Research Report

Psychological Science
1–10

DOI: 10.1177/0956797617722609
www.psychologicalscience.org/PS

Can Science Explain the Human Mind? Intuitive Judgments About the Limits of Science

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Abstract

Can science explain romantic love, morality, and religious belief? We documented intuitive beliefs about the limits of science in explaining the human mind. We considered both epistemic evaluations (concerning whether science could possibly fully explain a given psychological phenomenon) and nonepistemic judgments (concerning whether scientific explanations for a given phenomenon would generate discomfort), and we identified factors that characterize phenomena judged to fall beyond the scope of science. Across six studies, we found that participants were more likely to judge scientific explanations for psychological phenomena to be impossible and uncomfortable when, among other factors, they support first-person, introspective access (e.g., feeling empathetic as opposed to reaching for objects), contribute to making humans exceptional (e.g., appreciating music as opposed to forgetfulness), and involve conscious will (e.g., acting immorally as opposed to having headaches). These judgments about the scope of science have implications for science education, policy, and the public reception of psychological science.

Keywords

explanation, mind-body dualism, folk epistemology, open data, open materials

Received 8/23/16; Revision accepted 7/5/17

Research on romantic love has had a complicated past. In 1975, Senator William Proxmire awarded Elaine Hatfield and her colleagues a “Golden Fleece Award” for their research on love, claiming they were “fleecing” taxpayers with unneeded research. A reverend echoed what many people were thinking: “Who granted these ‘scientists’ the ability to see into men’s minds and hearts?” (Hatfield, 2006). These reactions reflect intuitive beliefs about the scope of science—beliefs about which questions cannot or should not be approached scientifically. But where do these beliefs come from? Why are falling projectiles appropriate targets of scientific research, while falling in love is not?

To our knowledge, these questions have not been investigated empirically, but prior work hints at a class of phenomena that could be commonly regarded as falling beyond the scope of science: phenomena associated with the mind or the soul. This proposal has roots in philosophy (e.g., Robinson, 2016), but psychologists have subsequently argued that humans are natural-born dualists, carving the world into minds and bodies. Bloom (2004), for instance, has suggested that dualist tendencies are often at odds with what science has to say about the physical substrates of the mind (see also Preston, Ritter, & Hepler, 2013), which could account for resistance toward scientific research on topics such as love.

The present research had two goals. First, we sought to chart people’s beliefs about the appropriate scope of science when it comes to explaining the human mind. To do so, we asked participants about the possibility of there being scientific explanations for various psychological phenomena, ranging from romantic love to more basic perceptual processes. Participants also indicated whether they were uncomfortable with the idea that science could fully explain each phenomenon. These judgments provided insight into participants’

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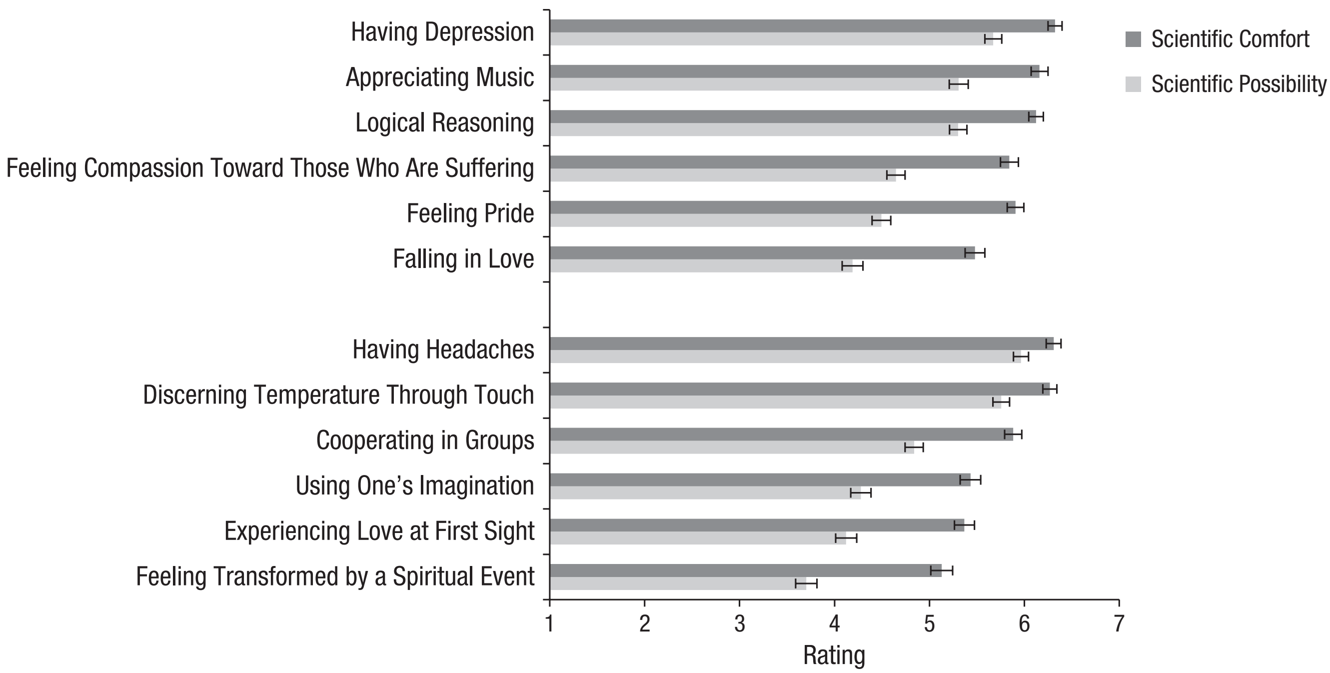

Fig. 1. Mean scientific-possibility and scientific-comfort ratings for 6 representative items (from a total of 46) from Studies 1 through 3 (top) and 6 representative items (from a total of 92) from Study 3 (bottom). Error bars represent ±1 *SEM*.

epistemic commitments as well as the nonepistemic judgments intimated by Proxmire and others: that there is something unsettling about scientific explanations for certain phenomena—whether this judgment stems from an affective response or from personal values.

The second goal of our research was to identify what it is that differentiates psychological phenomena perceived to fall within versus beyond the scope of science. Inspired both by philosophical discussions of mind-body dualism and empirical work on free will (Bloom, 2004; Nadelhoffer, Shepard, Nahmias, Sripada, & Ross, 2014; Nichols & Knobe, 2007; Shariff et al., 2014), we expected that phenomena with an introspectively accessible phenomenology, and over which people have some conscious will, would be more likely to fall beyond the perceived scope of science. On the basis of research in moral psychology and personal identity, we also anticipated that a phenomenon would be more likely to fall beyond the perceived scope of science if it is regarded as unique to humans (Goldenberg et al., 2001; Haslam, Bain, Douge, Lee, & Bastian, 2005) and central to identity (Strohminger & Nichols, 2014, 2015). Further, we predicted that phenomena that suggest abnormal functioning would be more likely to fall within the scope of science (Plunkett, Lombrozo, & Buchak, 2014). We additionally measured the perceived complexity of each phenomenon as a variable that could plausibly affect people's judgments of whether a complete scientific explanation for that phenomenon is possible.

Study 1

Method

We recruited 317 individuals from Amazon Mechanical Turk (155 females, 162 males; mean age = 35 years, *SD* = 11 years; 46% had a college degree or higher) who participated in exchange for payment.[1] Participants rated 46 mental traits, abilities, or phenomena (presented in a random order) on two measures of scientific explanation: "Science could one day fully explain ___" (scientific possibility) and "I am uncomfortable with the idea that science could one day fully explain ___" (scientific discomfort). All scientific-possibility ratings were made on one page, and all scientific-discomfort ratings were made on a second page, but the order of these pages was randomized. Scientific-discomfort scores were reverse-coded as "scientific comfort" so they would trend in the same direction as scientific-possibility scores. Sample items included falling in love, reaching for objects, and using language to communicate (see Fig. 1 for additional items and their corresponding scientific-possibility and scientific-comfort ratings; see Table S1 in the Supplemental Material available online for a complete list of items). Items were

Table 1. Zero-Order Correlations (Across Items) in Study 1

Dimension	2	3	4	5	6	7	8
1. Scientific possibility	.92***	−.67***	−.51***	.32*	−.39**	−.39**	−.06
2. Scientific comfort	—	−.74***	−.35*	.36*	−.32*	−.53***	−.12
3. Introspection-phenomenology		—	.15	.16	−.19	.25	.48***
4. Human uniqueness			—	.00	.24	−.13	.04
5. Abnormal functioning				—	−.61***	−.66***	.51***
6. Conscious will					—	.47***	−.59***
7. Importance for identity						—	−.02
8. Complexity							—

*p < .05. **p < .01. ***p < .001.

selected to span a range of psychological topics, from perception and language to morality and emotion.

We identified six dimensions on which we expected the traits, abilities, or phenomena described by these items to vary. Each participant was randomly assigned to rate each item on one of the six dimensions: *introspection-phenomenology* ("___ involves a subjective experience (a feeling of what it is like) that only the individual experiencing it can know"), *human uniqueness* ("___ is unique to humans"), *abnormal functioning* ("___ indicates abnormal functioning"), *conscious will* ("People have conscious will over ___—they can deliberatively influence when, how, or why it happens"), *importance for identity* ("___ is important for identity; it is a central aspect of what makes up a person's true self"), and *complexity* ("___ is complex").

Participants indicated their agreement with all statements on a scale from 1 (*strongly disagree*) to 7 (*strongly agree*). These ratings always followed the ratings for scientific possibility and discomfort, with items once again presented in a random order on a single page.

Results

Our sample size ensured that roughly 50 participants provided ratings for each dimension.[2] We chose this number to exceed the sample size used by Bear and Knobe (2016), who conducted similar analyses and assigned 30 participants to each of their conditions. We also exceeded their number of stimulus items (30).

Because rating dimension was a between-subjects factor, we analyzed relationships between our dimensions and dependent variables across our 46 items. We first created means for each item's scientific-possibility and scientific-comfort ratings using data from all participants. We then created means for each item corresponding to the six rated dimensions, in each case using data from the subset of participants who rated the corresponding dimension. Scientific possibility and scientific comfort were each significantly correlated with all dimensions, with the exception of complexity (see Table 1 for a complete correlation matrix). Scientific possibility and scientific comfort were also highly correlated with each other (r = .92). Our subsequent analyses therefore considered these ratings both in conjunction and individually.

We next sought to identify the unique variance contributed by each dimension. We therefore included our six dimensions as predictors in a multivariate regression that included both scientific possibility and scientific comfort as outcome variables. We found significant multivariate effects of introspection-phenomenology, $F(2, 38) = 60.02$, $p < .001$, human uniqueness, $F(2, 38) = 6.97$, $p = .003$, abnormal functioning, $F(2, 38) = 6.41$, $p < .004$, and conscious will, $F(2, 38) = 5.74$, $p = .007$. There were no significant multivariate effects of importance for identity, $F(2, 38) = 1.91$, $p = .162$, or complexity, $F(2, 38) = 0.28$, $p > .250$.

We followed this analysis with univariate models, both of which accounted for a high proportion of variance (adjusted R^2s = .83 and .84, respectively, ps < .001). In the model with scientific possibility as the outcome variable, we again found that introspection-phenomenology ($\beta = -0.77$, $p < .001$), human uniqueness ($\beta = -0.28$, $p < .001$), abnormal functioning ($\beta = 0.37$, $p = .002$), and conscious will ($\beta = -0.37$, $p = .001$) were all significant predictors, while importance for identity and complexity were not ($\beta = 0.18$, $p = .151$, and $\beta = -0.08$, $p > .250$, respectively). For the scientific-comfort model, we similarly found that introspection-phenomenology ($\beta = -0.78$, $p < .001$), human uniqueness ($\beta = -0.17$, $p = .027$), abnormal functioning ($\beta = 0.37$, $p = .002$), and conscious will ($\beta = -0.23$, $p = .037$) were significant predictors, while importance for identity and complexity were not ($\beta = -0.01$, $p > .250$, and $\beta = -0.06$, $p > .250$, respectively). In both models, introspection-phenomenology was the strongest predictor of scientific-explanation ratings.[3]

Discussion

Study 1 isolated several dimensions relevant to the perceived scope of science in explaining the human mind: introspection-phenomenology, human uniqueness, abnormal functioning, conscious will, and importance for identity. Equally important, however, is a relationship that we did not find: Participants were not committed to the idea that science cannot explain traits, abilities, or phenomena that are perceived to be complex. In Studies 2a through 2c, we revisited three significant dimensions that involved multiple components to identify which component was responsible for the associations with scientific possibility and discomfort.

Study 2a: Introspection-Phenomenology

Study 1 found that people judged scientific explanations to be less likely and more uncomfortable for items that supported first-person introspective access or some subjective feeling. The introspection-phenomenology dimension assessed in Study 1 combined several related elements (see Schwitzgebel, 2016); in Study 2a, we teased these apart.

Method

Two hundred eighteen individuals recruited from Amazon Mechanical Turk (120 females, 98 males; mean age = 32 years, *SD* = 11 years; 47% had a college degree or higher) participated in exchange for payment. Participants saw stimulus items identical to those used in Study 1. All participants again rated the 46 items for scientific possibility and scientific discomfort, and then each participant was assigned to rate each item on one of three additional dimensions that could have played a role in the introspection-phenomenology dimension identified in Study 1.

The three additional dimensions were *privileged first-person access* ("Only an individual him- or herself can know that he or she is experiencing ___; an outside observer might be able to guess but can't truly know"), *introspection* ("An individual having the experience can know he or she experiences ___ through introspection: the examination of one's own internal feelings or reflection"), and *subjective experience* ("___ has a subjective experience associated with it—a 'feeling' of what it is like").

Results

As in Study 1, we computed correlations between each of the three dimensions and the two dependent variables by using average ratings for each item (see Fig. 2). We also used a multivariate regression to test for the effects of our three dimensions on our two dependent variables. The analysis revealed a significant effect of privileged first-person access, $F(2, 41) = 7.23$, $p = .002$, but not introspection, $F(2, 41) = 2.42$, $p = .102$, or subjective experience, $F(2, 41) = 0.51$, $p > .250$.

We again followed this multivariate regression with two separate regression models, using either scientific possibility or scientific comfort as the outcome variable. In the scientific-possibility model (adjusted $R^2 = .57$, $p < .001$), we found that privileged first-person access ($\beta = -0.46$, $p = .007$) and introspection ($\beta = -0.32$, $p = .037$) were significant predictors, but subjective experience was not ($\beta = -0.07$, $p > .250$). For the scientific-comfort model (adjusted $R^2 = .69$, $p < .001$), we found similar results: Privileged first-person access ($\beta = -0.53$, $p < .001$) and introspection ($\beta = -0.25$, $p = .053$) were significant predictors, but subjective experience was not ($\beta = -0.13$, $p > .250$).

These models suggest that subjective experience was not responsible for unique variance in scientific-possibility and scientific-comfort ratings, and that privileged access may be the single most important factor. However, because all three dimensions were highly correlated with each other (all *r*s > .70), we also conducted a dominance analysis (Budescu, 1993; Nimon, Oswald, & Roberts, 2013) to measure the relative importance of predictors in our models. For both the scientific-possibility and scientific-comfort models, we found that privileged first-person access was the dominant predictor and that subjective experience was dominated by the other two dimensions, consistent with the results of the individual multiple regression models.

Study 2b: Human Uniqueness

In Study 2b, we unpacked another dimension from Study 1, human uniqueness, by differentiating between traits, abilities, or phenomena found only among humans and those that contribute to making humans exceptional.

Method

One hundred twenty-two participants (60 females, 62 males; mean age = 33 years, *SD* = 11 years; 57% had a college degree or higher) recruited from Amazon Mechanical Turk participated in exchange for payment. Participants again rated the 46 items on scientific possibility and scientific discomfort. Each participant was then assigned to rate items on one of the following two dimensions related to human uniqueness: *unique human ability* ("Only humans have the ability to do ___") or *human exceptionalism* ("The ability to ___ is part of what makes humans exceptional").

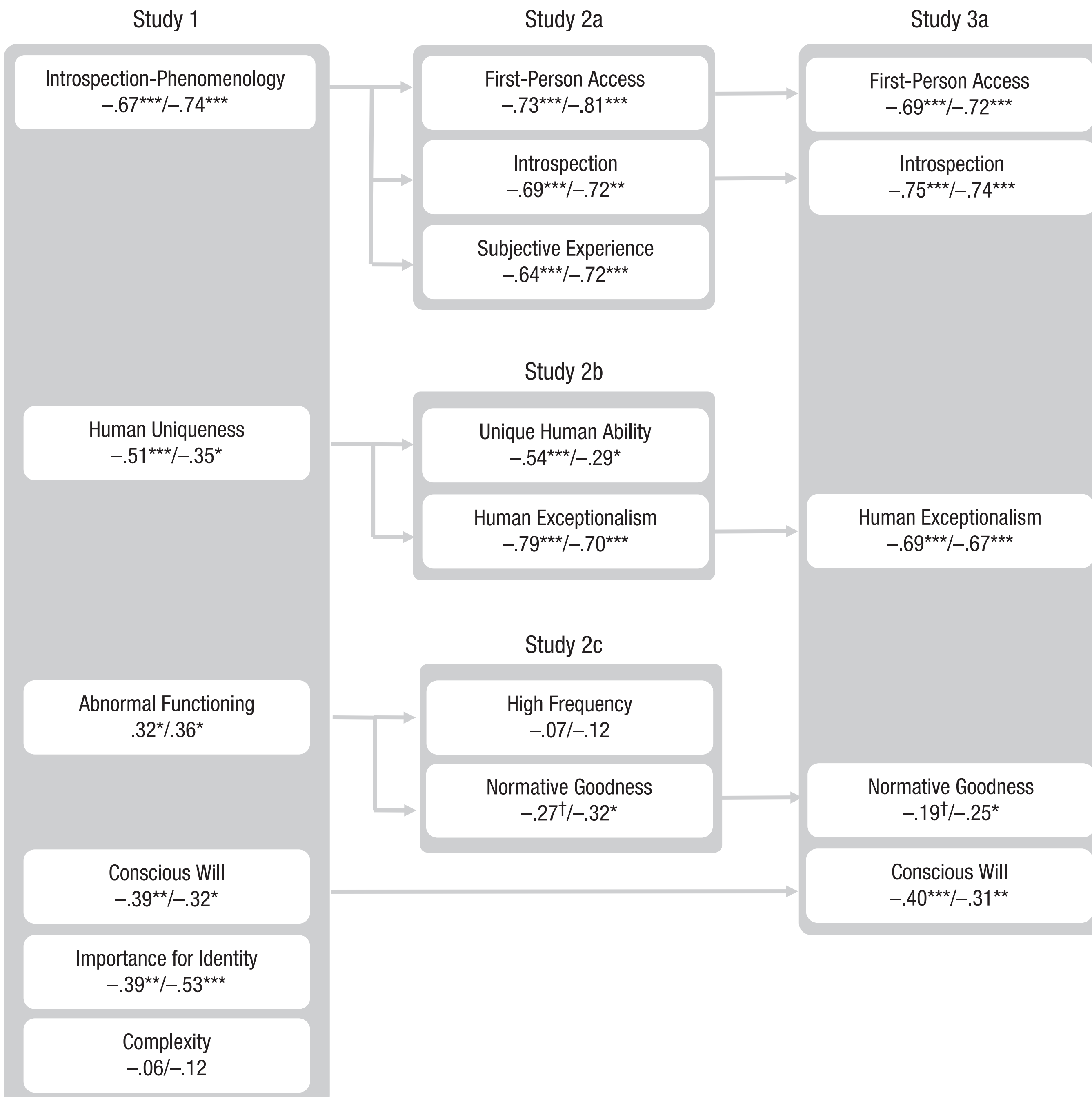

Fig. 2. Predictors and results from Studies 1 through 3a. The numbers below each predictor are the correlations between that predictor and scientific possibility (before the slash) and scientific comfort (after the slash). The arrows indicate how the constructs in Study 1 were unpacked in Studies 2a through 2c and how the constructs in Study 3a correspond to the constructs in the previous studies. Symbols indicate significant correlations (†$p < .07$, *$p < .05$, **$p < .01$, ***$p < .001$).

Results

Correlations between each dimension and the two dependent variables are reported in Figure 2. When we entered both dimensions in a multivariate regression with scientific possibility and scientific comfort as outcome variables, we found significant multivariate effects of both unique human ability, $F(2, 42) = 7.76$, $p = .001$, and human exceptionalism, $F(2, 42) = 23.54$, $p < .001$. Individual models also accounted for significant variance (scientific possibility: adjusted $R^2 = .65$, $p < .001$; scientific comfort: adjusted $R^2 = .47$, $p < .001$). In both cases, we found that human exceptionalism was a significant predictor ($\beta = -0.71$ and $\beta = -0.74$, respectively, *p*s < .001) but that unique human ability was not (β = −0.19, p = .071, and β = 0.07, p > .250, respectively). Because these two predictors were highly correlated with one another (r = .49), we again conducted a dominance analysis to evaluate the relative importance of predictors. For both the scientific-possibility and scientific-comfort models, we found that human exceptionalism was the dominant predictor, consistent with the results of the individual regression models.

Study 2c: Abnormal Functioning

Study 2c unpacked a third dimension from Study 1 by disentangling the statistical and normative dimensions of abnormality (see, e.g., Bear & Knobe, 2017; Hitchcock & Knobe, 2009; Uttich & Lombrozo, 2010; Wachbroit, 1994). A behavior can be normal in the statistical sense that it is common, even if it is not considered to be good (e.g., jaywalking), or normal in the sense that it is considered to be good or ideal, even if it is statistically uncommon (e.g., maintaining a normal weight). We untangled these dimensions by having participants rate items for frequency (i.e., normality in a statistical sense) or "goodness" (i.e., normality in a normative sense).

Method

One hundred twenty-five participants recruited from Amazon Mechanical Turk (61 females, 64 males; mean age = 35 years, *SD* = 12 years; 50% had a college degree or higher) participated in exchange for payment. Participants rated the 46 items from Study 1 on scientific possibility and scientific discomfort. Each participant was then assigned to rate items on one of the following two dimensions related to normality: *high frequency* ("Most people are able to ___") or *normative goodness* ("It is good to be able to ___").

Results

Correlations between each dimension and the two dependent variables are reported in Figure 2. We entered both dimensions as predictors in a multivariate regression with both scientific possibility and scientific comfort as outcome variables. Neither high frequency nor normative goodness had significant multivariate effects, $F(2, 42) = 0.44$, $p > .250$, and $F(2, 42) = 2.44$, $p = .100$, respectively. Individual regression models did not account for significant variance (scientific possibility: adjusted $R^2 = .05$, $p = .122$; scientific comfort: adjusted $R^2 = .07$, $p = .071$), but in both cases, we found that normative goodness was negatively related to acceptance of scientific explanations (β = −0.39, p = .048, and β = −0.42, p = .031, respectively), while a trait's frequency was not (β = 0.18 and β = 0.16, respectively, *p*s > .250). The two predictors were highly correlated with one another (r = .65), so we again conducted a dominance analysis to evaluate their relative importance. For both the scientific-possibility and scientific-comfort models, we found that normative goodness was the dominant predictor.

Study 3a

In a further study, we tested the predictive value of our significant dimensions more stringently by (a) considering additional items and (b) considering all dimensions that accounted for unique variance in Studies 1 through 2c in a single model.

Method

Three hundred seventeen individuals recruited from Amazon Mechanical Turk (151 females, 165 males, 1 who selected "other/prefer not to specify"; mean age = 34 years, *SD* = 10 years; 46% had a college degree or higher) participated in exchange for payment. We increased the number of items participants saw from 46 to 92, which thereby increased our degrees of freedom because analyses were conducted across items. Participants again rated each item on scientific possibility and scientific discomfort, but we modified the wording of these questions. In Studies 1 and 2, some items (e.g., making moral judgments, falling in love, recognizing faces) were phrased as "why" statements (e.g., "Science could one day fully explain why people fall in love"). Other items did not have "why" (e.g., "Science could one day fully explain the ability to use language to communicate"). To standardize the wording for all items, we asked participants in this study to rate statements in both of the following forms: *scientific possibility* ("Science could one day fully explain the following phenomenon: ___") and *scientific discomfort* ("I am uncomfortable with the idea that science could one day fully explain the following phenomenon: ___").

All participants completed this pair of ratings, and each participant also completed a final set of item ratings for a single dimension—first-person access, introspection, human exceptionalism, normative goodness, or conscious will. These dimensions were worded identically to how they appeared in previous studies and were chosen because they were responsible for unique variance in the individual models reported in Studies 1 and 2.

Results

We first calculated correlations between each of our dimensions and scientific possibility and scientific

Table 2. Results of the Two Regression Models Conducted in Study 3a

	Scientific-possibility model (R^2 = .78***)			Scientific-comfort model (R^2 = .68***)		
Predictor	*b*	*SE b*	β	*b*	*SE b*	β
First-person access	−0.36	0.09	−0.35***	−0.20	0.05	−.39***
Introspection	−0.31	0.10	−0.27**	−0.16	0.06	−.28*
Human exceptionalism	−0.38	0.08	−0.43***	−0.15	0.05	−.33**
Normative goodness	0.21	0.03	0.47***	0.06	0.02	.28**
Conscious will	−0.22	0.05	−0.32***	−0.06	0.03	−.17*

*p < .05. **p < .01. ***p < .001.

comfort. Consistent with Studies 1 and 2, correlations between all dimensions and ratings of our dependent variables were significant in the expected direction (ps < .035), with the exception of the correlation between normative goodness and scientific possibility, which was marginal (p = .065).

We entered our five dimensions as predictors in a multivariate regression with both scientific possibility and scientific comfort as outcome variables. This analysis revealed significant multivariate effects of all predictors—first-person access: $F(2, 85)$ = 9.11, p < .001; introspection: $F(2, 85)$ = 4.53, p = .014; human exceptionalism: $F(2, 85)$ = 11.30, p < .001; normative goodness: $F(2, 85)$ = 26.28, p < .001; and conscious will: $F(2, 85)$ = 13.58, p < .001. We then tested two multiple regression models across items with all five predictors, one on scientific possibility and one on scientific comfort (see Table 2). All predictors remained significant and in the expected direction, with the exception of normative goodness. Surprisingly, normative goodness was positively associated with both scientific possibility and scientific comfort in our regression models (β = 0.47, p < .001, and β = 0.28, p = .001, respectively), although the zero-order relationships between normative goodness and scientific possibility and scientific comfort remained negative (r = −.19, p = .065, and r = −.25, p = .017, respectively). This suggests that the partial relationship between normative goodness and our dependent variables is actually a positive one once the other four predictors are taken into account.

Study 3b

Study 3b aimed to test the generality of the results of Study 3a by replicating the study in a different sample: undergraduate students with exposure to psychology courses.

Method

Two hundred ninety-nine individuals (151 females, 146 males, 2 who selected “other/prefer not to specify”; mean age = 21 years, *SD* = 3 years) were recruited from the undergraduate participant pool at University of California, Berkeley, in exchange for course credit. On average, participants had taken four psychology courses. The procedure of Study 3b was identical to that of Study 3a.

Results

Correlations between each dimension and our two dependent variables are presented in Table 3. All pairs were significantly correlated, with the exception of scientific possibility and normative goodness. A multivariate regression identical to that in Study 3a revealed significant effects of first-person access, $F(2, 85)$ = 30.08, p < .001, human exceptionalism, $F(2, 85)$ = 11.42, p < .001, normative goodness, $F(2, 85)$ = 17.30, p < .001, and conscious will, $F(2, 85)$ = 10.53, p < .001, but not introspection, $F(2, 85)$ = 2.10, p = .128. The individual regression models revealed significant unique effects of all predictors, with the exception of the effect of introspection on scientific comfort (see Table 4). However, as in Study 3a, normative goodness was positively related to scientific comfort when variance due to the other four predictors was accounted for.

Finally, we asked whether participants’ psychology background influenced overall scientific possibility and comfort ratings. We did not find a relationship between the number of psychology courses taken and overall scientific-possibility ratings (r = −.02), $t(295)$ = −0.34, p > .250, nor overall scientific-comfort ratings (r = .05), $t(295)$ = −0.84, p > .250. Surprisingly, however, we found that our undergraduate population displayed lower mean scientific-comfort ratings compared with the Mechanical Turk population used in Study 3a (undergraduates: M = 5.51, SD = 1.30; Mechanical Turk participants: M = 5.80, SD = 1.30), $t(614)$ = 2.79, p = .006. There were no group differences for mean scientific-possibility ratings (undergraduates: M = 4.83, SD = 1.11; Mechanical Turk participants: M = 4.76, SD = 1.29), $t(614)$ = 0.77, p > .250.

Table 3. Zero-Order Correlation Coefficients Between Dimensions and Dependent Variables in Studies 3a and 3b

	Study 3a		Study 3b	
Dimension	Scientific possibility	Scientific comfort	Scientific possibility	Scientific comfort
First-person access	−.69***	−.72***	−.81***	−.84***
Introspection	−.75***	−.74***	−.61***	−.62***
Human exceptionalism	−.69***	−.67***	−.72***	−.67***
Normative goodness	−.19†	−.25*	−.17	−.21*
Conscious will	−.40***	−.31**	−.47***	−.38***

†$p < .07$. *$p < .05$. **$p < .01$. ***$p < .001$.

Discussion

Some topics are perceived to be more appropriate targets for scientific research than others. To our knowledge, however, no research has examined which psychological phenomena are believed to fall beyond the scope of science and why this is the case. Our results suggest that people are more likely to regard a psychological phenomenon as lying beyond the scope of science when it supports privileged introspective access, makes humans exceptional, and involves conscious will, although results are more nuanced when it comes to a phenomenon's normative goodness. Moreover, these judgments about the epistemic scope of science are accompanied by discomfort at the idea that science could fully explain the phenomenon in question.

These judgments reveal theoretically important aspects of folk epistemology: Science is not perceived to be limited by complexity itself but by the nonintentional, third-person perspective of scientific methodology. Judgments about what science perhaps should not attempt to explain—as reflected in scientific discomfort—additionally speak to the relationship between epistemic commitments and values. Further investigating this relationship is an important direction for future research. It could be that people are comfortable with what science can explain, believe science can explain what they are comfortable with science explaining, or that these judgments have an overlapping set of determinants.

Notably, the mind is not the only topic for which people resist scientific explanations; human evolution is a case in point. It seems plausible that some of our predictors—such as human exceptionalism—will extend to other scientific domains, whereas others—such as introspective access—are unique to scientific explanations for the mind. Future work is necessary to understand how judgments about the human mind sit within a larger epistemic framework and how they relate to a broader range of scientific and bioethical issues.

Pursuing this work is important given the relevance of scientific explanations for education, public health, and beyond. For example, scientific explanations for global warming have been shown to shift belief in anthropogenic climate change (Ranney & Clark, 2016), scientific explanations for health behaviors have been shown to generate change in those behaviors (Weisman & Markman, 2017), scientific explanations for criminal behaviors can shift legal judgments (e.g., Denno, 2015), and more generally, scientific explanations have been shown to influence learning and inference (Lombrozo, 2012, 2016). We suggest that such effects could be moderated by the factors our

Table 4. Results of the Two Regression Models Conducted in Study 3b

	Scientific-possibility model (R^2 = .82***)			Scientific-comfort model (R^2 = .77***)		
Predictor	*b*	*SE b*	β	*b*	*SE b*	β
First-person access	−0.55	0.08	−0.53***	0.37	0.05	−0.62***
Introspection	−0.19	0.09	−0.16*	−0.08	0.06	−0.12
Human exceptionalism	−0.31	0.06	−0.34***	−0.13	0.04	−0.26**
Normative goodness	0.17	0.03	0.34***	0.05	0.02	0.20**
Conscious will	0.22	0.05	−0.26***	−0.07	0.03	−0.15*

*$p < .05$. **$p < .01$. ***$p < .001$.

studies reveal. For example, scientific explanations involving mental health are likely to affect judgments and behavior, but we would expect such effects to be moderated by whether the experience or behavior being explained is believed to be good, consciously willed, and so on.

Our studies also reveal that the associations between scientific possibility and comfort, on the one hand, and our predictor dimensions, on the other, are not restricted to a single population. We found highly consistent results across a diverse online sample and a more homogenous undergraduate sample with exposure to formal education within psychology. At the same time, our findings hint at important differences across populations in the perceived scope of science; future work will seek to understand how other individual differences, such as socioeconomic status and political orientation, influence these judgments. Finally, our findings have important implications for policy and the public uptake of science and, more generally, shed light on potential resistance to scientific explanations for the mind and human behavior.

Action Editor

Timothy J. Pleskac served as action editor for this article.

Author Contributions

S. Gottlieb developed the study concept. S. Gottlieb and T. Lombrozo designed the study. S. Gottlieb collected and analyzed the data. S. Gottlieb wrote an initial manuscript, T. Lombrozo provided comments, and both of the authors contributed to subsequent drafts. Both authors approved the final version of the manuscript for submission.

Declaration of Conflicting Interests

The authors declared that they had no conflicts of interest with respect to their authorship or the publication of this article.

Funding

We thank the James S. McDonnell Foundation and the John Templeton Foundation for support.

Supplemental Material

Additional supporting information can be found at http://journals.sagepub.com/doi/suppl/10.1177/0956797617722609

Open Practices

All data and materials have been made publicly available via the Open Science Framework and can be accessed at https://osf.io/3r96f/. The complete Open Practices Disclosure for this article can be found at http://journals.sagepub.com/doi/suppl/10.1177/0956797617722609. This article has received the badges for Open Data and Open Materials. More information about the Open Practices badges can be found at http://www.psychologicalscience.org/publications/badges.

Notes

1. For all studies, we filtered out individuals who had participated in conceptually related studies from our lab group. This also prevented an individual from participating in more than one study reported in this article. All participants in Studies 1 through 3a had Mechanical Turk approval ratings greater than 95%, which has been shown to ensure high data quality (Peer, Vosgerau, & Acquisti, 2014). Therefore, no participants in any of our studies were excluded from analyses, though data from participants who did not complete a study were not analyzed.
2. This was the case for all the studies presented here.
3. For subsequent studies, we focused on the dimensions that accounted for significant unique variance in these individual models, but we additionally report correlations between each dimension and scientific possibility and comfort.

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