.04, .17] (for full results, see OSF). This omnibus interaction effect was driven by significant interactions for two of the six features of essences (namely, Discreteness and Inherence; the interaction was trending toward significance for Biological Basis as well). In addition, we observed an omnibus main effect of true-self/actual-self similarity, $F(12, 228) = 4.14, p < .001$, partial $\eta^2 = .18$, 90% CI [.07, .21]. Participants whose true and actual selves were more (vs. less) similar had higher ratings overall (averaged across both selves) for all features of essences save one (Consistency). These main effects are similar to the effect observed in Study 2; as discussed previously, these differences may arise because individuals with greater true-self/actual-self similarity regard the actual self as a direct expression of their true self, leading them to judge their actual self as similar to an essence as well.

In summary, the results of the present study suggest that the true self is assumed to resemble an essence more strongly than the actual self is (Prediction 1.2, Table 1). More generally, Studies 1–4 illustrate that people ascribe many of the same features to the true self that they do to essences; concepts of both one's own true self and true selves in general resemble how people conceive of essences in important ways (Prediction 1.1, Table 1).

Although these findings are broadly consistent with our hypothesis that belief in true selves emerges via essentialist reasoning, showing that the presumed nature of true selves *resemble* essences provides only indirect evidence for this hypothesis. In the remaining studies, we tested several predictions that follow more directly from it. Specifically, we examined (a) whether individual differences in belief in true selves are associated with individual differences in endorsement of essentialist beliefs in other domains, as well as endorsement of self-essentialist beliefs (Studies 5A and 5B; Predictions 2.1 and 2.2) and (b) whether experimental manipulations of essentialist beliefs in other domains can affect endorsement of self-essentialist beliefs and belief in true selves (Studies 6–8; Predictions 3.1 and 3.2).

Studies 5A and 5B: Correlations Between Belief in True Selves and Endorsement of Essentialist Beliefs in Other Domains

Although psychological essentialism is often conceptualized as a universal cognitive tendency, prior work has demonstrated that an individual-differences approach to essentialism is viable (e.g., Haslam et al., 2000; Kalish, 2002; Bastian & Haslam, 2006; Plaks, Malahy, Sedlins, & Shoda, 2012; Salomon & Cimpian, 2014). If belief in true selves results from the application of essentialist reasoning to personal identity and the self, individuals scoring higher on various indices of essentialist thinking should also be more likely to believe in true selves (e.g., “Every person has a true self”) and endorse beliefs about the self that are essentialist in character even though they do not reference the true self per se (i.e., self-essentialist beliefs; e.g., “The things that make me who I am are unlikely ever to change”; Prediction 2.1). We might also predict that the relationship between participants' belief in true

selves and self-essentialist beliefs should be stronger than either of these variables' relationships with essentialism-related measures about other domains (Prediction 2.2). These predictions were tested in two samples using a cross-sectional correlational design. Participants in both samples completed a number of essentialism-related individual-difference measures, as well as two critical measures designed to tap endorsement of self-essentialist beliefs and belief in true selves.

Method

Participants. For Study 5A, participants were 223 undergraduate students (147 women, 74 men, one transgender man, one not reporting gender) enrolled at Texas A&M University, who completed the study in exchange for course credit. Ages in the Study 5A sample ranged from 18 to 23 ($M_{\text{age}} = 18.91, SD = .94$), and most participants were White (57.4%).

For Study 5B, participants were 321 American adults recruited from MTurk (157 women, 142 men, one transgender man, one transgender woman, one gender nonconforming, 19 not reporting gender), who were paid \$1.00 each to complete the study. Ages in the Study 5B sample ranged from 18 to 74 ($M_{\text{age}} = 34.26, SD = 11.45$), and most participants were White (80.4%).

Materials and procedure. Participants completed several questionnaire measures, administered via Qualtrics. The measures administered in Study 5A and 5B were largely similar (all materials can be seen on OSF). In this report, we only discuss the measures that are relevant to the current investigation; other measures were included either for exploratory purposes or to test unrelated hypotheses. The order of all measures was randomized in both studies.⁴ Unless otherwise specified, all variables were measured on 7-point response scales (1 = *Strongly disagree*, 7 = *Strongly agree*), and composite scores for all variables were computed by averaging across the individual item scores after reverse-coding appropriate items.

Belief in true selves. Participants completed a 7-item scale assessing their belief in the ontological reality of true selves (BTS; see Appendix B for the full scale). Some of these items have been used in prior research (e.g., “The true self is real”; Schlegel et al., 2012), and the rest were developed by the authors as face-valid expressions of belief in true selves (e.g., “There is no such thing as a ‘true self’ that makes people who they are” [reverse-coded]; $M_{5A} = 5.52, SD_{5A} = 0.92, \alpha_{5A} = 0.91$; $M_{5B} = 5.24, SD_{5B} = 1.19, \alpha_{5B} = 0.93$).

Self-essentialist beliefs. Essentialist beliefs about the self were assessed with a 10-item⁵ self-essentialist beliefs scale (SEB; see Appendix B). Whereas the BTS scale explicitly referred to “true selves” and directly asked participants about their existence, the SEB scale was designed to assess beliefs about personal identity and the self that reflect the characteristic features of

⁴ Because of an error in how the randomizer function was set up in Study 5B, one set of measures was omitted at random from the survey administered to each participant. Thus, the number of participants who completed each measure varies, and the number of participants included in analyses is always less than the full sample size.

⁵ Study 5A included a preliminary pool of 39 self-essentialism items, which was refined through factor analysis to yield the final 10-item version of the scale. Results reported for Studies 5A and 5B use the refined 10-item scale.

essentialism identified previously (i.e., immutability, discreteness, inherence, informativeness, consistency, and biological basis; $M_{5A} = 5.38$, $SD_{5A} = 0.73$, $\alpha_{5A} = 0.81$; $M_{5B} = 5.15$, $SD_{5B} = 1.06$, $\alpha_{5B} = 0.90$). Although the statements making up the SEB scale might be thought to entail the existence of true selves, it is not a measure of beliefs in true selves per se. This measure may best be thought of as reflecting the kind of essentialist understandings of identity and the self that we hypothesize *contribute* to the belief in true selves, but it is possible that an individual might endorse these statements while still denying the existence of true selves when asked explicitly.

Inherence heuristic scale. A tendency to explain observed patterns in the world in terms of intrinsic properties (thought to be a cognitive precursor to essentialism) was assessed using the 15-item Inherence Heuristic Scale (IHS; Salomon & Cimpian, 2014; see also Cimpian & Salomon, 2014; Cimpian & Steinberg, 2014). Participants indicated their degree of agreement with various inherence-based explanatory statements (e.g., “It seems natural to use red in a traffic light to mean ‘stop’”) on a 9-point scale (1 = *Disagree strongly*, 9 = *Agree strongly*; $M_{5A} = 6.25$, $SD_{5A} = 1.07$, $\alpha_{5A} = 0.83$; $M_{5B} = 5.90$, $SD_{5B} = 1.19$, $\alpha_{5B} = 0.85$).

Essentialist beliefs about human kinds. A scale adapted from Haslam et al. (2000) and Salomon and Cimpian (2014) was used to assess essentialist beliefs about various groups (namely, Asians, Catholics, girls, musicians, poor people, and shy people). Each group was rated on five dimensions, including *uniformity*, *informativeness*, *underlying reality*, *innateness*, and *stability*; each dimension was defined and participants indicated the extent to which each group displayed each dimension on a 7-point scale (1 = *not at all*, 7 = *extremely*). Scores were averaged across dimensions and groups to yield a single essentialism score ($M_{5A} = 3.84$, $SD_{5A} = 0.68$, $\alpha_{5A} = 0.83$; $M_{5B} = 3.85$, $SD_{5B} = 0.87$, $\alpha_{5B} = 0.91$).

Essentialist beliefs about personality. A measure developed by Bastian and Haslam (2006) assessed essentialist beliefs about personality—specifically, it tapped the dimensions of *discreteness* (e.g., “Everyone is either a certain type of person or they are not;” $M_{5A} = 3.64$, $SD_{5A} = 0.75$, $\alpha_{5A} = 0.68$; $M_{5B} = 3.71$, $SD_{5B} = 0.86$, $\alpha_{5B} = 0.74$), *informativeness* (e.g., “When getting to know a person it is possible to get a picture of the kind of person they are very quickly;” $M_{5A} = 4.15$, $SD_{5A} = 0.75$, $\alpha_{5A} = 0.62$; $M_{5B} = 3.99$, $SD_{5B} = 0.84$, $\alpha_{5B} = 0.68$), and *biological basis* (e.g., “The kind of person someone is can be largely attributed to their genetic inheritance;” $M_{5A} = 4.12$, $SD_{5A} = 0.96$, $\alpha_{5A} = 0.81$; $M_{5B} = 4.25$, $SD_{5B} = 1.00$, $\alpha_{5B} = 0.80$). Separate scores were computed for each dimension by averaging the corresponding items. Although the content of these items is similar to the content of the SEB scale, the personality-essentialism measure explicitly refers to *kinds* or *types* of people rather than individual-level identity per se.

Entity lay theories. The view that personal characteristics are fixed and unchanging (i.e., an *entity lay theory*; Dweck, Chiu, & Hong, 1995) was assessed using three different measures. First, an eight-item scale (Levy, Stroessner, & Dweck, 1998) assessed entity theories about personality in general (this scale was adapted by Bastian & Haslam, 2006, to index the *immutability* dimension of essentialism in addition to the three dimensions described in the preceding paragraph). Items in this scale reflected the view that personality is unchanging (e.g., “Everyone is a certain kind of person, and there is not much they can do to really change that”;

$M_{5A} = 3.60$, $SD_{5A} = 0.99$, $\alpha_{5A} = 0.86$; $M_{5B} = 3.74$, $SD_{5B} = 1.30$, $\alpha_{5B} = 0.92$). Two additional three-item scales adapted from Dweck et al. (1995) assessed entity theories about intelligence (e.g., “Your intelligence is something about you that you can’t change very much;” $M_{5A} = 3.54$, $SD_{5A} = 1.40$, $\alpha_{5A} = 0.88$; $M_{5B} = 3.87$, $SD_{5B} = 1.63$, $\alpha_{5B} = 0.93$), and about moral character (e.g., “A person’s moral character is something very basic about them and it can’t be changed much;” $M_{5A} = 3.86$, $SD_{5A} = 1.40$, $\alpha_{5A} = 0.83$; $M_{5B} = 3.95$, $SD_{5B} = 1.56$, $\alpha_{5B} = 0.88$).

Moral vitalism scale. Moral vitalism, the belief that good and evil are real forces in the world, was assessed with the five-item Moral Vitalism Scale (MVS; Bastian et al., 2015). This measure was included because it reflects an essentialist orientation toward moral concepts (i.e., understanding morality as a real, inherent feature of the world), and thus the MVS provides an index of essentialism-related beliefs that do not directly pertain to persons. Items in the MVS consist of face-valid statements espousing this view (e.g., “There are underlying forces of good and evil in the world”; $M_{5A} = 5.51$, $SD_{5A} = 1.18$, $\alpha_{5A} = 0.87$; $M_{5B} = 4.65$, $SD_{5B} = 1.69$, $\alpha_{5B} = 0.94$).

Attention checks. Given concerns about the attentiveness of online participants (e.g., Goodman, Cryder, & Cheema, 2013; Oppenheimer, Meyvis, & Davidenko, 2009), several attention-check items were embedded among the questionnaire items (seven check items were included in Study 5A and eight check items were included in Study 5B).⁶ Check items instructed participants to select a given response option (e.g., “For quality control purposes, please select *Disagree* from the responses below”); failing to select the indicated response suggests that participants are not paying attention to the item stems. Participants missing two or more of these attention checks were excluded from analyses, resulting in 15 exclusions in Study 5A (final $N = 208$) and 16 exclusions in Study 5B (final $N = 305$).

Results and Discussion

To test Prediction 2.1, we examined the bivariate correlations between the belief in true selves scale (BTS) and the self-essentialist beliefs scale (SEB), on the one hand, and the other essentialism-related measures, on the other. We first computed these correlations separately in each sample (i.e., Study 5A and 5B); then, we computed meta-analytic estimates of the relationships across the two samples using the *metafor* package (Viechtbauer, 2010) for R (R Core Team, 2017). These correlations are presented in Table 4.

Although there were instances where the BTS and SEB measures were unrelated to certain essentialism-related variables, in general both of these self-related measures were associated positively with indices of essentialism, and no significant negative relationships were observed (r s between $-.06$ and $.41$). Meta-analytic estimates collapsing across the various essentialism-related variables indicated that, overall, both the BTS and the SEB scales were positively associated with essentialism in other domains: $r^+_{BTS} = .17$, 95% CI $[.10, .23]$, $SE_{BTS} = .03$, $z_{BTS} = 4.91$, $p_{BTS} < .0001$, and $r^+_{SEB} = .23$, 95% CI $[.18, .28]$, $SE_{SEB} = .02$,

⁶ These items were not included in the previous MTurk studies reported in this article (Studies 2 and 4), and as such no participants were excluded from analyses based on this criterion in those studies.

Table 4
Correlations Between Belief in True Selves, Self-Essentialist Beliefs, and Essentialism-Related Variables (Studies 5A and 5B)

Essentialism-related variables	Study 5A (N = 208)				Study 5B				Meta-analysis of Studies 5A and 5B			
	Belief in true selves		Self-essentialist beliefs		Belief in true selves (N = 229)		Self-essentialist beliefs (N = 234)		Belief in true selves (N = 437)		Self-essentialist beliefs (N = 443)	
	r	p	r	p	r	p	r	p	r [95%CI]	p	r [95%CI]	p
Inherence heuristic	.39	<.001	.37	<.001	.41	<.001	.26	<.001	.40 [.32, .48]	<.0001	.31 [.20, .42]	<.0001
Essentialism: Human kinds	.20	.004	.30	<.001	.26	<.001	.25	<.001	.23 [.14, .32]	<.0001	.27 [.18, .36]	<.0001
Essentialism: Personality												
Discreteness	.26	<.001	.29	<.001	.24	<.001	.36	<.001	.25 [.16, .33]	<.0001	.32 [.24, .41]	<.0001
Informativeness	.09	.199	.19	.005	.09	.193	.22	.001	.09 [-.01, .18]	.066	.21 [.12, .30]	<.0001
Biological basis	.06	.379	-.02	.778	.11	.091	.18	.006	.09 [-.01, .18]	.069	.08 [-.11, .27]	.411
Entity lay theories												
Personality	.02	.795	.19	.007	.14	.039	.31	<.001	.08 [-.04, .19]	.195	.25 [.13, .36]	<.0001
Intelligence	-.02	.754	.07	.325	-.06	.341	.15	.022	-.04 [-.14, .05]	.374	.11 [.02, .20]	.018
Morality	.05	.434	.18	.009	.14	.027	.27	<.001	.10 [.003, .19]	.043	.23 [.13, .31]	<.0001
Moral vitalism	.24	.001	.26	<.001	.37	<.001	.20	.005	.31 [.17, .43]	<.0001	.23 [.14, .32]	<.0001

$z_{SEB} = 9.84$, $p_{SEB} < .0001$. These results support Prediction 2.1 (see Table 1).

Scores on the BTS scale were less consistently related to the essentialism variables about other domains than were scores on the SEB scale. Significant positive correlations (meta-analytic r s between .10 and .40) were observed between BTS scores and five of the nine essentialism-related variables (see Table 4). In addition, BTS scores had a potentially nonnegligible relationship with the informativeness and biological basis dimensions of the personality-essentialism scale (meta-analytic r s = .09), although these results did not reach statistical significance. Scores on the SEB scale were significantly related to all but one of the essentialism-related variables (meta-analytic r s between .11 and .32); the exception was the biological basis dimension of the personality-essentialism scale (see Table 4; see also Study 3). It may be that the SEB variable correlated more robustly with the other essentialism-related variables in this study because it is more proximal to general essentialist cognition than is the BTS variable, which according to our hypothesis is a specific downstream product of essentialist reasoning.

Consistent with Prediction 2.2, the correlations between scores on the BTS and SEB scales in these studies ($r_{5A} = .45$, $r_{5B} = .47$, meta-analytic $r+ = .46$) were numerically larger than all correlations between either measure and the essentialism-related variables that were not about the self. To test for statistical significance, we compared the meta-analytic correlation between BTS and SEB with the meta-analytic correlations between these two measures and each of the other essentialism-related variables using the *cocor* package for R (Diedenhofen & Musch, 2015). Results of these comparisons indicated that the meta-analytic correlation between BTS and SEB scores ($r+ = .46$) was significantly greater than 17 of the 18 meta-analytic correlations between these two variables and the nine essentialism-related variables (full output and syntax available on OSF). The one exception was the correlation between the BTS scale and the Inherence Heuristic Scale ($r+ = .40$), which was not significantly lower than the BTS scale's correlation with the SEB scale, 95% CI_{diff} [- .04, .16], avg. $p_{diff} = .217$, across the various correlation-comparison methods implemented by *cocor*.

These results suggest that endorsement of belief in true selves is closely related to endorsement of self-essentialist beliefs, but the

correlations between the BTS and the SEB scales in these samples were not so large as to suggest that the two are interchangeable. These data also cannot provide direct evidence of a causal relationship between these two variables. The remaining studies directly examined the hypothesized causal relationship between essentialist reasoning and endorsement of beliefs about the true self.

Study 6: Effects of a Personality-Based Essentialism Manipulation on Endorsement of Self-Essentialist Beliefs

The foregoing studies found evidence consistent with the first four predictions derived from our overarching hypothesis (see Predictions 1.1–2.2 in Table 1). However, thus far we have relied exclusively on correlational methods, precluding a direct demonstration of the causal influence of essentialist reasoning on the extent to which people endorse a belief in true selves. We tested this proposed causal influence experimentally in Studies 6–8. Specifically, we tested whether an experimentally induced increase (vs. decrease) in endorsement of essentialist beliefs in domains distinct from the self (e.g., personality, gender) would “spill over” and cause an analogous increase (vs. decrease) in endorsement of self-essentialist beliefs (Studies 6 and 7) and belief in true selves (Studies 7 and 8).

In Study 6, we manipulated endorsement of essentialist beliefs in a domain related to, yet distinct from, beliefs about the self—namely, personality. If our hypothesis is correct, then reinforcing (vs. undermining) essentialist beliefs about this related domain should in turn increase (vs. decrease) endorsement of essentialist beliefs about the self (Prediction 3.1, Table 1). Although this laboratory manipulation does not instantiate the temporally extended processes by which essentialist beliefs about the self initially emerge “in the wild,” it nonetheless tests the hypothesized link between essentialist reasoning and judgments about the self. The primary dependent measure in this experiment was the self-essentialist beliefs (SEB) scale used in Study 5, which assesses essentialist beliefs about the self—beliefs that are arguably formed when people apply general-purpose essentialist reasoning to the self domain. Although the beliefs tapped by the SEB measure are distinct from the belief that true selves exist, they are nevertheless

a likely part of the process by which people ultimately come to believe that there exists such a thing as a *true* self.

Method

Participants. Three hundred four adults (141 women, 150 men, three transgender men, one transgender woman, one gender nonconforming, eight not reporting; $M_{\text{age}} = 35.13$, $SD_{\text{age}} = 12.08$) were recruited from MTurk and paid \$0.85 each for participating in the study. The sample was predominantly White (72.0%).

Materials and procedure. The study was presented to participants as two unrelated studies, with the manipulation of essentialism delivered in the first (ostensibly, a study of scientific literacy) and the dependent measure collected in the second (ostensibly, a study of religious beliefs and meaning in life). The two parts of the study were programmed as separate Qualtrics surveys, with the first automatically redirecting to the second upon completion. Different themes and fonts in the two parts reinforced the idea that they were separate studies.

Manipulation of essentialist beliefs about personality. An article-based manipulation, presented to participants as a test of scientific literacy, was used to manipulate endorsement of essentialist beliefs about personality. To enhance the believability of this cover story, all participants first read and answered comprehension questions about a filler article that described the practice of bird banding, adapted from the Wikipedia article on the topic (https://en.wikipedia.org/wiki/Bird_ringing). Next, one of two critical articles was presented at random. In the high-essentialism condition, the article described genomics work that was said to have identified the genes underlying certain personality traits, whereas in the low-essentialism condition the article described genomics work that was said to have failed to find meaningful links between genes and personality. These articles were based on materials used by Williams and Eberhardt (2008; see Appendix C for full text of articles). Each article was preceded by a bogus loading screen stating that an article was being accessed from an Associated Press database.

After reading the critical article, participants completed a series of comprehension-check items. An open-ended item asked participants to explain the article in their own words, and two multiple-choice items asked participants to identify the topic and the conclusion of the article, respectively. Participants who missed one or more of these comprehension checks were excluded from subsequent analyses (see the Results section for an exclusion tally). This criterion was used in the subsequent experiments (Studies 7 and 8) as well.

Manipulation check. To assess whether the manipulation affected participants' endorsement of essentialist beliefs about personality as intended, participants completed three face-valid manipulation check items (e.g., "The kind of person someone is can be largely attributed to their genetic inheritance"; Bastian & Haslam, 2006; see Appendix C). These items were presented immediately after the critical article but were framed as questions about participants' *personal opinions* on the topics discussed in the articles they had read. Responses were recorded on a 1 (*Strongly disagree*) to 7 (*Strongly agree*) scale, and responses to the three items were averaged together to yield a final composite manipulation-check variable ($M = 3.56$, $SD = 1.39$, $\alpha = .77$).

Self-essentialist beliefs scale. The SEB scale administered in Study 5 was also used here. It consisted of 10 items reflecting

essentialist views about one's own self (e.g., "I have deeply-rooted qualities that make me who I am at a fundamental level"; see Appendix B for all items). Responses were made on a 7-point scale (1 = *Strongly disagree*, 7 = *Strongly agree*) and were averaged ($M = 5.08$, $SD = .98$, $\alpha = .91$).

Attention checks. Two types of attention checks were used in Study 6. First, we included three standard attention-check items requesting that participants select a certain response, similar to those used in Study 5. Following the same criteria applied in Study 5, we excluded participants who missed two or more of these three items. Second, we asked participants to indicate how noisy the environment in which they completed the study was. Given that the manipulation depends on participants reading and understanding articles, we anticipated that completing the study in a highly distracting environment could impair the effectiveness of the manipulation. We excluded participants who gave responses of 5 or greater on a 7-point scale. We used the 5-or-greater criterion in the subsequent experimental studies as well.⁷ In this and the subsequent experiments, participants who guessed the manipulation and the outcome variable of interest were also excluded from analyses.

Finally, participants completed additional measures included to bolster the cover story (e.g., religiousness, meaning in life) and several demographic items prior to being probed for suspicion, debriefed, and given their completion code for the study.

Results and Discussion

Of the 304 participants, 47 were excluded for missing comprehension and/or attention checks, and six were excluded for expressing suspicion about the study's hypothesis, leaving a final sample of 251 ($n = 125$ in the low-essentialism condition, $n = 126$ in the high-essentialism condition). The exclusion rate in this study (17.4%) was similar to the average rate of 15% in MTurk studies (Chandler, Mueller, & Paolacci, 2014).

Manipulation check. We conducted an independent-samples *t* test on participants' endorsement of essentialist beliefs about personality. Results indicated that the manipulation was successful: Endorsement of essentialist beliefs about personality was markedly higher in the high-essentialism condition ($M = 4.05$, $SD = 1.27$) compared with the low-essentialism condition ($M = 2.90$, $SD = 1.24$), $t(249) = 7.25$, $p < .001$, $d = .92$, 95% CI [.65, 1.17].

Self-essentialist beliefs. An independent-samples *t* test was conducted to assess differences between the conditions on the key dependent measure: endorsement of self-essentialist beliefs. Results indicated that, as predicted, self-essentialist beliefs were endorsed at significantly higher levels in the high-essentialism condition ($M = 5.30$, $SD = .86$) than in the low-essentialism condition ($M = 5.03$, $SD = 1.02$), $t(249) = 2.29$, $p = .023$, $d = .29$, 95% CI [.04, .54].

Mediation analysis. To determine whether the manipulation affected participants' endorsement of self-essentialist beliefs via the intended mechanism (i.e., by influencing their endorsement of essentialist beliefs about the related domain of personality), we conducted a mediation analysis using the PROCESS macro for

⁷ Analyses in Study 6 and the subsequent experiments were robust to the particular noise threshold applied; similar results were obtained when the cutoff was set at a value of 6 or 7.

SPSS (Hayes, 2013). Condition (low-essentialism = 0; high-essentialism = 1) was entered as the independent (X) variable; endorsement of self-essentialist beliefs was entered as the dependent (Y) variable; and the manipulation check (i.e., endorsement of essentialist beliefs about personality) was entered as the mediating (M) variable. Bias-corrected confidence intervals for the effects in this model were computed based on 5,000 bootstrapped resamples. Results of this analysis revealed a significant indirect effect of condition on participants' endorsement of self-essentialist beliefs through their endorsement of essentialist beliefs about personality, $b = .24$, $SE = .06$, bias-corrected 95% CI [.13, .38]. These results indicate that the manipulation influenced participants' self-essentialist beliefs as intended, as a spillover from participants' essentialist beliefs about personality. Although statistical tests of mediation have been advocated by some in social cognition research (Lench, Taylor, & Bench, 2014), some caution is warranted in interpreting results obtained with this approach, particularly because the mediator and the dependent measure were assessed in the same session, making it unclear which variable psychologically precedes the other (e.g., Spencer, Zanna, & Fong, 2005; Winer et al., 2016).

Study 7: Effects of a Gender-Based Essentialism Manipulation on Endorsement of Self-Essentialist Beliefs and Belief in the True Self

Study 6 provided preliminary support for the idea that boosting endorsement of essentialist beliefs in a different domain influences the degree to which people conceive of the self in an essentialist fashion (i.e., endorse self-essentialist beliefs). However, the domain in which essentialism was manipulated (i.e., personality) is conceptually related to the self. Further, the measure of self-essentialist beliefs used as the dependent variable in Study 6 is not a measure of belief in the existence of true selves per se. To address these limitations, Study 7 manipulated endorsement of essentialist beliefs about a more distal conceptual domain (namely, gender) and included measures of both self-essentialist beliefs and belief in true selves as dependent variables. These two modifications made Study 7 a more conservative test of Prediction 3.1 (that manipulating endorsement of essentialist beliefs in a different domain will influence endorsement of self-essentialist beliefs), as well as a first test of Prediction 3.2 (that manipulating endorsement of essentialist beliefs in a different domain will influence the extent to which people believe that true selves exist).

Method

Participants. Participants were 545 American adults (255 women, 275 men, 1 trans woman, four gender nonconforming, four reporting another gender identity, six not reporting gender) recruited from MTurk and paid \$1.00 for their participation. Ages in the sample ranged from 18 to 72 ($M = 35.44$, $SD = 10.77$), and the sample was primarily White (76.1%).

Materials and procedure.

Manipulation of essentialist beliefs about gender. In this study, we developed an article-based manipulation of essentialist beliefs about gender, broadly similar to the manipulation in Study 6. The key differences were the domain (i.e., personality vs. gender) and broader coverage of the multiple dimensions of es-

sentialism. Namely, instead of emphasizing the biological basis of gender categories, the manipulation we created for Study 7 emphasized their cross-cultural and temporal invariance (vs. variance in the low-essentialism condition), as well as other aspects of essentialism (e.g., discreteness, informativeness). The critical articles (see Appendix D) featured a fictitious anthropologist with expertise in the cultural anthropology of gender responding to the question of whether there is any substance to the traditional gender binary between men and women. In the high-essentialism condition, the expert stated that a distinction between men and women is a feature of all known cultures, past and present (implying the immutability and naturalness dimensions of essentialism). The high-essentialism article further suggested that the specific content ascribed to gender categories is also cross-culturally consistent (implying informativeness) and that most people can be categorized as either men or women (implying discreteness). In the low-essentialism condition, the expert stated that there is extreme cross-cultural variability in how gender is conceptualized and expressed, which suggests the man-woman binary may be less substantive than it seems (undermining gender categories' immutability, naturalness, informativeness, and discreteness).

After reading the critical article, participants completed an open-ended comprehension item and two multiple-choice comprehension check items similar to Study 6. Participants who responded incorrectly to any of these items were excluded from analyses.

Manipulation check. An eight-item measure of essentialist beliefs about gender (Rhodes & Gelman, 2009) was embedded with several other filler items ostensibly assessing participants' personal opinions on topics addressed in the articles. The items in this measure consisted of statements reflecting the view that gender categories mark natural and distinct kinds of people (e.g., "People that are the same gender have many things in common," 1 = *Strongly disagree*, 7 = *Strongly agree*; $M = 4.49$, $SD = 1.29$, $\alpha = .89$).

Self-essentialist beliefs. The SEB scale used in Studies 5 and 6 was used here. Scores on the 10 items were averaged to compute overall self-essentialism scores ($M = 5.20$, $SD = .99$, $\alpha = .91$).

Belief in true selves. A 16-item version of the BTS scale was used in this study. This version of the scale included a larger number of reverse-coded items than the version of the scale used in Study 5 (e.g., "The idea of true selves doesn't make much sense to me", 1 = *Strongly disagree*, 7 = *Strongly agree*; see Appendix B for the full scale). After reverse-scoring the appropriate items, the item scores were averaged to yield an overall scale score ($M = 4.70$, $SD = 1.20$, $\alpha = .95$).⁸

Attention checks. Four attention check items were embedded throughout the study (one in the first part of the study and three in the second part). As in Study 6, participants failing two or more of

⁸ Although the SEB and BTS scales were our primary dependent measures in this study, we also included an exploratory essay-based measure (first used by Christy, Sanders, Vess, Routledge, & Schlegel, 2017) in which participants read an essay expressing disbelief in true selves and reported their attitudes towards the essay's author. Given the dissimilarity between the essay measure and the other dependent measures, we opted not to include results for the essay measure in this report. However, the results for this measure were consistent with those observed for the BTS scale (i.e., a nonsignificant total effect of the manipulation but a significant indirect effect of the manipulation via the manipulation-check measure).

these checks were excluded from analyses, as were participants reporting excessive environmental noise.

Results and Discussion

Of the 545 participants, 54 were excluded for failing comprehension and/or attention checks and one was excluded for expressing suspicion about the study hypotheses (i.e., identifying the manipulation and the outcome variable of interest). This resulted in a final sample of 490 participants (10.1% exclusion rate; $n = 248$ in the high-essentialism condition and $n = 242$ in the low-essentialism condition).

Manipulation check. An independent-samples t test compared endorsement of essentialist beliefs about gender in the high-versus the low-essentialism conditions. Levene's test indicated that the variances were unequal between the conditions, $F(2, 488) = 9.45, p = .002$, hence the t test results are reported with adjusted degrees of freedom. Endorsement of essentialist beliefs about gender was significantly higher in the high-essentialism condition ($M = 4.86, SD = 1.16$) compared with the low-essentialism condition ($M = 4.07, SD = 1.36$), $t(473.20) = 6.98, p < .001, d = .63, 95\% CI [.45 .81]$. This indicates that the manipulation successfully influenced the targeted domain of essentialist belief.

Effects on dependent variables. A MANOVA was conducted with condition entered as a between-subjects factor and the BTS and SEB scores entered as dependent variables. The omnibus multivariate effect of condition did not reach significance, $F(2, 487) = 2.35, p = .097$, partial $\eta^2 = .01, 90\% CI [.00, .03]$. The univariate test for the BTS scale indicated no significant difference between the high-essentialism ($M = 4.78, SD = 1.17$) and low-essentialism ($M = 4.73, SD = 1.29$) conditions, $F(2, 487) = .18, p = .671, d = .04, 95\% CI [-.14, .22]$. However, a significant difference in SEB scores was observed between the high-essentialism ($M = 5.34, SD = .93$) and low-essentialism ($M = 5.16, SD = 1.06$) conditions, $F(2, 487) = 3.89, p = .048, d = .18, 95\% CI [.001, .36]$ replicating Study 6.

Mediation analysis. As in Study 6, we conducted a bootstrapped mediation analysis using the PROCESS macro for SPSS (Hayes, 2013) to test the possibility that the manipulation influenced endorsement of belief in true selves indirectly via its effects on endorsement of essentialist beliefs about gender and self-essentialist beliefs. A serial mediation model was run with a dummy-coded condition variable (0 = low-essentialism, 1 = high-essentialism) entered as the independent variable (X), and gender essentialism and SEB scores entered as sequential mediating (M) variables. BTS scores were the outcome variable (Y) in this model. Bias-corrected confidence intervals were computed based on 5,000 bootstrapped samples. Although traditional approaches to statistically testing for mediation (e.g., Baron & Kenny, 1986) required the presence of a total effect of X on Y , more recently Hayes (2009) has demonstrated that indirect effects observed in the absence of total effects may still provide meaningful evidence of a mediated causal relationship (i.e., an effect of X on Y through M). Thus, we examined indirect effects for the BTS measure even though no total effect was detected for this outcome.

Results of this model indicated a significant serial indirect effect of condition on BTS scores via essentialist beliefs about gender and self-essentialist beliefs, $b = .12, SE = .03$, bias-corrected 95% CI [.07, .19]. Thus, it seems the gender-based manipulation had a

reliable indirect effect on belief in true selves through the proposed mechanism. Although it most directly and powerfully influenced essentialist beliefs about gender, the effect appears to have extended to essentialist beliefs about the self, and via this pathway to have influenced belief in the existence of true selves. As mentioned previously, however, these results should be interpreted as suggestive rather than conclusive evidence for the hypothesized causal mechanism, given the limitations of mediation analysis on data such as these.

In summary, Study 7 yielded further evidence that manipulations of endorsement of essentialist beliefs in other domains can influence the degree to which people endorse essentialist beliefs about the self. Further, the mediation results suggested that this process may have a downstream effect on endorsement of belief in true selves. Thus, this study conceptually replicated the findings of Study 6 in support of Prediction 3.1, and provided preliminary support for Prediction 3.2 as well.

Study 8: Effects of a Race-Based Essentialism Manipulation on Endorsement of Belief in True Selves

In Study 8, we again manipulated endorsement of essentialist beliefs in a domain distant from the self—namely, race. This manipulation was adopted directly from prior work (Williams & Eberhardt, 2008) and involved articles asserting that scientists had versus had not been able to uncover a clear genetic basis for race. The BTS scale was the sole dependent measure in this study. Thus, Study 8 was a conservative, direct test of Prediction 3.2.

Method

Participants. Participants were 306 American adults (155 women, 149 men, one not sure, one not reporting gender) recruited from MTurk and paid \$1.50 each. The sample was primarily White (78.1%) and ranged in age from 19 to 68 years ($M = 32.99, SD = 9.95$).

Materials and procedure.

Manipulation of essentialist beliefs about race. An article-based manipulation was presented under the guise of a test of scientific literacy (procedure and materials adopted from Williams & Eberhardt, 2008). Participants were randomly assigned to read either a high- or low-essentialism article. The article claimed that scientists succeeded (high-essentialism) versus failed (low-essentialism) to identify genetic factors predictive of racial phenotypes, suggesting that race is a naturally occurring versus socially constructed category (see Appendix E).

Belief in true selves. In this study, we employed a 10-item version of the BTS scale as our dependent measure (see Appendix B). Responses to the 10 items were averaged to yield a composite measure of participants' belief that true selves exist ($M = 5.09; SD = 1.07, \alpha = .91$).

Attention checks. The same attention check items used in the prior experiments were used in Study 8.

Finally, participants completed additional exploratory measures and demographic items prior to being probed for suspicion, debriefed, and given their completion code for the study.

Results and Discussion

Of the 306 participants who completed the survey, 33 were excluded for failing comprehension and/or attention checks and seven for expressing suspicion about the purpose of the study, leaving a final sample of 266 participants (13.1% exclusion rate; $n = 136$ in the low-essentialism condition, $n = 130$ in the high-essentialism condition).⁹

An independent-samples t test was conducted to test whether participants exposed to the article claiming that racial categories have a genetic basis were more likely to believe that the true self exists than participants exposed to the article disputing a genetic basis for race. As predicted, participants in the high-essentialism condition ($M = 5.22$, $SD = 0.98$) expressed stronger endorsement of belief in true selves than participants in the low-essentialism condition ($M = 4.93$, $SD = 1.14$), $t(264) = 2.20$, $p = .029$, $d = .27$, 95% CI [.03, .51].

Strikingly, manipulating endorsement of essentialist beliefs in a domain that is conceptually distant from the self (i.e., race) affected the extent to which people were willing to endorse statements suggesting that true selves exist. Thus, the results of Study 8 are consistent with the hypothesis that belief in true selves emerges in part from the application of essentialist reasoning to the self.

We conducted a preregistered direct replication of this key experiment (<https://osf.io/s62fh/>) with 551 American MTurk users (292 male, 258 female, one not reporting). This sample size was calculated to achieve 80% power to detect an effect of magnitude $d = .27$ and included an allowance for exclusions (58 for failing comprehension and/or attention checks and four for expressing suspicion about the purpose of the study; final $N = 489$; 11.3% exclusion rate). As in the sample above, participants in the high-essentialism condition ($M = 5.09$; $SD = 0.99$; $n = 237$) endorsed the existence of true selves more than participants in the low-essentialism condition ($M = 4.99$; $SD = 0.96$; $n = 252$). Although the high- versus low-essentialism difference did not reach statistical significance in this replication sample, $t(487) = 1.14$, $p = .255$, $d = .10$, 95% CI [−.07, .28], a random-effects meta-analysis of the two samples indicated that the overall effect of the race manipulation was reliable, $d+ = .17$, 95% CI [.01, .33], $z = 2.03$, $p = .043$. Although this meta-analytic effect size is small, it is important to keep in mind that the manipulation used in these studies was not intended to capture, and is not representative of, how essentialist reasoning gives rise to beliefs about the true self outside the lab. We used it simply as an experimental means of testing the causal link between these phenomena in the context of a brief online study. Thus, the magnitude of the relationship assessed here most likely underestimates the true magnitude of the causal effect of essentialist reasoning on the emergence of beliefs about the true self.

Meta-Analysis of Experimental Studies (Studies 6–8)

To estimate more reliably the effect of our manipulations of essentialism on reasoning about the self, we conducted a random-effects meta-analysis of the standardized mean differences between the high- and low-essentialism conditions across Studies 6–8 using the *metafor* package for R (Viechtbauer, 2010; data and R scripts available in the supplemental materials on OSF). This approach has been advocated as a means of assessing the overall

reliability of a set of studies (Fabrigar & Wegener, 2016). As the BTS and SEB measures reflect similar beliefs about the self, and were found to be substantially correlated in the studies that included both measures (i.e., $r_{5A} = 0.45$, $r_{5B} = 0.47$, $r_7 = 0.57$), they were collapsed in an initial meta-analysis. Five effect sizes were included in this meta-analysis (one each from Study 6, Study 8, and the preregistered replication of Study 8, and two from Study 7). Results indicated that, overall, manipulating endorsement of essentialist beliefs in other domains reliably influenced people's endorsement of essentialist beliefs about the self, $d+ = .15$, $SE = .04$, $z = 3.38$, $p = .0007$, 95% CI [.06, .24].

Although the BTS and SEB scales are related conceptually and empirically, they are nonetheless distinct measures, and as such we also computed separate meta-analytic estimates for each. There were three effect sizes for the BTS measure (one each from Study 7, Study 8, and its preregistered replication) and two effect sizes for the SEB measure (one each from Studies 6 and 7). With respect to the BTS measure, the meta-analytic estimate was marginal, $d+ = .12$, $SE = .06$, $z = 1.90$, $p = .058$, 95% CI [−.004, .24], but suggestive of a nonzero effect. With respect to the SEB measure, the meta-analysis indicated a reliable effect, $d+ = .22$, $SE = .07$, $z = 2.93$, $p = .0034$, 95% CI [.07, .36]. Thus, the results of the separate meta-analyses are largely consistent with the results of the overall meta-analysis, although they also suggest that the effects on the measure of belief in true selves were smaller and less reliable than the effects on the measure of self-essentialist beliefs. Although these meta-analytic results point to a reliable effect of manipulations of essentialist beliefs on self-related outcomes, this conclusion is based on a small number of studies. It thus remains important to conduct further experimental studies that seek to directly and conceptually replicate these findings (ideally across multiple cultural contexts), to more accurately estimate the reliability and magnitude of these effects.

General Discussion

A growing area of research suggests that lay beliefs about the true self are widespread and psychologically consequential. Although there is debate about whether true selves in fact exist (with some scholars labeling them a myth; e.g., Baumeister, 1995), the extent to which people feel like they know (Schlegel et al., 2011; Schlegel et al., 2012) and express (Kernis & Goldman, 2006) their true selves predicts a range of well-being outcomes (e.g., Bettencourt & Sheldon, 2001; Davis, Hicks, Schlegel, Smith, & Vess, 2015; Harter, Marold, Whitesell, & Cobbs, 1996; Lakey, Kernis, Heppner, & Lance, 2008). The current research provides a potential answer to the question of why people so commonly believe that they have true selves and why they place such emphasis on these presumed aspects of who they are: Beliefs about the true self may be a product of the pervasive cognitive tendency to explain the world in terms of hidden causal essences (e.g., Cimpian & Salomon, 2014; Gelman, 2003; Medin & Ortony, 1989).

To summarize, the present studies suggest that (a) beliefs about the nature of true selves exhibit key features of essences (Studies 1–4), that (b) endorsement of belief in true selves is associated

⁹ Because these exact materials were used successfully by Williams and Eberhardt (2008) to manipulate essentialist beliefs about race, a manipulation check was not included in Study 8.

with endorsement of self-essentialist beliefs and essentialist beliefs in other domains (Study 5), and that (c) experimental manipulations of essentialist beliefs in other domains can influence endorsement of self-essentialist beliefs and belief in true selves specifically (Studies 6–8).

More concretely, these studies tested and found support for a set of six predictions (see Table 1). Studies 1A, 1B, and 2 found that people tend to regard the true self as immutable, consistent with Prediction 1.1. Specifically, participants thought their true selves were unlikely to change 30 years into the future (Study 1A), were unlikely to be different in a radically different sociohistorical context (Study 1B), and were already present within themselves 10 years in the past (Study 2). Studies 3 and 4 replicated this general pattern, while also suggesting that beliefs about the nature of the true self display five other features of essences (discreteness, informativeness, inherence, consistency, and, albeit with some inconsistencies, biological basis). These findings provided additional support for Prediction 1.1. We also found, in Studies 2 and 4, that people believe the true self resembles an essence more than the actual (behavioral, everyday) self does (Prediction 1.2). Moving beyond highlighting the similarities between true selves and essences, Studies 5A and 5B suggested that endorsement of belief in true selves is empirically associated with endorsement of other essentialist beliefs, supporting Prediction 2.1. This finding is consistent with the idea that common processes give rise to all of these beliefs. A particularly close relationship was observed between belief in true selves and self-essentialist beliefs, supporting Prediction 2.2. Finally, Studies 6, 7, and 8 illustrated that increasing versus decreasing endorsement of essentialist beliefs in various domains (personality, gender, and race, respectively) via experimental manipulations had corresponding effects on endorsement of both self-essentialist beliefs, supporting Prediction 3.1, and belief in true selves, supporting Prediction 3.2.

The results of these eight studies provide support for our hypothesis that the belief that a true self exists within each person emerges in part because people apply essentialist reasoning to personal identity and the self. Psychological essentialism is a robust phenomenon, evident in how people all over the world reason about social and natural categories (e.g., Atran et al., 2001; Errington, 1989; Gelman, 2003; Gil-White, 2001; Henrich et al., 2010). Our findings suggest that essentialist reasoning also guides how people understand the identity of individual persons. That is, the same processes that lead people to believe that category members possess a shared essence that accounts for their similarities and common identity may also lead people to believe that each person possesses a personal essence (a true self) that explains the regularities in their psychology and behavior across time and contexts and that makes them an individual with a distinct identity.

The current studies integrate the established literature on psychological essentialism with the emerging literature on the true self to provide the first comprehensive assessment of essentialism in reasoning about the self. This integration advances current theories of self-concepts, informing future investigations into these concepts and their role in human psychology. Although the study of beliefs about the true self has hitherto been something of a niche topic, by integrating it with the literature on essentialism we hope

to demonstrate this concept's broader relevance within and beyond psychology.

Theoretical and Practical Implications

The evidence that people apply essentialist reasoning to identity and the self has several important theoretical implications. First, it implies that the global concepts of *self* and *person* are substantially organized around the true self. That is, when reasoning about themselves and others, people may rely heavily on the notion of personal essences, and intuitively distinguish between essential and nonessential personal characteristics in their inference processes. Although this has already been documented in the moral domain (Newman et al., 2015), people may also invoke true selves when making other social judgments, including self-evaluations. This possibility has far-reaching implications for many areas of study in social and personality psychology. In some areas, such as the study of the self-concept, these implications are reasonably clear. For instance, the hypothesis that people hold essentialist views of identity and the self can be readily integrated with established paradigms such as self-schema theory (Markus, 1977), within which it suggests that self-schemas will commonly exhibit an essentialist structure. In other areas, such as the measurement of personality traits, the implications of our hypothesis are less clear, but still potentially impactful. For instance, if lay conceptions of the person posit an essence at the core of the self, it seems important for personality psychologists to account for the degree to which a given trait is endorsed as essential, independently of the overall level of that trait that a person endorses (similar to Allport's distinction between cardinal, central, and secondary traits; Allport, 1937).

Another interesting implication of the argument that people essentialize the self is the broad commonality that this view suggests across how people reason about self, others, and many other entities in the social and natural world, including even inanimate objects (Gelman, 2013). Although the self and significant others surely receive special attention, and are among the most frequently revisited and elaborated concepts in our minds, there may be certain basic shared processes, such as essentialist thinking, by which these and other concepts are formed. If this is the case, it may help explain commonalities in how people reason about the identity of persons and nonpersons, such as the seemingly robust tendency to perceive the *true* version of an entity as *normatively good* (e.g., De Freitas et al., 2018; De Freitas, Tobia, et al., 2017)—these patterns may be symptomatic of essentialist belief-formation processes giving rise to a common conceptual structure across these domains. Thus, our hypothesis could be a step toward a more unified understanding of conceptual development and of the parallels between social and nonsocial cognition.

The evidence that people essentialize the self may also have implications for well-being. For instance, holding essentialist beliefs about the self may promote well-being by orienting people to the self in ways that facilitate positive subjective experiences: Because essences are regarded as causally powerful (e.g., Gelman, 2003), individuals who believe in the existence of an essence-like true self may employ this belief to explain their own behaviors and choices. Explaining one's own behavior in terms of a true self may in turn result in an enhanced subjective experience of authenticity or self-expression in behavior. To the extent that it portrays the self

as having a definite, substantial *core* that can be discovered, an essentialist perspective on identity may also facilitate subjective experiences of self-knowledge (e.g., Schlegel et al., 2009, 2011), self-concept clarity (e.g., Campbell, 1990), and autobiographical coherence (e.g., Baerger & McAdams, 1999; McAdams, 1995; McAdams, Diamond, de St. Aubin, & Mansfield, 1997). These experiences, in turn, may promote global well-being. Consistent with this possibility, initial evidence linking essentialist self-views to various indicators of well-being has been reported (Dulaney, Graupmann, & Quinn, 2019).

For the same reasons that they perceive more self-expression in their own behavior, individuals who believe that true selves exist or who otherwise hold essentialist views of the self may also be more inclined to see others' behavior as diagnostic (e.g., Johnson et al., 2004). This may have some benefits, such as feeling that one knows other people more intimately or that one more completely understands their behavior. However, people who essentialize identity and the self may also be more judgmental of others, quicker than nonessentialists to form lasting impressions based on limited experience. That is, self-essentialists may be more susceptible to the correspondence bias (e.g., Gilbert & Malone, 1995). Consistent with this possibility, social-category essentialism is associated with holding stereotypic beliefs about essentialized groups (Bastian & Haslam, 2006; Haslam, Bastian, Bain, & Kashima, 2006), suggesting that essentialists are more likely to come to enduring conclusions about others. However, there are likely some important qualifiers to this tendency, including the moral valence of the target's behavior (e.g., Newman, Bloom, & Knobe, 2014; Newman et al., 2015) and whether the behavior is perceived as typical of or distinctive to the target in question (e.g., Kelley, 1967). Exploring such issues is fertile ground for future research.

Contextual Considerations

Although our hypothesis suggests that beliefs about the true self are produced by normative, universal cognitive tendencies, there are likely differences in the exact form these beliefs take. For instance, culture and religion may influence the degree to which individuals believe that true selves exist, as well as which personal characteristics are thought to be part of the true self.

Culture. Cross-cultural differences in the structure of the self-concept are well-documented, particularly when comparing Eastern and Western cultures (e.g., Markus & Kitayama, 1991). A number of investigators have concluded that in Eastern cultures, the self is represented primarily in terms of social roles and relationships, while in Western cultures the self is represented as a more self-contained and independent entity (e.g., Markus & Kitayama, 1991; Triandis, 1989; Shweder & Bourne, 1984). Given this distinction, it might be expected that beliefs about the true self are endorsed more widely in Western societies. Cultural narratives in Western societies may also more explicitly reference the true self and related ideas (such as authenticity) than Eastern cultural narratives (e.g., Cross & Markus, 1999; Slabu, Lenton, Sedikides, & Bruder, 2014; see also Chandler, 2000). Indeed, Baumeister (1995) characterized the true self as a myth of "our [Western] culture." As such, some individuals in Western societies may come believe in true selves simply by internalizing these cultural narratives. This process could either be independent of or act in tandem

with the essentialism pathway we are investigating here. Given that all participants in the present studies were Americans, we are not able to fully disentangle the cultural versus cognitive mechanisms that may underlie our findings.

Although it is plausible to suppose that essentialist beliefs about the self (in the form of belief in the existence of true selves) are more prevalent in the West, other evidence suggests that these beliefs may be relatively widespread. As previously mentioned, category essentialism is prevalent across a variety of cultural contexts (e.g., Atran et al., 2001; Errington, 1989; Gil-White, 2001; Sousa, Atran, & Medin, 2002), and if beliefs about the true self are produced by the same underlying processes, they may be similarly prevalent. That is, our hypothesis predicts that there should be a good deal of cross-cultural uniformity in the belief that true selves exist. While existing evidence indirectly supports this claim (see Kashima et al., 2004, 2005; Meyer et al., 2013; Kim et al., 2019), this prediction should be tested more directly in future investigations.

There may even be some degree of cross-cultural invariance in the personal characteristics that are seen as part of the true self. Park, Haslam, and Kashima (2012) found that relational traits (e.g., warm-hearted, sympathetic) were essentialized across Korean, Japanese, and Australian samples, and more recently De Freitas et al. (2018) have found that the tendency to view true selves as morally good was present in samples drawn from Russia, Colombia, and Singapore. Although this is far from an exhaustive sampling of the world's cultures, these findings imply that characteristics that are relevant to interpersonal functioning, particularly moral traits, are widely perceived as being at the core of individual identity (see also De Freitas, Cikara, et al., 2017).

Despite these cross-cultural commonalities, the specific qualities ascribed to the true self may also vary systematically by culture. For example, Kashima et al. (2004) found that global perceptions of self-consistency were not significantly related to judging that one possesses a true self among Korean and Japanese participants (or, somewhat surprisingly, in a German sample), while self-consistency was positively associated with these judgments in British and Australian samples. Further, the same study found that the extent to which the self is perceived to vary across specific contexts (e.g., with family vs. strangers) was negatively associated with endorsement of beliefs about the true self in the Western samples (and in the Korean sample, albeit nonsignificantly) but positively associated with endorsement of these beliefs in the Japanese sample. These results suggest that the specific values of a culture (e.g., an emphasis on individual autonomy vs. social harmony) can inform the extent to which qualities such as consistency and contextual sensitivity are ascribed to the true self. The fact that Kashima et al. (2004) observed different patterns among different Western cultures (e.g., Germany vs. English-speaking cultures) and among different Eastern cultures (e.g., Korea vs. Japan) implies that a more fine-grained approach that takes account of differences in national (or even regional and local) subcultures may be warranted, as opposed to a gross Eastern/Western distinction. Determining the exact ways in which beliefs about the true self are uniform and the ways in which they vary across cultures is an important challenge to be taken up in future investigations.

Religion. Religion may also affect the extent to which people endorse beliefs about the true self. There are clear parallels be-

tween these beliefs and beliefs about souls (e.g., Bering, 2006), and we suspect that true selves and souls are often equated in folk psychology. The primary feature that distinguishes souls from true selves seems to be immortality; souls are by definition immortal, whereas true selves are not. Speculatively, beliefs about souls may be a subset of beliefs about the true self that have been modified through religious enculturation (i.e., religions may teach people to refer to the essence of individual identity as a *soul*, and to ascribe the additional features of immortality and immateriality to this essence). In many ways, the soul beliefs held within various religions can be seen as magnifying features that are already present in people's intuitive beliefs about the true self. For example, immortality can be thought of as simply a more extreme form of immutability. Specifying the exact relationships between religion, beliefs about the true self, and beliefs about souls is a fascinating problem for future investigations to take up.

Constraints on Generality

Consistent with recent recommendations (e.g., Simons, Shoda, & Lindsay, 2017), we now discuss the scope of the conclusions that can be drawn from the current data. Given that our account invokes (what are currently understood to be) normative cognitive processes, we expect that similar findings would be obtained in most healthy adult samples. Of course, should our understanding of essentialism and its cross-cultural generality be revised in light of new evidence, we would revise the scope of our conclusions about the true self accordingly. Our expectation that these conclusions apply to most healthy adult samples is also premised on a number of background factors, such as the availability of linguistic means of referring to the true self or the absence of cultural proscriptions against discussing the self.

In addition, because (a) the evidence presented here was obtained exclusively in Western samples and (b) cultural differences in self-concepts are common (e.g., Markus & Kitayama, 1991), we are most confident that our conclusions generalize to healthy adults in similar (e.g., independent) cultures. Although there are certainly good reasons to expect similar results in more interdependent cultures as well, we cannot rule out the possibility that the precise contours of the relationship between essentialist reasoning and beliefs about the true self will differ in cultures (and contexts within cultures; e.g., Stephens, Townsend, & Dittmann, 2019) where other modes of conceiving of the self are prevalent. It is also possible that the specific idea of a true self is somehow tied to the current sociohistorical context rather than being an inevitable, ahistorical outcome of applying essentialist reasoning to the self. If this is the case, we would still expect *self-essentialist beliefs* to be common and influential, whether or not people also formulate and verbalize the notion of a true self.

With respect to stimuli, we expect that any materials that capture the central features of essentialism and the true self, as defined in the literature, and that are also properly contextualized for participants (given what they are familiar and comfortable with) should yield similar results. It is also likely that online versus in-person modes of administration do not affect the robustness of these results, assuming of course that participants are equally familiar with these two ways of interacting with researchers. We have no reason to believe that the results depend on other characteristics of the participants, context, or materials.

Conclusion

The present research suggests that belief in the existence of true selves emerges in part because people apply essentialist reasoning to identity and the self. These findings represent a substantial step toward understanding the processes that give rise to beliefs about the true self, and provide fertile ground for further theorizing concerning these beliefs, their formation, and their downstream consequences.

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(Appendices follow)

Appendix A

Full Text of Prompts Used in Studies 1A, 1B, and 2

Study 1A: Life in the Future

Reflection prompt. In this next part of the study, we would like you to engage in a creative hypothetical reflection exercise.

Specifically, we'd like you to imagine what your life will be like 30 years in the future. Think about where you might be, what you might be doing, who you might be with, and what you might be like. Try to be realistic and honest with yourself about what you think your future will be like, even though it may be tempting to fantasize about what you want it to be like.

This screen will not advance for 2 minutes, so we encourage you to spend at least that long thinking about this scenario.

Writing prompt. In the box below, write a short story about what your life might be like 30 years from now. Think about the ways your personality and life would likely be the same and ways in which your life and personality might be different.

Again, this is an exercise in creativity. Just try to really get into the task. The *next* button will become active in 3 minutes, so try to spend at least that long writing.

Study 1B: Alternative Historical Era

Reflection prompt. In this next part of the study, we would like you to engage in a creative hypothetical reflection exercise.

Specifically, we'd like you to imagine that you were born in a past historical period. You can imagine that you were born in any period before the present day. For example, you might imagine that you were born during the Great Depression, in the colonial era, in classical antiquity (e.g. ancient Greece or Rome), or even in prehistoric times—it's entirely up to you which historical period you choose to imagine.

This screen will not advance for 2 minutes, so we encourage you to spend at least that long thinking about this scenario.

Writing prompt. In the box below, write a short story about what your life might have been like if you were born in a different historical era. Think about the ways your personality and your life would likely be the same and ways in which your life and personality might be different.

Again, this is an exercise in creativity. Just try to really get into the task. The *next* button will become active in 3 minutes, so try to spend at least that long writing.

Study 2: Life in the Past

Reflection prompt. In this next part of the study, we would like you to engage in a reflective memory exercise.

Specifically, we'd like you to imagine what your life was like 10 years in the past. Think about where you were living, what you were spending your time doing, who you were spending it with, and what you were like. Try to remember as accurately as you can what your life was like at this time.

This screen will not advance for 2 minutes, so we encourage you to spend at least that long thinking about this topic.

Writing prompt. In the box below, write a short story about what your life was like 10 years ago. Think about the ways your personality and life were the same as they are now and ways in which your life and personality were different.

Again, this is an exercise in memory and reflection. Just try to really get into the task. The "next" button will become active in 3 minutes, so try to spend at least that long writing.

Appendix B

Belief in True Selves (BTS) and Self-Essentialist Beliefs (SEB) Scales

All scales used a 7-point response scale (1 = *Strongly disagree*, 7 = *Strongly agree*).

Seven-Item BTS Scale (Study 5)

People often refer to the idea of the *true self*. The *true self* is believed to be a part of the person that represents who they really are, even if they sometimes behave in ways that are not consistent with this part of themselves. The following items assess some of your opinions and beliefs about the idea of the *true self*.

Please indicate your degree of agreement with each of the following statements using the scale provided.

1. Every person has a true self.
2. Every person has a set of core characteristics that defines who they really are.
3. There is no such thing as a "true self" that makes people who they are.

(Appendices continue)

4. Each person in the world has some basic personal traits that are central to their identity as an individual.
5. The true self is real.
6. I believe all people possess a single true self.
7. I believe that I have one true self.
13. It is difficult for me to imagine that true selves don't really exist.
14. It might turn out that true selves don't really exist.
15. The idea of true selves doesn't make much sense to me.
16. There is no fact of the matter about who a person "really is"; a person's identity changes in every new situation they enter.

Sixteen-Item BTS Scale (Study 7)

People often refer to the idea of the *true self*. The *true self* is believed to be a part of the person that represents who they really are, even if they sometimes behave in ways that are not consistent with this part of themselves. Philosophers, scientists, and lay-people have long debated whether people really possess a true self. Some believe that people do possess a true self and that true selves are real, whereas others believe that the true self isn't a real thing that people actually possess.

We are interested in where you stand on the issue of true selves. Is the true self real? Do people really possess a true self at their core? The following items assess some of your opinions and beliefs about this idea.

1. Every person has a true self.
2. There is no such thing as a "true self" that makes people who they are.
3. The true self is real.
4. I believe all people possess a single true self.
5. I believe that I have one true self.
6. It is possible that I don't have a true self.
7. Not everyone has a true self.
8. True selves might not really exist, even though many people believe they do.
9. Some people might not have a true self.
10. I am skeptical about the idea of true selves.
11. I wouldn't be surprised to learn that true selves are not real.
12. I am confident that true selves are real.

Ten-Item BTS Scale (Study 8)

People often refer to the idea of the *true self*. The *true self* is believed to be a part of the person that represents who they really are, even if they sometimes behave in ways that are not consistent with this part of themselves. The following items assess some of your opinions and beliefs about the idea of the *true self*.

Please indicate your degree of agreement with each of the following statements using the scale provided.

1. Every person has a true self.
2. Every person has a set of core characteristics that defines who they really are.
3. There is no such thing as a "true self" that makes people who they are.
4. The identity of individual people is not based on any deeply-rooted personal qualities.
5. People do not have well-defined and stable individual identities.
6. There is no fact of the matter about who a person "really is"; a person's identity changes in every new situation they enter.
7. Each person in the world has some basic personal traits that are central to their identity as an individual.
8. The true self is real.
9. I believe all people possess a single true self.
10. I believe that I have one true self.

(Appendices continue)

SEB Scale (Studies 5, 6, and 7)

The following items reflect beliefs that you may or may not hold about your own identity. Please indicate your degree of agreement or disagreement using the scale provided.

1. The important parts of my identity will still be there in 30 years.
2. The things that make me who I am are unlikely ever to change.
3. The defining parts of my identity clearly distinguish me from other people.
4. I am a distinct individual because I have certain central characteristics that define my identity.
5. My personal identity has well-defined boundaries; it is clear where I end and others begin.
6. The important parts of who I am are deeply-rooted.
7. It is difficult to imagine being a person other than the one I am now.
8. I have certain basic characteristics that define my identity.
9. I have deeply-rooted qualities that make me who I am at a fundamental level.
10. I have a single clearly-defined identity as a person.

Appendix C**Articles, Comprehension Checks, and Manipulation Check Used in Study 6****Filler Article (Presented to All Participants Prior to Critical Article)****The simple science of bird banding**

PAXUTENT, MD—Scientists at the North American Bird Banding Laboratory have recently begun the Wild Bird Awareness Initiative, an effort to raise public knowledge of and appreciation for the many wild birds native to our continent. As well as educating about the birds themselves, this initiative also aims to make people more familiar with the common research techniques used by ornithologists. Among the simplest of these techniques is *bird ringing* or *bird banding*.

Bird banding refers to the practice of attaching small tags to the legs of wild birds for research purposes. By using these tags, scientists can identify individual birds and track them over time. When a bird is first captured, a small numbered tag (typically an aluminum band) with a unique ID number is secured around its leg. Often, the band will also include the original researcher's contact information so that they can be easily updated if the banded bird is recaptured by someone else in the future.

"The main reason we band birds is to make it possible for us to track various measurements over time," says Monica Hirsch, one of the ornithologists leading the initiative. "We take several measurements from a bird each time it is captured—age, size and weight, and location are some of the basic ones, but we can also take more in-depth measurements like the bird's percentage of body fat and the condition of its feathers, and sometimes we even take small samples of blood or tissue."

When a banded bird is recaptured, these measurements are updated and logged in a database with the measurements from previous captures. The North American Bird Banding Program, a joint operation of the U.S. Geological Survey and the Canadian Wildlife Service, coordinates all bird banding activity on the continent. The Program maintains a centralized database, containing measurements taken from millions of individual birds throughout North America. This collection of data allows researchers to observe patterns in the health and behavior of entire populations of birds.

"Some birds have been recaptured as much as 50 years after first being banded," says Dr. Hirsch. "This gives us some idea of their potential lifespan." In research she has conducted with Jordan Bennett, a graduate student in ornithology at the University of Maryland and intern at the Bird Banding Laboratory, Dr. Hirsch has also found that some birds travel more than 14,000 miles in the first three months of their lives.

"We are hopeful that the Wild Bird Awareness Initiative will spark more widespread interest in birds, and in ornithology. In the events we've had so far people have been very interested to hear what we have to say, which of course is very encouraging," Dr. Hirsch said. "We see birds everywhere, every day of our lives, and many people are naturally curious about them. Our hope is that this program will help people better understand birds and how to co-exist with them, and if we're lucky we just might inspire a few future ornithologists."

(Appendices continue)

Comprehension items for filler article (included to reinforce cover story; not used as exclusion criteria).

1. In your own words, explain the article you just read.
2. Which of the following statements best represents the *topic* of the article you just read?
 - a. Studying birds to better understand the physics of flight.
 - b. A simple technique used in the scientific study of birds.
 - c. Scientists are trying to find out how birds navigate over long distances.
3. Which of the following statements best represents the *conclusion* of the article you just read?
 - a. Birds' body structures can be translated into designs for ultra-light, ultra-efficient aircraft.
 - b. Banding is a simple practice that can be used to track important information about bird populations.
 - c. Birds are able to navigate over long distances using the Earth's electromagnetic field.

High-Essentialism Article

Scientists pinpoint genetic underpinnings of personality traits

CHARLOTTESVILLE—Scientists working on mapping the origins of life through the Human Genome Project have uncovered some genetic codes that they believe can be used as indicators of people's personality.

"Up till now, [we] weren't able to determine a person's personality traits based just on DNA," said Robert Kaminsky, a University of Virginia scientist and lead author of the study, which was just released in the prestigious journal *Gene*. "But now we're able to use some of genetic to guess at what a person may be like, based on a very small genetic sample."

Dr. Kaminsky and a graduate student, Lisa Faridany, along with colleague Anthony Schmidt of the Georgetown Medical Center, have been working for several years on mapping the genotypic expressions involved in the personality traits of neuroticism and extraversion. Neuroticism involves sensitivity to threats and a tendency to experience negative emotions, while extraversion involves sensitivity to rewards and a tendency to experience positive emotions. Kaminsky, Faridany, and Schmidt have focused particularly on the serotonin 2A receptor (HTR2A) gene, which is implicated most powerfully in emotional experience.

The researchers used skin, blood, and other tissue samples from hospital patients whose levels of neuroticism and extraversion were indicated in their charts (based on both self-reports and reports from people who knew the patients well, such as their spouses, close friends, and parents), but kept hidden from lab members until the genetic analyses were complete.

"We found that once we had a good idea of where the genetic components to some of these key psychological features were located, we were able to correctly guess the patients' personality traits 69% of the time, which is well above chance rate," Dr. Kaminsky said. "And with people with especially pronounced levels of neuroticism and extraversion, our success rates were even higher."

Their results add to the growing body of evidence that so much of who we are as people can be traced to our genetic origins—including our personalities.

"This doesn't mean that there aren't environmental influences on personality, just like everything else," Dr. Kaminsky cautioned. "But in the end, we obtain our genetic material from our parents, so we generally inherit their personality traits along with everything else."

Dr. Kaminsky and his colleagues are continuing their contribution to the Human Genome Project with current work on the genetic underpinnings of depression and other mood disorders.

Low-Essentialism Article

Scientists reveal that personality has no genetic basis

CHARLOTTESVILLE—Scientists working on mapping the origins of life through the Human Genome Project have definitively demonstrated that no genetic codes can be tied to personality traits.

"Up till now there was a big question [in the scientific community] about whether we could determine a person's personality based just on DNA," said Robert Kaminsky, a University of Virginia scientist and lead author of the study, which was just released in the prestigious journal *Gene*. "But now we know the answer—there are no genetic markers that indicate what personality traits a person possesses."

Dr. Kaminsky and a graduate student, Lisa Faridany, along with colleague Anthony Schmidt of the Georgetown Medical Center, have been working for several years on mapping the genotypic expressions involved in the personality traits of neuroticism and extraversion. Neuroticism involves sensitivity to threats and a tendency to experience negative emotions, while extraversion involves sensitivity to rewards and a tendency to experience positive emotions. Kaminsky, Faridany, and Schmidt have focused particularly on the serotonin 2A receptor (HTR2A) gene, which is implicated most powerfully in emotional experience.

(Appendices continue)

The researchers used skin, blood, and other tissue samples from hospital patients whose levels of neuroticism and extraversion were indicated in their charts (based on both self-reports and reports from people who knew the patients well, such as their spouses, close friends, and parents), but kept hidden from lab members until the genetic analyses were complete.

“We found that even when we had a good idea of where the genetic components to some of these key psychological features were located, we were able to correctly guess the patients’ personality traits only 27% of the time, which is really no better than chance rate,” Dr. Kaminsky said. “There’s just no one cue or set of cues that indicates, say, whether someone is highly extraverted or highly neurotic.”

Their results add to the growing body of evidence that although genes do play an important role in who we are, social and environmental factors may in many circumstances be even more powerful.

“This doesn’t mean that there aren’t hereditary components to personality,” Dr. Kaminsky cautioned. “We do inherit some of our personality traits from our parents, but the majority of personality development is driven by people’s experiences and what they are exposed to in their environment, especially in the early years of life. There’s just no clear genetic basis for it.”

Dr. Kaminsky and his colleagues are continuing their contribution to the Human Genome Project with current work on the genetic underpinnings of depression and other mood disorders.

Comprehension items presented after critical article (used as exclusion criteria).

1. In your own words, explain the article you just read.
2. Which of the following statements best represents the *topic* of the article you just read?
 - a. Using DNA evidence to explore whether personality traits have an underlying biological basis
 - b. Using DNA evidence to understand why certain people become serial killers
 - c. The basic particles that are the building blocks for all other forms of matter
3. Which of the following statements best represents the *conclusion* of the article you just read?
 - a. Scientists *can* reliably guess a person’s personality based on certain DNA sequences, suggesting that personality is biologically-based.
 - b. Scientists have been able to pinpoint the genes that cause people to develop a psychopathic personality.
 - c. Scientists *cannot* reliably guess a person’s personality based on certain DNA sequences, suggesting that personality is not biologically-based.

Manipulation check/mediator items (7-point response scale, 1 = *Strongly disagree*, 7 = *Strongly agree*). We are interested in your *personal opinions* on some of the topics addressed in the articles. Please indicate how much you *personally agree or disagree* with each statement using the scale provided.

1. The kind of person someone is can be largely attributed to their genetic inheritance.
2. The kind of person someone is is clearly defined; they either are a certain kind of person or they are not.
3. The kind of person someone is is something very basic about them, and it can’t be changed very much.

(Appendices continue)

Appendix D

Articles, Comprehension Checks, and Manipulation Check Used in Study 7

Filler Article

The same filler article used in Study 6 was also used in Study 7.

High-Essentialism Article

The truth about the gender binary: It's always been there and always will be

As people increasingly demand recognition for transgender and other non-binary gender identities (e.g., genderqueer, agender, gender nonconforming, etc.), we are confronting many important new questions, both legal and philosophical. Perhaps the most basic question that has been raised is whether the traditional man-woman gender binary has any firm basis in reality, or whether it is instead a mere social convention to categorize people in this manner.

This, like all fundamental questions of human nature, is a difficult question to answer. However, this is exactly the kind of question that anthropologists are trained to answer. Dr. Hazel Pretchik of Oxford University has devoted her entire career to studying the anthropology of gender. Dr. Pretchik has traveled the world observing and documenting how hundreds of different cultures approach gender, from small-scale hunter-gatherer communities in Africa and the Pacific Islands to fully industrialized societies in North America, Asia, and Europe. Based on her extensive experience, Dr. Pretchik felt that she could give a confident answer to the fundamental question: Is the gender binary real?

"Of course it's real!" says Dr. Pretchik. "In every society I have studied, they make a basic distinction between women on the one hand and men on the other. I have never seen or heard about a culture that doesn't recognize men and women as distinct groups." This means that a gender binary is what anthropologists call a cultural universal, a feature that is present in all known human societies. If it can be demonstrated that a certain behavior or practice is a cultural universal, this is strong evidence that it arises from our basic human nature. For example, language and music are found in every known human society, and we conclude from this that being speakers and music-makers are inherent parts of what it means to be human. Dr. Pretchik argues the same can be said of the man-woman binary.

"Not only do male and female gender concepts exist in every society I know of," Dr. Pretchik continued, "There is also a remarkable degree of consistency in the specific content of what it

means to be male or female across cultures." According to Dr. Pretchik's research, there are cross-culturally consistent patterns of gender differences in appearance and dress, occupation, personal preferences and tastes, personality traits, and styles of communication and interaction with others. For example, in virtually all known cultures women wear their hair longer than men, men tend to pursue more competitive occupations and pastimes while women tend to pursue more cooperative activities, and women tend to do more listening than men in interpersonal communication. Thus, the typical differences between men and women that Americans recognize are also well-represented in other cultures.

Dr. Pretchik also notes that some societies do recognize genders beyond the man-woman binary, saying "Without question there are societies that have concepts of a 'third gender.' However, the man-woman distinction is ubiquitous, and there is no denying that the overwhelming majority of people who have existed on this Earth have lived and died as either men or women. That is the anthropological and historical fact, and I don't see that changing anytime soon."

Low-Essentialism Article

The truth about the gender binary: Variation is the only constant

As people increasingly demand recognition for transgender and other non-binary gender identities (e.g., genderqueer, agender, gender nonconforming, etc.), we are confronting many important new questions, both legal and philosophical. Perhaps the most basic question that has been raised is whether the traditional man-woman gender binary has any firm basis in reality, or whether it is instead a mere social convention to categorize people in this manner.

This, like all fundamental questions of human nature, is a difficult question to answer. However, this is exactly the kind of question that anthropologists are trained to answer. Dr. Hazel Pretchik of Oxford University has devoted her entire career to studying the anthropology of gender. Dr. Pretchik has traveled the world observing and documenting how hundreds of different cultures approach gender, from small-scale hunter-gatherer communities in Africa and the Pacific Islands to fully industrialized societies in North America, Asia, and Europe. Based on her extensive experience, Dr. Pretchik felt that she could give a confident answer to the fundamental question: Is the gender binary real?

(Appendices continue)

“Of course it’s not real!” says Dr. Pretchik. “In every society I have studied, they define gender in a unique and highly idiosyncratic way. I have never seen or heard about two cultures that deal with gender in the exact same way.” This means that the gender binary Americans are familiar with is not what anthropologists call a cultural universal, a feature that is present in all known human societies. If it can be demonstrated that a certain behavior or practice is a cultural universal, this is strong evidence that it arises from our basic human nature. For example, language and music are found in every known human society, and we conclude from this that being speakers and music-makers are an inherent part of what it means to be human. Dr. Pretchik argues that this is not so for the man-woman binary.

“Male and female gender concepts don’t even exist in every society I know of,” Dr. Pretchik continued, “And even among societies that do distinguish between men and women there is a remarkable degree of diversity in the specific content of what it means to be male or female across cultures.” According to Dr. Pretchik’s research, there is tremendous cross-cultural variability in gender differences in appearance and dress, occupation, personal preferences and tastes, personality traits, and styles of communication and interaction with others. For example, there are cultures where women wear their hair shorter than men, cultures in which men tend to pursue more cooperative occupations and pastimes while women tend to pursue more competitive activities, and cultures where men tend to do more listening than women in interpersonal communication. Thus, the typical differences between men and women that Americans recognize may be completely reversed in other cultures.

Dr. Pretchik also notes that some societies recognize genders beyond the man–woman binary, saying “Without question there are societies that have concepts of a ‘third gender.’ This, along with the other evidence I have been discussing, clearly shows that the man-woman gender binary and the associated beliefs about each gender that are common in America are just one way among an infinite variety of ways that a society can deal with gender. That is the anthropological and historical fact, and I wouldn’t be surprised at all if America has a very different approach to gender 100 years from now.”

Comprehension Check Items

1. In your own words, explain the article you just read.
2. Which of the following best represents the *topic* of the article you just read?
 - a. Considering anthropological evidence about the nature of the male/female gender binary
 - b. Using DNA evidence to understand differences between men and women
 - c. Examining whether men and women differ in intelligence and other cognitive abilities
3. Which of the following best represents the *conclusion* of the article you just read?
 - a. Similar male and female gender categories seem to be universally present (high-essentialism condition) versus are not found (low essentialism condition) in all human cultures.
 - b. Scientists have discovered that X and Y chromosomes interact with other genes in complex ways.
 - c. Psychologists have found that most people report that they like women better than they like men.

Manipulation Check/Mediator Items (Rhodes & Gelman, 2009)

We are interested in your *personal opinions* on some of the topics addressed in the articles. Please indicate how much you *personally agree or disagree* with each statement using the scale provided.

1. Gender is a very important part of what makes people who they are.
2. People that are the same gender have many things in common.
3. Gender is an all-or-none category; people are either male OR female, there is nothing in between.
4. Gender is a natural category.
5. Gender categories are important in all cultures around the world.
6. Knowing someone’s gender tells you a lot about a person.
7. Males share an underlying property that causes them to have many similarities.
8. Females share an underlying property that causes them to have many similarities.

(Appendices continue)

Appendix E

Articles and Comprehension Checks Used in Study 8

High-Essentialism Article

Scientists pinpoint genetic underpinnings of race

CHARLOTTESVILLE—Scientists working on mapping the origins of life through the Human Genome Project have uncovered some genetic codes that they believe can be used as indicators of racial background.

“Up till now, [we] weren’t able to determine a person’s race based just on DNA,” said Robert Kaminsky, a University of Virginia scientist and lead author of the study, which was just released in the prestigious journal *Gene*. “But now we’re able to use some of the genetic cues to skin color and other physical features to guess at what a person may look like, based on a very small genetic sample.”

Dr. Kaminsky and a graduate student, Lisa Faridany, along with colleague Anthony Schmidt of the Georgetown Medical Center, have been working for several years on mapping the genotypic expressions involved in skin color and other phenotypic physical features. They have focused particularly on the melanocortin 1 receptor (MCR1) gene, which is implicated most powerfully in skin color. The present study explores the link between this gene and the phenylalanine hydroxylase protein, which is involved in melanin production, in varying amounts for different racial groups.

The researchers used skin, blood, and other tissue samples from hospital patients whose race was indicated in their charts, but was kept hidden from lab members until the genetic analyses were complete.

“We found that once we had a good idea of where the genetic components to some of these key physical features were located, we were able to correctly guess the patients’ racial backgrounds 69% of the time, which is well above chance rate,” Dr. Kaminsky said. “And with Black and White participants in particular, our success rates were even higher.”

Their results add to the growing body of evidence that so much of who we are as people can be traced to our genetic origins—including race.

“This doesn’t mean that there aren’t environmental influences on race, just like everything else,” Dr. Kaminsky cautioned. “But in the end, we obtain our genetic material from our parents, so we generally inherit their race along with everything else.”

He pointed to evolutionary theories as to why humans might have evolved to have different physical appearances. For example, the melanin that produces a dark skin color among people of

African heritage may have served as a life-saving protection against strong sun exposure, he said. And among people living in what is now Northern Europe, their relatively lesser access to sunlight was aided by fairer skin, which allows for greater absorption of Vitamin D.

Dr. Kaminsky and his colleagues are continuing their contribution to the Human Genome Project with current work on the genetic underpinnings of depression and other mood disorders.

Low Essentialism Article

Scientists reveal that race has no genetic basis

CHARLOTTESVILLE—Scientists working on mapping the origins of life through the Human Genome Project have definitively demonstrated that no genetic codes can be tied to racial background.

“Up till now there was a big question [in the scientific community] about whether we could determine a person’s race based just on DNA,” said Robert Kaminsky, a University of Virginia scientist and lead author of the study, which was just released in the prestigious journal *Gene*. “But now we know the answer—there are no genetic markers that indicate what racial group a person belongs to.”

Dr. Kaminsky and a graduate student, Lisa Faridany, along with colleague Anthony Schmidt of the Georgetown Medical Center, have been working for several years on mapping the genotypic expressions involved in skin color and other phenotypic physical features. They have focused particularly on the melanocortin 1 receptor (MCR1) gene, which is implicated most powerfully in skin color. The present study explores the link between this gene and the phenylalanine hydroxylase protein, which is involved in melanin production, in varying amounts for different racial groups.

The researchers used skin, blood, and other tissue samples from hospital patients whose race was indicated in their charts, but was kept hidden from lab members until the genetic analyses were complete.

“We found that even when we had a good idea of where the genetic components to some of these key physical features were located, we were able to correctly guess the patients’ racial backgrounds only 27% of the time, which is really no better than chance rate,” Dr. Kaminsky said. “There’s just no one cue or set of cues that indicates, say, whether someone is Black or White.”

(Appendices continue)

Their results add to the growing body of evidence that although genes do play an important role in who we are, social and environmental factors may in many circumstances be even more powerful.

“This doesn’t mean that there aren’t hereditary components to physical appearance,” Dr. Kaminsky cautioned. “We do inherit our physical appearance from our parents, but the practice of classifying people into racial groups based on certain patterns of physical appearance is entirely cultural in origin. There’s just no genetic basis for it.”

He pointed to evidence that each racial group has more variability within the group in any given physical dimension, such as skin color, than exists between any two groups. He also added that racial classification is a relatively recent development in human history—even though people’s physical appearances have been relatively stable over time, the categories into which people are classified change constantly according to the political climate.

Dr. Kaminsky and his colleagues are continuing their contribution to the Human Genome Project with current work on the genetic underpinnings of depression and other mood disorders.

Comprehension Items

1. In your own words, explain the passage you just read.
2. Which of the following statements best represents the *topic* of the passage you read?

- a. Using DNA evidence to explore whether race has an underlying biological basis
 - b. A simple technique used in the scientific study of birds
 - c. The basic particles that are the building blocks for all other forms of matter
3. Which of the following statements best represents the *conclusion* of the passage you read?
 - a. Scientists can reliably guess a person’s race based on certain DNA sequences, suggesting that race is biologically-based.
 - b. Banding is a simple practice that can be used to track important information about bird populations.
 - c. Scientists cannot reliably guess a person’s race based on certain DNA sequences, suggesting that race is not biologically-based.

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