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Missing the Trees for the Forest: A Construal Level Account of the Illusion of Explanatory Depth

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An *illusion of explanatory depth* (IOED) occurs when people believe they understand a concept more deeply than they actually do. To date, IOEDs have been identified only in mechanical and natural domains, occluding why they occur and suggesting that their implications are quite limited. Six studies illustrated that IOEDs occur because people adopt an inappropriately abstract construal style when they assess how well they understand concrete concepts. As this mechanism predicts, participants who naturally adopted concrete construal styles (Study 1) or were induced to adopt a concrete construal style (Studies 2–4 and 6), experienced diminished IOEDs. Two additional studies documented a novel IOED in the social psychological domain of electoral voting (Studies 5 and 6), demonstrating the generality of the construal mechanism, the authors also extended the presumed boundary conditions of the effect beyond mechanical and natural domains. These findings suggest a novel factor that might contribute to such diverse social-cognitive shortcomings as stereotyping, egocentrism, and the planning fallacy, where people adopt abstract representations of concepts that should be represented concretely.

Keywords: illusion of explanatory depth, construal, metacognition, overconfidence, illusion of political sophistication

For over 30 years, research on human metacognition—the process of evaluating one's own thoughts and abilities—has demonstrated the fallibility of human introspection (e.g., Alicke, 1985; Castel, McCabe, & Roediger, 2007; Kruger, 1999; Kruger & Dunning, 1999; Nisbett & Wilson, 1977; Rozenblit & Keil, 2002). People generally tend to believe they are more competent than they actually are, and this effect is particularly pronounced among poor performers. For example, participants in one article who demonstrated logical reasoning and grammatical skills among the bottom quartile of their classmates believed they actually performed better than 58% of their classmates (Kruger & Dunning, 1999).

Although the poorest performers in the population tend to overestimate their capabilities most dramatically, more competent members of the population sometimes make similar errors in a variety of domains. One striking demonstration, the *illusion of explanatory depth* (IOED), arises when people overestimate their ability to explain mechanical and natural processes (e.g., Keil, 2003; Rozenblit & Keil, 2002). For example, people know that a zipper closes because it has teeth that somehow interlock, but they know very little about how the teeth actually interlock to enable the bridging mechanism. Similarly, many people know vaguely that an earthquake occurs because two geological plates collide and move relative to one another, but again they know little about the mechanism that initially produces these collisions. Nonetheless, people *believe* they understand these concepts quite deeply and are surprised by the shallowness of their own explanations when prompted to describe the concepts thoroughly.

To date, researchers have only found evidence for IOEDs when people assess their understanding of manmade devices and natural processes (like zippers and earthquakes). In contrast, people appear to be better calibrated when assessing their knowledge of semantic concepts, like declarative facts and trivia (e.g., country capitals; Rozenblit & Keil, 2002). As Rozenblit and Keil (2002) noted, one important characteristic that distinguishes manmade devices and natural processes from trivia is that people are liable to confuse a superficial understanding of what mechanical devices achieve or the consequences of natural processes for a deeper understanding of *how* they function. For example, whereas people either do or do not know that Ouagadougou is the capital of Burkina Faso, they might understand why zippers exist, know how they look, and be able to identify their parts without understanding how zippers function. Similarly, people need not understand how the earth quakes to recognize the consequences of an earthquake and the basic fact that they cause land to shift violently. In other

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words, people can understand certain concepts at an abstract level quite well, while only superficially understanding their more concrete characteristics. IOEDs are likely to emerge when people mistake their mastery of the abstract characteristics of the concept for a belief that they understand the concrete aspects of the concept deeply, when their understanding is far shallower.

On the surface, this appears similar to the mechanism that Pronin and her colleagues ascribe to the so-called *introspection illusion*—the tendency for perceivers to believe they understand other people more deeply than others understand them (e.g., Pronin, Gilovich, & Ross, 2004). The introspection illusion occurs because people focus on how others behave and ignore others' thoughts, which are largely inaccessible. However, these mechanisms are distinct in one critical sense: People experience the IOED despite having access to both abstract and concrete information, whereas the introspection illusion occurs precisely because people have access to a limited field of information. The IOED is arguably easier to manipulate, then, because people are capable of assessing their understanding of the target mechanism—they just fail to focus on the information that illuminates the depth of their understanding and, instead, focus on relatively uninformative cues. Specifically, the IOED should diminish if people are induced to focus on a target's concrete properties instead of its abstract features. To examine this question, we adopted the construal level theory (CLT; for reviews, see Liberman & Trope, 2008; Trope & Liberman, 2003) framework.

CLT and the Illusion of Explanatory Depth

According to CLT, people construe or represent the environment along a continuum from abstractly to concretely. Abstract representations tend to capture the essence of a target, focusing broadly on its superordinate or general features. In contrast, concrete representations focus on the target's narrow or specific features. For example, in the context of serial processes like getting dressed in the morning, an abstract construal might emphasize why the process is important, whereas a concrete construal might emphasize how and in what order people complete the process (Trope & Liberman, 2003; Vallacher & Wegner, 1987). Construal style influences a vast array of cognitive processes, including attitude formation (e.g., Fujita, Eyal, Chaiken, Trope, & Liberman, 2008), likelihood estimates (e.g., Todorov, Goren, & Trope, 2007), and feature processing at large (e.g., Alter & Oppenheimer, 2008; Henderson, Fujita, Trope, & Liberman, 2006).

CLT has important implications for IOEDs. When asked whether they understand how a ballpoint pen works, for example, people are likely to reach very different conclusions depending on whether they adopt an abstract or concrete construal of the pen. Abstractly, ballpoint pens enable people to write information by applying ink to a sheet of paper. This abstract construal is superficially compelling, and people in an abstract mindset are likely to interpret their understanding of the pen's general, abstract properties as a satisfying, concise explanation of how the pen works. In fact, this abstract construal of the pen ignores the mechanism that enables the pen to perform that function in the first place. In contrast, a more concrete representation might focus on the parts that constitute the pen (the barrel, the ball, and the ink reservoir) and how they work in concert to release the ink. Consider the following description of how a ball point pen works (from the materials used by Rozenblit & Keil, 2002):

> The key to a ballpoint pen is the ball. This ball acts as a buffer between the material you're writing on and the quick-drying ink inside the pen. The ball rotates freely and rolls out the ink as it is continuously fed from the ink reservoir (usually a narrow plastic tube filled with ink). The ball is kept in place—between the ink reservoir and the paper—by a socket; and while it is in tight, it still has enough room to roll around as you write. As the pen moves across the paper, the ball turns and gravity forces the ink down the reservoir and onto the ball, where it is transferred onto the paper. It's this rolling mechanism that allows the ink to flow onto the top of the ball and roll onto the paper you're writing on, while at the same time sealing the ink from the air so it does not dry in the reservoir.

People who adopt a concrete representation of a ballpoint pen are therefore better equipped to assess how well they understand the role of each component of the pen than are people who adopt a broad, abstract construal of the process.

IOEDs might arise because people confuse the metacognitive experience of understanding an abstract concept with the more relevant metacognitive experience of understanding the concept's concrete details. These two metacognitive experiences arise from two distinct sets of cognitive content. For example, people who construe a ballpoint pen abstractly are more likely to focus on the pen's function and perhaps its global appearance. In contrast, people who construe the pen concretely are more likely to focus on how well they understand how its parts work together to enable the pen to function—in this case, the appropriate metacognition. Accordingly, people are less likely to overestimate their understanding of how the pen works when their introspections focus appropriately on the pen's concrete features rather than its abstract features. It is important that, in both cases, people rely on their metacognitions to assess their understanding of a pen. At the same time, however, they fail to recognize that construing the pen abstractly leads them to focus primarily on cognitive content that cannot illuminate how deeply they understand how the pen functions concretely. As such, IOEDs should become more pronounced as people adopt increasingly abstract mindsets, and construal style should mediate the strength of the illusion.

Overview of Present Research

We conducted six studies designed to show that the IOED emerges because people adopt an abstract construal style and inappropriately rely on the ensuing metacognitions when assessing their understanding of concrete concepts. Accordingly, we began by examining whether participants who naturally adopted an abstract construal style would experience heightened IOEDs (Study 1). Having explored the naturally arising relationship between construal and the IOED, we examined whether inducing a broad (Study 2) or abstract (Studies 3 and 4) construal style would exaggerate the IOED. We examined this effect using two distinct construal manipulations and tested directly whether participants who transiently adopted an abstract construal style experienced exaggerated IOEDs. Because this construal mechanism is domain general, it suggests that the boundary conditions identified in earlier research (e.g., Rozenblit & Keil, 2002) may be too stringent. We therefore tested whether these boundary conditions

should be relaxed by seeking evidence for an IOED in the novel domain of electoral voting, where voters typically construe candidates as representatives of their chosen party's abstract ideals (Studies 5 and 6).

Study 1: The Relationship Between Abstraction and the IOED

We began by examining whether people who naturally perceive the world more abstractly experience heightened IOEDs. Participants completed two tasks: first, a task designed to assess whether they were experiencing the IOED and, second, a task that assessed how abstractly or concretely they construed a series of everyday behaviors. We calculated the relationship between these measures to determine the relationship between participants' construal style and their tendency to experience the IOED.

Method

Participants. Sixty adult participants (35 women, 25 men; M_{age} = 36.22 years, SD = 13.22; 36 White, 22 Asian, 2 Black)[1] completed a brief two-part questionnaire on Amazon.com's Mechanical Turk online survey program. Mechanical Turk allows researchers to post questionnaires that are completed by Amazon.com users who participate in exchange for small contributions toward an Amazon.com gift voucher. The platform records each participant's IP address to prevent participants from completing the same questionnaire more than once. Because neither gender nor ethnicity interacted with the results in this or the following studies, we refrain from discussing gender and ethnicity effects further.

Materials, design, and procedure.

IOED task. Participants were asked to complete a questionnaire titled "How do different things work?" The instructions explained that participants would be asked to rate their understanding of three different mechanical processes, each on a 7-point scale (from 1 = *know nothing about how this object works* to 7 = *know everything about how this object works*).

To give participants a sense of how to use the scale, we provided the sample paragraph describing how a ballpoint pen works (from Rozenblit & Keil, 2002). A paragraph following the description explained that a score of 7 would feature all the elements of the description (e.g., what the parts are, their function, how they interact), a 4 would require knowledge of some of the basics but not all the intricacies of the description, and a score of 1 would reflect an absence of knowledge about how the object worked.

Having read the sample paragraph, participants assessed their understanding of how three target devices (bicycle lock, sewing machine, and zipper) worked using the 7-point scale. After making these initial ratings, participants were asked to imagine they had "just met a person who did not understand how these three items work" and to "write as complete an explanation of how each item works" as they could manage. Participants typed open-ended descriptions of how each device worked. Finally, participants reassessed their knowledge of how each device worked again on the same 7-point scale as they had used previously. We calculated the magnitude of each participants' IOED by subtracting their postexpression knowledge estimate from their initial knowledge estimate (both averaged across the three devices). A larger positive score therefore represents a larger IOED.

Construal measure. To assess participants' prevailing construal style, we asked participants to indicate whether they preferred a concrete description or an abstract description for 13 everyday behaviors taken from the Behavioral Identification Form (BIF; Vallacher & Wegner, 1989; for a similar approach to ours, see Fujita, Trope, Liberman, & Levin-Sagi, 2006). For example, participants decided whether they preferred the description of *eating* as "chewing and swallowing" (concrete construal) or "getting nutrition" (abstract construal). The two descriptions were assigned the labels of *Description A* and *Description B,* and we counterbalanced which label referred to the concrete and abstract descriptions. Participants indicated their relative preference for the two descriptions on a 7-point scale (from 1 = *strongly prefer Description A* to 7 = *strongly prefer Description B*). We reverse scored the ratings when Description A was the abstract description and Description B was the concrete description and averaged the resulting 13 ratings to measure participants' relative preference for the abstract descriptions.

Results and Discussion

We found basic evidence for an IOED across the sample, as participants tended to significantly overestimate their ability to explain how the three devices worked before attempting to express those explanations in writing (M = 0.42, SD = 0.82), one-sample $t(58) = 3.89$, $p < .0001$, $\eta_p^2 = .21$. Participants also expressed a significant preference for the abstract descriptions of the 13 items in the BIF. Specifically, their responses tended to be significantly higher than the midpoint of 4 on the 7-point scale, where higher numbers represented a preference for abstract construal (M = 4.39), $t(58) = 2.65$, $p = .01$, $\eta_p^2 = .11$. This latter result suggests that participants tended to naturally prefer the descriptions consistent with an abstract construal mindset.

Most important, consistent with our expectations, participants tended to report higher IOEDs when they adopted a more abstract mindset according to the BIF measure, $r(58) = .26$, $p < .05$. This result provides initial evidence that people who construe the world relatively abstractly experience more pronounced IOEDs.

Study 2: Focusing on Parts Versus Focusing on the Whole

Study 1 suggested a naturally occurring relationship between construal and the IOED. In the remaining studies, we sought to demonstrate experimentally that people experience greater IOEDs when they are induced to adopt abstract or broad mindsets rather than concrete or narrow mindsets.

Building on our assumption that IOEDs occur because people inappropriately consult abstract knowledge when assessing their

[1] We tested a sample of 100 participants but were left with a sample of 60 after the remaining participants failed to satisfy an instructional manipulation check (Oppenheimer, Meyvis, & Davidenko, 2009). Instructional manipulation checks are designed to identify participants who fail to read the experiment's instructions carefully, which introduces noise and lowers power when the experiment requires focused attention. We were unsure why the rate of failure was so high in this study, but we administered the same instructional manipulation check on several other studies and found dramatically smaller rates of failure between 5% and 10%.

understanding of concrete mechanical concepts, people should experience diminished IOEDs when induced to adopt a narrower, concrete mindset. Study 2 examined whether people who were induced to think more narrowly about mechanical devices were more calibrated when assessing their understanding of those devices. Participants were asked to estimate how well they could explain the operation of three mechanical devices. In one condition, participants were asked to rate how well they could explain how the mechanical devices worked (the *broad construal* condition), and in the other condition, they were asked to rate how well they could explain how the parts of the mechanical devices enabled the devices to work (the *narrow construal* condition). After attempting to explain how the three devices worked, participants reassessed their knowledge on the rating scale they had used previously. Although both conditions prompted a similar introspective process, the narrow construal condition induced a more concrete construal of each process by explicitly asking participants to consider its component parts. If the mechanism we proposed indeed drives the IOED, participants in the narrow construal condition should provide better calibrated knowledge estimates.[2]

Method

Participants. Seventy-nine adult participants (51 women, 28 men; M_{age} = 34.90 years, SD = 12.65) completed a brief questionnaire on Amazon.com's Mechanical Turk online survey program.

Materials, design, and procedure. As in Study 1, participants completed a questionnaire titled "How do different things work?" This questionnaire was identical to the questionnaire used in Study 1, apart from the inclusion of a construal manipulation in Study 2. Specifically, in the broad construal condition, participants were asked to rate how well they knew, for example, "how a zipper works." In the narrow construal condition, participants rated instead how well they knew "how the parts of a zipper enable it to work." As in Study 1, we compared participants' initial estimates to their postexpression estimates of how well they understood how the zipper, bike lock, and sewing machine worked.[3]

Results and Discussion

We began by conducting a 2 (Construal: narrow vs. broad) × 2 (Rating: initial vs. postexpression) mixed-design analysis of variance (ANOVA), with repeated measures on the rating factor. Participants appeared to experience an IOED, as they rated their understanding of the three devices more highly before trying to explain how they worked than after they had produced written explanations, $F_{\text{bike lock}}(1, 76) = 7.52$, $p < .01$, $\eta_p^2 = .09$; $F_{\text{zipper}}(1, 76) = 22.12$, $p < 10^{-5}$, $\eta_p^2 = .23$; $F_{\text{sewing machine}}(1, 76) = 4.75$, $p < .05$, $\eta_p^2 = .06$. However, these main effects were qualified by significant Rating × Construal interactions, $F_{\text{bike lock}}(1, 76) = 4.64$, $p < .05$, $\eta_p^2 = .06$; $F_{\text{zipper}}(1, 76) = 4.74$, $p < .05$, $\eta_p^2 = .06$; $F_{\text{sewing machine}}(1, 76) = 4.75$, $p < .05$, $\eta_p^2 = .06$ (see Table 1 for descriptive statistics for each mechanical device; Figure 1 depicts these descriptives collapsed across the three devices). Participants in the broad construal condition experienced an IOED when assessing their understanding of all three devices, believing they were better able to explain how the devices worked than they actually were, $F_{\text{bike lock}}(1, 45) = 10.95$, $p < .01$, $\eta_p^2 = .20$; $F_{\text{zipper}}(1, 45) = 28.82$, $p < .10^{-5}$, $\eta_p^2 = .39$; $F_{\text{sewing machine}}(1, 45) = 10.19$, $p < .01$, $\eta_p^2 = .19$. In contrast, participants in the narrow construal condition did not experience a significant IOED when assessing their understanding of any of the three devices (all ps $> .11$). We also reclassified participants according to whether or not they generally overestimated their knowledge of how the three devices worked. Participants who, on average, gave higher initial knowledge ratings than postexpression knowledge ratings were classified as globally experiencing the IOED, whereas participants whose initial ratings were equal to or lower than their postexpression ratings were classified as not globally experiencing the IOED. Whereas 74% of participants in the broad construal condition experienced the IOED, a significantly lower proportion of 42% experienced the IOED in the narrow construal condition, $\chi^2(1, N = 79) = 7.99$, $p < .01$, $\varphi = .32$.

Study 2 therefore suggests that people are better calibrated when assessing their ability to explain mechanical processes when they adopt a narrow rather than broad construal style. Moreover, this robust effect emerged for three different devices: a bicycle lock, a zipper, and a sewing machine. These results therefore provide encouraging preliminary support for our hypothesis that IOEDs occur when people adopt inappropriately abstract construal styles when assessing their knowledge of concrete processes.

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[2] In a preliminary pilot study, we asked 42 Princeton University undergraduates to assess their ability to explain how 10 different mechanical devices operated. As in Study 2, participants were randomly assigned to a *broad construal* condition or a *narrow construal* condition. In the broad construal condition, participants were asked to rate how well they knew, for example, "how a zipper works." In the narrow construal condition, participants rated instead how well they knew "how the parts of a zipper enable it to work." Responding on a 7-point scale (from 1 = *know nothing about how this object works* to 7 = *know everything about how this object works*), participants in the narrow construal condition assessed their knowledge more critically (M = 2.54, SD = 0.84) than did participants in the broad construal condition (M = 3.05, SD = 0.87), $t(9) = 7.61$, $p < .10^{-4}$, $\eta_p^2 = .87$. This pattern was very robust, persisting across all 10 mechanical devices. Consistent with our expectations, this preliminary result suggests that the standard IOED effect might be attenuated when people adopt a narrower or concrete construal style.

[3] Researchers who study the IOED typically ask participants to rate their knowledge of the target issue both before and after expressing their understanding of the issue. One concern is that asking the same question twice introduces demand characteristics, which might lead participants to claim that they are experiencing a more pronounced IOED than they actually are. This potential demand characteristic may explain why even participants in the concrete construal condition experienced a small IOED. Nonetheless, several features of the present research obviate this potential confound: First, in all but one study, we focused on the interaction between construal style and the IOED, so we are interested less in the absolute magnitude of the IOED than in the relative difference between the magnitude of the IOED when people construe the world abstractly rather than concretely; second, in Study 3b, we assessed the magnitude of the IOED with a single, direct item as well as the repeated question used in the other studies; and third, even in Study 5, where we did not focus on an interaction, independent third-party raters assessed participants' explanations and confirmed that the IOED was not merely an artifact of demand.

Table 1
Self-Assessed Knowledge of How Three Devices Worked in the Narrow Construal (Focus on Parts) and Broad Construal (Focus on Device) Conditions, Initially and After Expressing How They Worked, in Study 2

		Initial Rating (1–7)		Postexpression rating (1–7)	
Device	Construal type	*M*	*SD*	*M*	*SD*
Bicycle lock	Broad construal	3.91**	1.67	3.13**	1.33
	Narrow construal (parts)	3.31	1.40	3.22	1.50
Zipper	Broad construal	4.98**	1.27	3.96**	1.66
	Narrow construal (parts)	4.31	1.47	3.94	1.39
Sewing machine	Broad construal	3.33**	1.43	2.67**	1.35
	Narrow construal (parts)	2.81	1.55	2.81	1.18

** denotes row-wise difference at $p < .01$.

Overview of Studies 3a and 3b

One concern with Study 2 was that asking participants to think about how a device worked (the broad construal condition) was materially different from asking them to think about how the parts of the device enabled it to work (the narrow construal condition). Accordingly, in Studies 3a and 3b, we used a different paradigm to induce participants to adopt an abstract or concrete mindset.

In addition to gathering converging evidence, we designed Studies 3a and 3b to test more directly the extent to which abstract mindsets led to IOEDs. In Study 3a, we aimed to show that the IOED was mediated by the participant's construal style. To that end, Study 3a included questions that measured participants' prevailing construal style along a continuum from concrete to abstract. This measure, serving as a potential IOED mediator, allowed us to determine whether participants who adopted a more abstract mindset showed more pronounced IOEDs than their counterparts who adopted a more concrete mindset.

Whereas our previous studies established participants' experience of an IOED indirectly, Study 3b assessed the IOED using a more direct self-report measure. Specifically, in addition to asking participants to assess their understanding of the devices before and after expressing how they worked, we asked participants directly whether their perceived depth of understanding changed between the first and second ratings. Studies 3a and 3b were methodologically very similar apart from these minor distinctions.

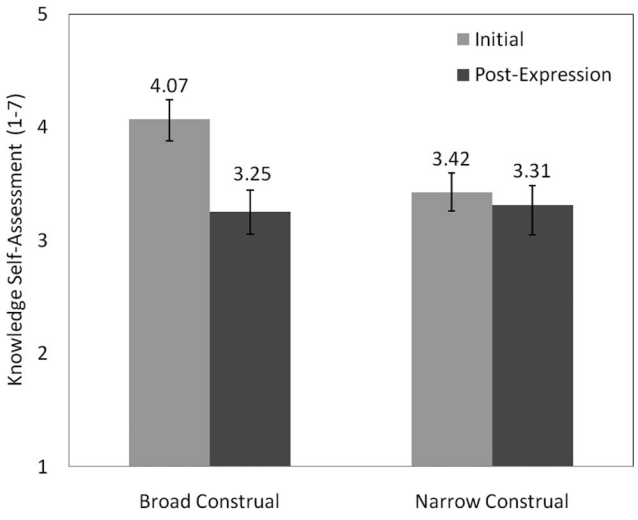

Figure 1. Average rated knowledge of how three devices worked in the narrow construal (focus on parts) and broad construal (focus on device) conditions, initially and after expressing how they worked, in Study 2. Error bars represent the standard error of the mean.

Study 3a: Construal Abstractness Mediates the Illusion of Explanatory Depth

Method

Participants. Eighty adult participants (57 women, 23 men; $M_{age} = 37.43$ years, $SD = 10.89$) completed this study on Amazon.com's Mechanical Turk online survey program. As in Studies 1 and 2, participants received a small contribution toward an Amazon.com gift voucher.

Materials, design, and procedure. At the beginning of the study, participants were asked to complete three ostensibly unrelated questionnaires. Participants completed the three questionnaires, which were in fact a construal manipulation, the main IOED task, and a construal manipulation check.

Construal manipulation. The first questionnaire was designed to induce participants to adopt either a concrete construal style or an abstract construal style. One of the critical distinctions between concrete and abstract construal is that people focus on *how* goal-directed actions are completed when they adopt a concrete lens but focus on *why* they engage in those actions when they adopt an abstract lens (e.g., Liberman & Trope, 1998; Vallacher & Wegner, 1987). Accordingly, participants in the concrete construal condition typed in an open-ended response box *how* they might perform three everyday behaviors (backing up their computers, driving a car, and getting dressed in the morning), whereas participants in the abstract construal condition described *why* they might perform those actions (for a similar construal-induction procedure, see Freitas, Gollwitzer, & Trope, 2004; Fujita, Trope, Liberman, & Levin-Sagi, 2006).

IOED task. Participants completed the three-item IOED task used in Study 1 and the broad construal (no parts) condition in Study 2. Specifically, participants estimated how well they believed they could explain the operation of a bicycle lock, zipper, and sewing machine; tried to explain how those devices work; and again rated their ability to explain how those devices worked.

Construal manipulation check. To assess the effectiveness of the initial construal manipulation, participants completed the 13-item BIF described in Study 1.

Results and Discussion

Manipulation check. As expected, participants who described *why* they engaged in the three everyday tasks later preferred the abstract descriptions for the 13 behaviors more strongly than did participants who described *how* they engaged in the three tasks ($M = 4.67$, $SD = 0.75$ and $M = 3.49$, $SD = 0.67$, respectively), $t(78) = 7.24$, $p < 10^{-10}$, $\eta_p^2 = .40$. Participants in the abstract construal condition therefore appeared to adopt a more abstract construal style than did participants in the concrete construal condition.

Primary analyses. Participants' initial knowledge assessments and postexpression knowledge assessments were strongly associated across the three devices (both αs $= .79$), so we collapsed them to form a single initial knowledge assessment measure and a single postexpression knowledge assessment measure, respectively.

As in Study 2, we conducted a 2 (Construal: narrow vs. broad) $\times$ 2 (Time of Assessment: initial vs. postexpression) mixed-design ANOVA, with repeated measures on the time of assessment factor. Collapsed across the construal conditions, participants rated their understanding of the devices more highly before than after trying to explain how they worked, $F(1, 78) = 34.97$, $p < 10^{-8}$, $\eta_p^2 = .31$. However, this main effect was qualified by a significant Time of Assessment $\times$ Construal interaction, $F(1, 78) = 4.44$, $p < .04$, $\eta_p^2 = .05$ (see Figure 2). Follow-up simple effects analyses revealed that, although participants in the concrete construal condition experience a significant IOED, $F(1, 32) = 9.61$, $p = .004$, $\eta_p^2 = .23$, participants in the abstract construal condition experienced a markedly stronger IOED, $F(1, 46) = 31.21$, $p < 10^{-6}$, $\eta_p^2 = .40$. As in Study 2, we reclassified participants as having shown an IOED if they gave higher average initial knowledge ratings than postexpression knowledge ratings. Whereas 72% of participants in the abstract construal condition experienced the IOED, a significantly lower proportion of 48% experienced the IOED in the concrete construal condition, $\chi^2(1, N = 80) = 4.71$, $p = .03$, $\varphi = .24$.

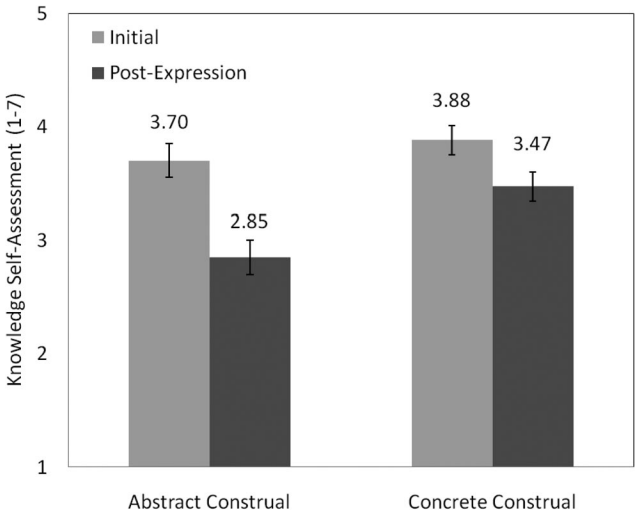

Figure 2. Average rated knowledge of how three devices worked in the abstract construal and concrete construal conditions, initially and after expressing how they worked, in Study 3a. Error bars represent standard error of the mean.

Mediation analysis. The previous analyses suggest that the IOED was more pronounced in the abstract construal condition. Based on our hypotheses, this condition-wise difference should arise because participants in the abstract construal condition transiently adopted a more abstract construal mindset. To test this relationship, we examined whether participants' construal style, measured by the BIF, mediated the relationship between their construal condition assignment and how strongly they experienced an IOED. Accordingly, we followed Baron and Kenny's (1986) popular multistep mediation procedure. As Figure 3 shows, participants' BIF scores fully mediated the relationship between their construal condition and the magnitude of their IOED (Sobel's $z = 1.96$, $p < .05$). Specifically, participants in the abstract construal condition experienced a greater IOED than did participants in the concrete construal condition, but this relationship was no longer significant when participants' preference for abstract construal on the BIF was included in the regression model. At the same time, participants' BIF scores significantly predicted the magnitude of their IOED, controlling for the effects of the construal condition variable. These results further suggest that illusions of explanatory depth arise largely because people sometimes assess their understanding of concrete processes through the lens of an abstract construal style.

Further analyses. Although these results generally confirmed our expectations, they were in one sense surprising. IOEDs generally occur when people overestimate their ability to explain a particular process, and later lower those estimates when they realize that their explanatory powers are somewhat more limited. Although participants in the abstract construal condition lowered their estimates more strongly than did participants in the concrete construal condition, participants' initial ratings did not differ by condition (see the light bars in Figure 2; $F < 1$, $p > .5$). Rather, the effect appeared to be driven by participants' revised ratings, as participants in the abstract condition assigned lower ratings than those in the concrete construal condition when asked to revise their knowledge estimates postexpression, $F(1, 78) = 4.22$, $p = .04$, $\eta_p^2 = .05$.

These results admit three distinct interpretations: First, participants may have been unsure how to anchor their responses on the 7-point scale initially, so they gravitated toward the middle of the scale and adjusted accordingly when making a second response[4]; second, when making their final assessments, participants in the concrete condition may have overestimated the depth of their

[4] Although participants initially appeared to gravitate toward the middle of the scale in Studies 3a and 3b, participants in the concrete construal condition in Study 2 rated their initial understanding of the devices significantly below the midpoint of 4 ($M = 3.42$; cf. $M = 4.07$ in the abstract condition). The construal manipulation in Study 2 was significantly more heavy handed than the manipulation in the remaining studies, so asking participants to focus on the parts of each device may have cast sufficient doubt on their ability to explain the mechanisms to prompt responses that fell below the midpoint.

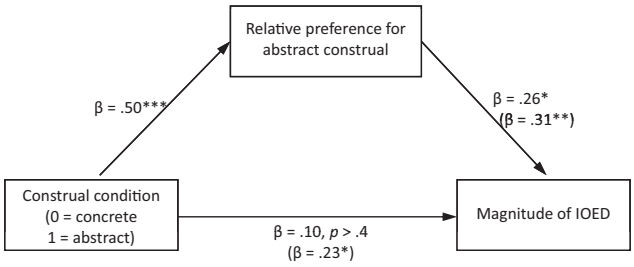

Figure 3. Mediation analysis in Study 3a, testing whether a relative preference for abstract construal, measured on the Behavioral Identification Form (Vallacher & Wegner, 1989), mediated the relationship between construal condition and the size of the illusion of explanatory depth (IOED). $^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$.

explanations relative to participants in the abstract condition; and, third, participants in the concrete condition may have actually provided better descriptions of how the three devices worked. The first explanation is consistent with the IOED, whereas the second and third explanations reflect different cognitive processes.

The data generally support the first explanation, which is consistent with an IOED. Participants' initial ratings did not differ significantly from the midpoint of 4 in either the abstract condition, $t(46) = -1.55$, $p > .12$, $\eta_p^2 = .05$, or the concrete condition, $t(32) = -.52$, $p > .60$, $\eta_p^2 < .01$, which may indicate that they gravitated toward the midpoint in both conditions because they were unsure about how to assign absolute initial ratings. Indeed, researchers across a broad array of contexts have noted that Likert-type rating scales measure absolute responses far less effectively than they measure relative responses (e.g., Dittrich, Francis, Hatzinger, & Katzenbeisser, 2007; Heine, Lehman, Peng, & Greenholtz, 2002; Olson, Goffin, & Haynes, 2007). Respondents who are unsure how to use a scale tend to gravitate initially toward its midpoint, and a second rating using the same scale is therefore more informative because it can be quantified relative to the somewhat arbitrary initial rating. This interpretation is consistent with our suggestion that participants in the abstract construal condition experienced a more pronounced IOED than did participants in the concrete construal condition, because participants who adopted an abstract construal style lowered their postexpression ratings more profoundly than did participants who adopted a concrete construal style.

The second interpretation of the results is that participants in the concrete construal condition overestimated the depth of their explanations relative to participants in the abstract construal condition. This overestimation would lead participants in the concrete construal condition to lower their postexpression estimates less than participants in the abstract construal condition. To eliminate this alternative explanation, we conducted a brief supplementary study. One hundred participants on Amazon's Mechanical Turk program completed either the abstract or concrete construal manipulation used in Study 3a. After completing the construal manipulation, participants rated the depth of 12 descriptions taken from the original study (a randomly selected set that contained two of each of the three devices in each of the two construal conditions) using the original 7-point scale. Each description was rated by at least two participants in each construal condition. We averaged these ratings to create a mean *other concrete* rating and a mean *other abstract* rating. To show that participants in the original concrete condition were not more lenient merely because they adopted a concrete construal style, we conducted a 2×2 ANOVA examining the effect of condition (concrete vs. abstract) and target (self-ratings vs. other ratings) on ratings of each statement's depth. We found a significant interaction between condition and target, $F(1, 78) = 5.21$, $p = .025$, $\eta_p^2 = .06$, and follow-up simple effects analyses revealed that the statements were only rated more highly by self-raters who were induced to adopt a concrete construal style, $F(1, 78) = 4.22$, $p = .043$, $\eta_p^2 = .05$, but not by observers who had not completed the study themselves ($F = 1.04$, $p = .31$), $\eta_p^2 = .01$ (see Figure 4).[5] This effect suggests that adopting a concrete mindset does not induce leniency, per se. Rather, participants who completed the study appeared to rate their descriptions more leniently than did participants in the abstract condition because they were less surprised by the statements' lack of depth.

Finally, the same observer ratings rule out the third alternative explanation, that participants in the concrete condition actually provided deeper descriptions of the three mechanical devices. Specifically, third-party raters did not generally rate the descriptions generated by participants in the concrete condition ($M = 4.19$, $SD = 1.15$) more highly than those generated by participants in the abstract condition ($M = 4.22$, $SD = 1.29$), $t(79) = .26$, $p = .80$, $\eta_p^2 < .01$.

Although these last analyses rule out the possibility that people are more lenient or provide better descriptions when they adopt a concrete construal style, we sought additional affirmative evidence that participants experienced an IOED. Accordingly, in Study 3b, we used a more direct measure of the IOED that did not rely on relative ratings.

Study 3b: Measuring the Magnitude of the IOED Directly

Method

Participants. One hundred thirty-two adult participants (81 women, 51 men; $M_{age} = 35.92$ years, $SD = 12.54$) completed this study on Amazon.com's Mechanical Turk online survey program. As in Studies 1–3a, participants received a small contribution toward an Amazon.com gift voucher.

Materials, design, and procedure. This study was identical to Study 3a, apart from several subtle but important differences. In place of the BIF questionnaire, participants answered one additional question about each device that assessed the strength of the IOED more directly (the *direct* measure). Specifically, after indicating how deeply they understood how each of the three devices worked, participants indicated whether their perceived understanding of each device changed between their initial and final ratings (-3 = *I know much less than I thought I did*, 0 = *I know as much*

[5] Unfortunately, we failed to administer a construal manipulation check after observers had completed their construal induction process. Nonetheless, the same manipulation was successful in two other studies that included a manipulation check in this article and several other studies reported by other researchers (e.g., Freitas et al., 2004; Fujita et al., 2006). Accordingly, observers in the concrete and abstract construal conditions are unlikely to have rated the descriptions similarly merely because the construal manipulation was ineffective.

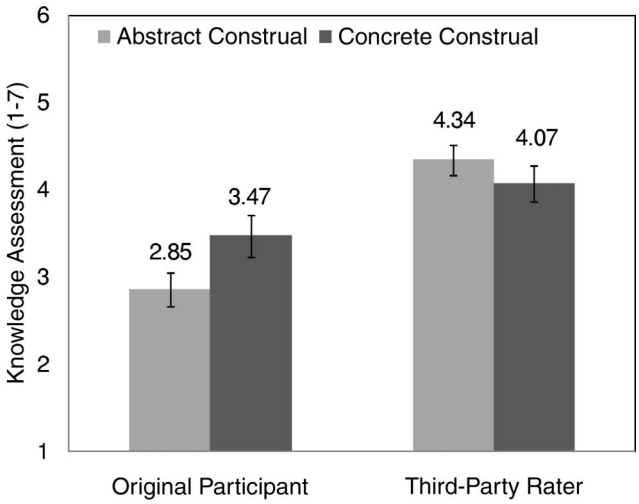

Figure 4. Assessments of the strength of the explanations in Study 3a by participants (postexpression) and third-party observers who were induced to adopt a concrete or abstract construal style. Error bars represent standard error of the mean.

as I thought I did, +3 = *I know much more than I thought I did*). Paired with participants' initial and postexpression knowledge assessments (the *indirect* measure), this directly phrased question allowed us to determine whether participants experienced an IOED or whether their divergent initial and final knowledge assessments instead reflected a different cognitive process.

Results and Discussion

Preliminary analyses. We began by collapsing participants' ratings across the three mechanical devices (bicycle lock, sewing machine, and zipper), as we had done in Studies 1–3a. These collapsed scores produced three separate ratings for each participant: an initial knowledge assessment, a postexpression knowledge assessment, and the direct measure of whether participants' assessments changed between their initial and postexpression assessments.

As expected, the difference between participants' postexpression and initial knowledge assessments was strongly correlated with the direct measure of how much their assessment changed after expressing how the devices worked, $r(130) = .64$, $p < 10^{-16}$. This relationship suggests that the indirect IOED measure (the difference between participants' initial assessments and their assessments after expressing how the devices worked) adequately reflected participants' direct, subjective experiences of the IOED.

Indirect measure analysis. As in Study 3a, we examined participants' initial knowledge assessments and postexpression knowledge assessments in the two construal conditions. We conducted a 2 (Construal: narrow vs. broad) × 2 (Time of Assessment: initial vs. postexpression) mixed-design ANOVA, with repeated measures on the time of assessment factor. Collapsed across the construal conditions, participants initially rated their understanding of the devices more highly than after trying to explain how they worked, $F(1, 130) = 67.45$, $p < 10^{-13}$, $\eta_p^2 = .34$. This main effect was qualified by the same significant Time of Assessment × Construal interaction observed in Study 3a, $F(1, 130) = 7.07$, $p < .01$, $\eta_p^2 = .05$ (see Figure 5). Again, although participants in the concrete construal condition experienced a significant IOED, $F(1, 54) = 12.96$, $p = .001$, $\eta_p^2 = .19$, participants in the abstract construal condition experienced a markedly more pronounced IOED, $F(1, 76) = 71.94$, $p < 10^{-12}$, $\eta_p^2 = .49$. Again, we reclassified participants as having shown an IOED if they gave higher average initial knowledge ratings than postexpression knowledge ratings. Whereas 77% of participants in the abstract construal condition experienced the IOED, a significantly smaller proportion of 56% experienced the IOED in the concrete construal condition, $\chi^2(1, N = 132) = 6.07$, $p = .01$, $\varphi = .21$.

The pattern of results mirrors those in Study 3a: Again, participants' initial ratings did not differ significantly between the two construal conditions ($F < 1$; see the two light gray, left-hand bars in Figure 5) and approximated the scale's midpoint value of 4. In contrast, participants in the abstract construal condition assessed their knowledge more critically than did participants in the concrete construal condition after attempting to express how the devices worked, $F(1, 130) = 4.73$, $p < .04$, $\eta_p^2 = .04$ (see the two left-hand bars in Figure 5).

Direct measure analysis. Participants' responses on the direct measure were strongly related to their responses on the indirect measure ($\alpha = .77$), suggesting that they measured the same underlying construct. Moreover, consistent with the proposition that participants in the abstract construal condition experienced a greater IOED than did those in the concrete construal condition, participants in the abstract condition perceived a significantly greater decline in their knowledge after expressing how the three devices worked ($M = -0.85$, $SD = 1.07$) than did participants in the concrete construal condition ($M = -0.42$, $SD = 1.35$), $t(130) = 2.06$, $p = .04$, $\eta_p^2 = .03$. This direct result mirrors the pattern of results from the indirect measure, and suggests that participants in the abstract construal condition indeed experienced a stronger IOED than did participants in the concrete construal condition.

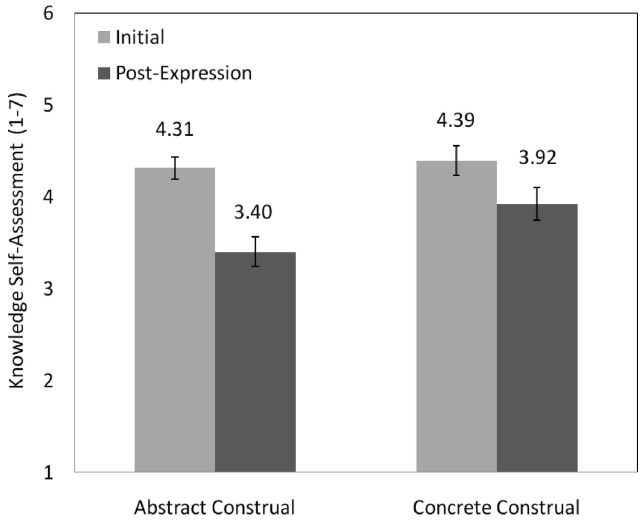

Figure 5. Average rated knowledge of how three devices worked in the abstract construal and concrete construal conditions, initially and after expressing how they worked, in Study 3b. Error bars represent standard error of the mean.

Study 4: Addressing Alternative Explanations for the Construal–IOED Link

We designed Study 4 to examine two alternative explanations for the apparent link between construal and the IOED in the earlier studies. In Studies 3a and 3b, participants in the concrete construal condition were induced to adopt a concrete construal style by indicating *how* they might complete three everyday behaviors. In contrast, those in the abstract construal condition reported *why* they might undertake the same series of behaviors. In addition to priming a more concrete construal style, asking participants to report *how* they undertook three behaviors may have also primed them to think more carefully about how the zipper, bike lock, and sewing machine work in the second phase of the study. Consequently, participants in the concrete condition might have shown a diminished IOED because they were primed to think about how well they could explain how the three devices worked, rather than because they approached the question with a more appropriate, concrete mindset, per se. To address this concern, we adopted a different construal manipulation in Study 4.

We also evaluated an alternative explanation for the link between construal and the IOED. Prior research suggests that people are more willing to entertain self-criticism when they adopt an abstract construal style (e.g., Freitas, Salovey, & Liberman, 2001; Fujita et al., 2006). Consequently, participants in the abstract construal condition may have been more self-critical, leading them to report lower postexpression knowledge estimates than those in the concrete construal condition. We included two scales at the conclusion of the study to examine this potential alternative explanation.

Method

Participants. One hundred forty-two adults (79 women, 63 men; M_{age} = 33.12 years, SD = 13.14) completed this questionnaire using the Mechanical Turk platform described in the earlier studies.

Materials, design, and procedure. Participants began by completing a construal manipulation questionnaire. The questionnaire listed 10 objects, and participants were asked to identify either a superordinate category to which the object belonged (inducing higher level, abstract construal) or a specific example of each object (inducing lower level, concrete construal; adopted from Fujita & Han, 2009; Fujita et al., 2006). For example, participants were presented with the word *soda,* which engendered responses like *drink* and *beverage* in the abstract construal condition and *Coke* and *Pepsi* in the concrete construal condition.

After completing the construal manipulation, participants completed the IOED measure described in Study 3a, in which they estimated their ability to explain how a zipper, bike lock, and sewing machine work; attempted to explain how those devices work; and then reevaluated their ability to explain how the devices work.

Finally, participants responded to two questions designed to assess whether participants in the abstract condition were more self-critical or had higher self-expectations than did participants in the concrete condition. Specifically, participants indicated how strongly they agreed with the statements "It is appropriate to criticize myself when I perform poorly" and "I sometimes fail to live up to my expectations" (both on 7-point scales anchored at 1 = *strongly disagree* and 7 = *strongly agree*).

Results and Discussion

As in the earlier studies, we conducted a 2 (Construal: concrete vs. abstract) × 2 (Rating: initial vs. postexpression) mixed-design ANOVA, with repeated measures on the rating factor. Again, we found an IOED, collapsed across the construal conditions, as participants initially rated their understanding of the devices more highly than after trying to explain how they worked, $F(1, 141) = 33.88$, $p < 10^{-8}$, $\eta_p^2 = .19$. This main effect was qualified by the same significant Rating × Construal interaction observed in the earlier studies, $F(1, 140) = 4.66$, $p < .04$, $\eta_p^2 = .03$ (see Figure 6). Again, although participants in the concrete condition experienced a significant IOED, $F(1, 70) = 7.94$, $p = .006$, $\eta_p^2 = .10$, participants in the abstract construal condition experienced a significantly stronger IOED, $F(1, 70) = 28.94$, $p < 10^{-7}$, $\eta_p^2 = .29$. As in the earlier studies, we reclassified participants as having shown an IOED if they gave higher average initial knowledge ratings than postexpression knowledge ratings. Whereas 65% of participants in the abstract construal condition experienced the IOED, a significantly smaller proportion of 48% experienced the IOED in the concrete construal condition, $\chi^2(1, N = 142) = 4.12$, $p < .05$, $\varphi = .17$.

Participants in the abstract condition were neither more self-critical (M = 5.06, SD = 1.56) nor had higher expectations of themselves (M = 4.77, SD = 1.36) than did participants in the concrete condition (M = 5.20, SD = 1.33 and M = 4.78, SD = 1.51, respectively; both ts < 1). Moreover, participants who were more self-critical and had higher expectations of themselves did not experience stronger IOEDs, both rs(140) = .08, both ps > .34. These results suggest that participants in the abstract construal condition did not show a heightened IOED merely because they were more self-critical or had higher self-expectations.

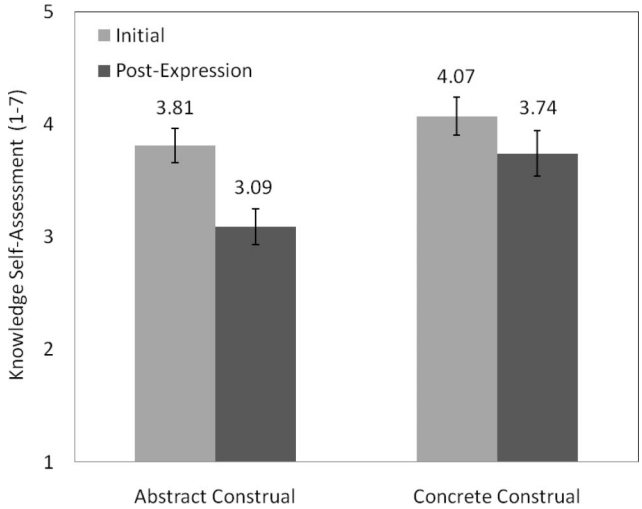

Figure 6. Average rated knowledge of how three devices worked in the abstract construal and concrete construal conditions, initially and after expressing how they worked, in Study 4. Error bars represent standard error of the mean.

In sum, Studies 1–4 offer strong support that people experience greater IOEDs when induced to adopt an abstract or broad mindset. In an initial demonstration of this relationship, participants who naturally adopted an abstract construal mindset experienced heightened IOEDs in Study 1. Study 2 showed this effect using a manipulation that led participants to focus on three mechanical devices narrowly or broadly, and Studies 3a and 3b, on the one hand, and Study 4 on the other hand, showed the same effect using two subtler construal induction techniques. The mediation results in Study 3a also suggested that participants in the abstract construal condition experienced greater IOEDs because they transiently adopted a more abstract mindset. Although the pattern of results in Studies 3a and 3b admitted the possibility that participants were experiencing a cognitive bias that differed from the IOED, supplementary analyses argued against these alternative accounts (Study 3a) and more direct measures of changes in confidence (Study 3b) suggested that participants in the abstract construal condition indeed experienced greater IOEDs than did participants in the concrete construal condition. Moreover, participants in the concrete condition did not show a diminished IOED because they were induced to focus specifically on how the mechanical devices operated, nor because they were less self-critical or had higher expectations than did participants in the abstract construal condition (Study 4).

One implication of the relationship between construal style and the IOED is that IOEDs should emerge whenever people adopt an abstract mindset when prompted to explain a concrete process. Accordingly, although researchers have identified IOEDs in a limited set of domains (e.g., Rozenblit & Keil, 2002), the domain-general nature of this mechanism predicts similar illusions of understanding across a wide array of domains. Indeed, this account of IOEDs suggests that people might overestimate how deeply they can explain any multilevel phenomena that tend to be construed abstractly by default. In other words, if the relationship between construal and IOEDs is domain-general, as we have argued, then the phenomenon should arise beyond the domains of mechanical and natural processes.

Many social psychological domains fulfill these criteria, including, for example, the democratic voting process (construing candidates as general exemplars of a political party), person perception processes (construing people as stereotyped exemplars of a group), and negotiation (construing the negotiation partner as a stereotypical, antagonistic adversary). To examine whether the boundary conditions for IOEDs might extend to domains like these, in Study 5, we approached voters during the 2008 U. S. Presidential primaries and examined whether they were susceptible to an illusion of political sophistication: the tendency to overestimate how deeply they understood their favored candidates' policy positions.

Study 5: The Illusion of Political Sophistication

Consistent with a construal-based mechanism, there are good reasons to believe that voters might be prone to an illusion that mirrors the IOED. During national election and presidential primary years, Americans are bombarded with politically charged television campaigns, print advertisements, and radio programs that convey a wealth of superficial, abstract information about the candidates. Political advertisements are particularly insidious because they impart simplified and unduly favorable versions of a candidate's true policies, ignoring the intricacies that distinguish those policies from the alternatives (e.g., Basil, Schooler, & Reeves, 1991). In short, people may become conversant with rival candidates just as they become conversant with zippers and earthquakes: They know just enough to feel informed at the abstract level but not enough to recognize that they are in fact underinformed at the concrete level.

Method

Participants. One hundred Princeton University undergraduates (55 women, 45 men; M_{age} = 20.53 years, SD = 1.28) who voted in the 2008 U. S. Presidential primary volunteered to complete a brief online questionnaire after receiving an e-mail that sought their participation in a "brief political attitudes survey."

Materials, design, and procedure. We surveyed New Jersey voters during the week following the New Jersey presidential primaries, when, having recently voted, they should have been maximally aware of their preferred candidate's positions. Participants completed a Web-based political attitudes questionnaire. The first page asked participants to indicate their general political views on a 7-point scale from *very liberal* to *very conservative* (with a *moderate* midpoint) and which political party they supported. Participants also indicated how informed they were about politics in general (1 = *not at all informed*, 4 = *somewhat informed*, 7 = *very well informed*).

After responding to these preliminary questions, a second page asked participants to indicate which candidate they were supporting in their party's primary. Democrats selected between Barack Obama and Hillary Clinton, and Republicans selected among John McCain, Mitt Romney, and Mike Huckabee. Participants also indicated the main reason why they were supporting that candidate ("the candidate's appearance"; "intelligence"; "stance on different policies"; "personal characteristics, including personality, religious values, and integrity"; and "experience in getting the job done"). Finally, participants selected which of their candidate's policies they supported most strongly (one or more of war, energy issues, immigration, social security, taxes, education, economy, health care, civil rights, and gun control).

One policy was randomly chosen from among those policies that the participant had selected as most important. The third page of the questionnaire asked participants to indicate how well they understood their candidate's stance on that policy (*initial*; from 1 = *not at all well* to 7 = *very well*). The following page asked participants to "Please explain, as completely as [they could, their] candidate's stance on [the same issue], such that a person who knew nothing of [their] candidate's stance would have a complete understanding of [their] policy on the issue." Participants typed their responses and then proceeded to the next page, which asked them to indicate, again on the same 7-point scale, how well they understood their candidate's stance on the target policy (*postexpression*). Finally, participants reported their age, ethnicity, and gender.

Results and Discussion

Descriptive statistics and demographics. The data from two participants were disregarded because they pasted policy explana-

tions from the candidates' websites. All other responses were checked against Google searches to ensure that they were at least written in participants' own words.

Seventy-six percent of the participants were Democrats, and the remaining 24% were Republicans. Consistent with this pattern, participants identified themselves as slightly liberal on the 7-point liberal–conservative ideological scale ($M = 3.22$, $SD = 1.47$, median = 3). In descending order, participants supported Barack Obama (52%), Hillary Clinton (24%), John McCain (14%), Mitt Romney (5%), and Mike Huckabee (5%) and reported voting on the basis of policy stances (45%), personal characteristics (30%), experience (15%), intelligence (6%), and the candidate's appearance (4%).

Self-reported illusion of explanatory depth. The results revealed a robust IOED. Participants reported a greater understanding of their favored candidates' policies before attempting to elucidate the candidates' stance on a specific policy than afterwards ($M_{initial} = 4.31$, $SD = 1.53$ vs. $M_{postexpression} = 3.53$, $SD = 1.89$), $t(97) = 6.82$, $p < 10^{-10}$, $\eta_p^2 = .32$. Further, whereas only 5% of the participants believed they knew more about their candidate's policies than they first thought, 49% reported understanding their policy more poorly than they first thought. Simply, many more participants overestimated rather than underestimated their knowledge, $\chi^2(1, N = 53) = 34.89$, $p < 10^{-9}$.

Moreover, as illustrated in Figure 7, the effect held equally for Republicans and Democrats (see Figure 7a), whether or not they reported their preferences were primarily driven by their candidates' stance on "the issues" (see Figure 7b) and regardless of which policy the candidate was asked to elucidate (see Figure 7c; none of these variables interacted with the initial and postexpression measures; all Fs < 1.35, all ps $> .24$).

Blind rater analysis. The previous analyses are consistent with two distinct interpretations: Either participants overestimated their knowledge before expressing their favored candidate's policy position (as we would argue), or the act of expressing their opinions led participants to underestimate their knowledge. To validate participants' ratings, three raters (two of whom were blind to the purposes of the study) coded participants' open-ended responses without knowledge of their other responses or demographic characteristics. Raters were trained by reading several sample explanations that fell along the breadth of the continuum to illustrate the differences between a poorly, moderately, and well-explained policy description. Encouragingly, the three raters agreed with each other in their assessments of participants' explanations ($\alpha = .95$), and their ratings were closely related to participants' postexpression self-assessments ($\alpha = .89$). Moreover, a pairwise comparison revealed that participants' mean self-assessments were almost identical to the raters' mean assessments ($M_{participants} = 3.53$, $SD = 1.89$ vs. $M_{raters} = 3.52$, $SD = 1.78$), $t(97) = .04$, $p = .97$, $\eta_p^2 < .001$. Participants' postexpression ratings of self-understanding were therefore exceptionally well calibrated, leaving open only the possibility that their pre-expression ratings vastly overestimated their understanding of the target policy.

These results demonstrate an IOED in the novel domain of voting and policy preferences. This effect offers encouraging initial support for the domain generality of the construal mechanism, because it suggests that the IOED occurs in at least one domain beyond natural and mechanical processes, the only domains originally associated with the IOED (Rozenblit & Keil, 2002). In Study 6, we examined directly whether this illusion of political

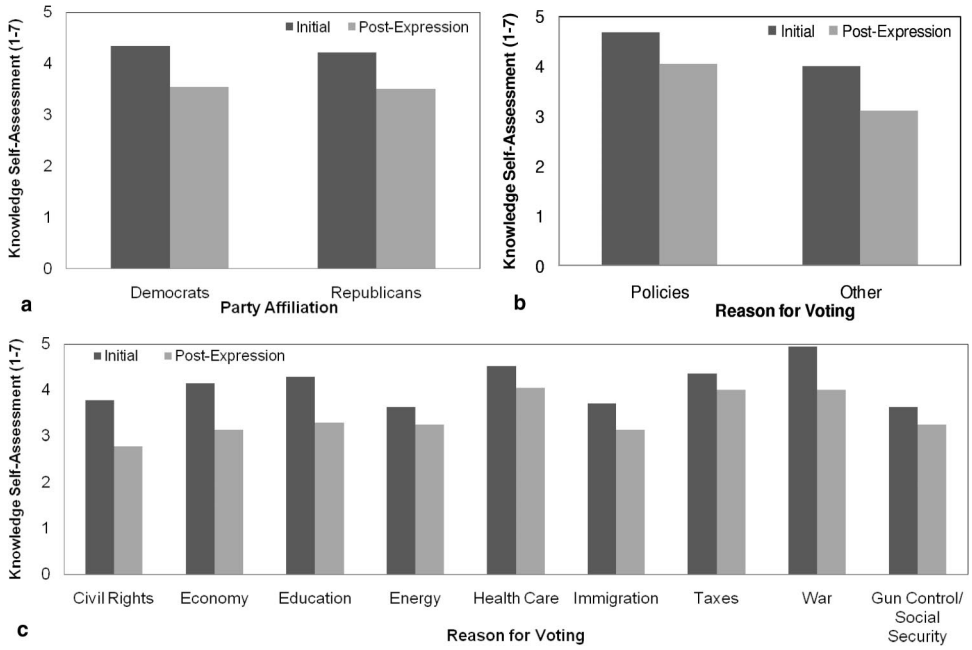

Figure 7. Study 5: Voters exhibited an illusion of explanatory depth regardless of their political affiliation (a), primary reason for voting (b), and which issue they were asked to explain (c). Note that only four participants expressed their favored candidate's position on gun control and social security, so they were combined to form a single entry in Panel c.

sophistication is driven by the same construal mechanism that explained the effects in Studies 1–4.

Study 6: The Illusion of Political Sophistication and Construal

Method

Participants. Sixty-nine adult participants (49 women, 20 men; M_{age} = 34.99 years, SD = 11.18) completed a three-part questionnaire on Amazon.com's Mechanical Turk online survey program. We collected these data after Barack Obama and John McCain had been selected as their respective parties' Presidential candidates but before the Presidential election was held. Respondents again received a small contribution toward an Amazon.com gift voucher.

Materials, design, and procedure. The three-part questionnaire was similar in format to the questionnaire used in Study 3a, in which we examined the effects of construal style on how deeply people believe they can explain mechanical processes. As in Study 3a, participants were induced to adopt an abstract or concrete construal style by expressing *how* (concrete condition) or *why* (abstract condition) they back up their computers, drive a car, and get dressed in the morning.

Following the construal manipulation, participants completed the same political issues questionnaire used in Study 5, with one minor amendment: Instead of explaining one of several different policies, all participants explained their candidate's policy on healthcare, which was an overwhelmingly popular policy choice in Study 5. This approach avoided the possibility that participants would systematically choose to describe different policies depending on whether they were induced to adopt an abstract or concrete construal style.

As in Study 3a, at the end of the study, we assessed the effectiveness of the construal manipulation by asking participants to complete the 13-item BIF, which assessed their relative preference for abstract and concrete descriptions of everyday behaviors, like eating and brushing their teeth.

Results and Discussion

Manipulation check. As expected, participants who described *why* they engaged in the three everyday tasks later preferred the abstract descriptions for the 13 behaviors more strongly than did participants who described *how* they engaged in the three tasks (M = 4.80, SD = 0.71 vs. M = 4.38, SD = 0.95, respectively), $t(67) = 2.08$, $p < .05$, $\eta_p^2 = .06$. Participants in the abstract construal condition therefore appeared to adopt a more abstract construal style than did participants in the concrete construal condition.

Primary analyses. As in Study 3a, we conducted a 2 (Construal Condition: abstract vs. concrete) × 2 (Time of Assessment: initial vs. postexpression) mixed-design ANOVA, where the second factor was repeated within-participant. Consistent with the illusion of political sophistication, participants believed they understood their preferred candidate's healthcare policy more deeply before (M = 4.39, SD = 1.42) than after (M = 3.67, SD = 1.89) attempting to express that policy position, $F(1, 67) = 20.50$, $p < 10^{-5}$, $\eta_p^2 = .23$. However, as Figure 8 suggests, this main effect

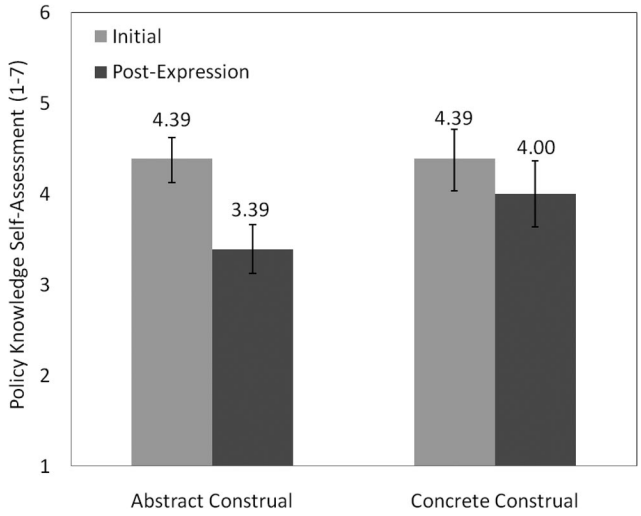

Figure 8. Average rated knowledge of favored candidate's healthcare policy in the abstract construal and concrete construal conditions, initially and after expressing those policies, in Study 6. Error bars represent standard error of the mean.

was qualified by the expected Construal × Time of Assessment interaction, $F(1, 67) = 4.00$, $p < .05$, $\eta_p^2 = .06$. Follow-up simple-effects analyses showed that participants experienced a significant illusion of political sophistication in the abstract construal condition, $F(1, 37) = 29.29$, $p < 10^{-6}$, $\eta_p^2 = .44$, but not in the concrete construal condition, $F(1, 30) = 2.35$, $p = .14$, $\eta_p^2 = .07$. We found a similar pattern of results when we reclassified participants as having shown an IOED if they gave higher average initial knowledge ratings than postexpression knowledge ratings. Whereas 61% of participants in the abstract construal condition experienced the IOED, a significantly lower proportion of 32% experienced the IOED in the concrete construal condition, $\chi^2(1, N = 69) = 5.47$, $p < .02$, $\varphi = .28$.

Mediation analysis. Replicating Study 3a, we examined whether participants' relative preference for the abstract descriptions in the BIF mediated the effect of construal condition on the magnitude of the illusion of political sophistication. As Figure 9 shows, participants' BIF scores mediated the relationship between their construal condition and the magnitude of their illusion of political sophistication, although a Sobel test was only marginally significant ($z = 1.65$, $p = .09$).

These results are very similar to the results in Study 3a, where participants who adopted an abstract construal mindset were poorly calibrated when assessing their understanding of three mechanical devices. Participants in the abstract construal condition in Study 6 tended to overestimate how well they understood their favored candidate's healthcare policy, whereas this illusion of political sophistication was absent amongst participants in the concrete construal condition. As in Study 3a, a mediation analysis suggested that this relationship between construal condition and the magnitude of the IOED was driven by transient differences in participants' construal styles.

General Discussion

In six studies, we showed that IOEDs arise at least in part because people sometimes adopt an inappropriately broad or ab-

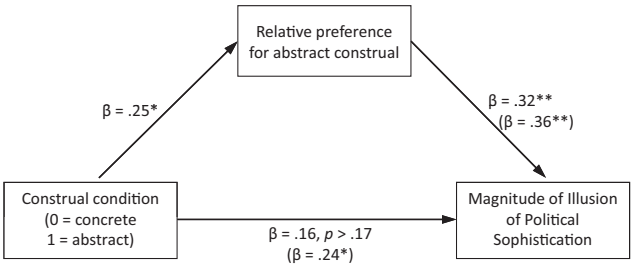

Figure 9. Mediation analysis in Study 6, testing whether a relative preference for abstract construal, measured on the Behavioral Identification Form (Vallacher & Wegner, 1989), mediated the relationship between construal condition and the size of the illusion of explanatory depth (IOED). $^{*}p < .05$. $^{**}p < .01$.

stract construal style when evaluating their understanding of concrete processes. Having identified that IOEDs are driven by this domain-general construal mechanism, we also relaxed the boundary conditions of the phenomenon by identifying a novel IOED in the domain of political voting.

In an initial demonstration that construal style mediates the IOED, participants in Study 1 experienced larger IOEDs the more abstractly they construed 13 basic human behaviors. Adopting an experimental approach in the second study, we found that participants rated their knowledge of how three mechanical devices worked more accurately when the devices were framed more narrowly according to their component parts. When asked to express how those devices worked, only participants in the broad construal condition were surprised by the incompleteness of their explanations.

In Studies 3a and 3b, we gathered convergent evidence by adopting a different construal manipulation, showing that the results in Study 2 were not confined to the parts/whole construal manipulation. Participants were induced to adopt a concrete or an abstract mindset by expressing how (concrete) or why (abstract) they engage in certain everyday processes, like getting dressed in the morning. Again, participants in an abstract mindset tended to show a significantly greater IOED than did participants in a concrete mindset. We also eliminated several potential alternative explanations for the results and showed directly that construal style mediated the strength of the IOED. However, the similarity between the concrete construal priming procedure (asking participants how they perform three everyday behaviors) and the IOED task (asking them how competently they could explain three mechanical processes) remained a concern. Accordingly, we adopted a third distinct construal manipulation in Study 4, in which participants either generated superordinate categories (the abstract condition) or exemplars (the concrete condition) of a set of target items. As in the earlier studies, participants in the concrete construal condition showed diminished IOEDs relative to those in the abstract construal condition. We also ruled out the possibility that the findings emerged because participants in the abstract construal condition experienced elevated self-criticism or self-expectations.

Having identified construal as a domain-general mechanism behind the IOED in Studies 1–4, we showed an IOED in the novel domain of political voting. Participants in Study 5 reported understanding their favored 2008 Presidential candidate's policies better than they actually did when asked to express those policies in writing. Study 6 suggested that this process was mediated by participants' construal style: Participants who adopted a more abstract construal style showed a more pronounced illusion of political sophistication.

Implications and Future Directions

Our findings suggest an important link between two prominent contemporary psychological theories: the illusion of explanatory depth, which has begun to attract great interest among cognitive psychologists (e.g., Lawson, 2006; Mills & Keil, 2004; Rozenblit & Keil, 2002; for a review see Keil, 2003), and construal level theory, which has generated a rich program of research in social psychology over the past decade (for reviews, see Liberman & Trope, 2008; Trope & Liberman, 2003).

In addition, we show that the IOED occurs in at least one novel domain: political voting. This finding is important, because it suggests that IOEDs are apt to emerge whenever the target concept can be construed along a concrete–abstract continuum. Moreover, as construal level theory suggests, this continuum describes how people represent a remarkably broad array of concepts across numerous social and cognitive psychological domains. Although construal level theory researchers have tended to focus on when people adopt distinct construal styles, our findings illustrate the importance of understanding how people construe the world by default. Numerous studies have shown that people perceive the same concept or target abstractly from afar and concretely from nearby, but even in the absence of distance cues, our findings suggest that people gravitate toward an abstract construal of political policies and mechanical processes. Similarly, researchers have shown that people reach very different conclusions about the following diverse targets depending on whether they represent those targets abstractly or concretely: American cities and obscure English words (Alter & Oppenheimer, 2008), conceptions of the self (Wakslak, Nussbaum, Liberman, & Trope, 2008), morally charged behaviors (Eyal, Liberman, & Trope, 2008), the behavior of other people more generally (e.g., Liberman, Trope, Macrae, & Sherman, 2007; Nussbaum, Trope, & Liberman, 2003), and conceptions of the future (Nussbaum, Liberman, & Trope, 2006). Our findings suggest that whenever people instinctively adopt an abstract construal style, they might erroneously conclude that they understand fine-grained, concrete concepts more deeply than they actually do.

When adopting an abstract construal style, people might therefore be systematically overconfident about what the future holds and how well they understand themselves and others. For illustrative purposes, it is easy to imagine that one's future will embody certain abstract concepts, like being financially comfortable and raising children; when people are pressed to consider their futures more concretely, they might be less confident about how many children they will have and whether they will be merely comfortable or conspicuously wealthy.

Thinking more concretely about the future might therefore influence how people behave across several important domains: They may be more likely to invest rather than spend, a significant concern in the United States (U.S. savings rate hits lowest level since 1933, 2006); more likely to avoid the planning fallacy by mentally allocating more time to future tasks (e.g., Buehler, Grif-

fin, & Ross, 1994; Kruger & Evans, 2004); and more likely to adopt careful family planning techniques. Abstract construal often improves negotiation outcomes, as negotiators tend to concede unimportant demands while remaining steadfast on the most important issues (Henderson, Trope, & Carnevale, 2006). Our research suggests, however, that negotiators who adopt an abstract construal style may overestimate the prospects of resolving an intractable disagreement as they fail to fully consider the issues in concrete detail. More generally, the IOED hampers decision making because it signals that the decision maker has enough information to make an informed decision. Our findings suggest that people who are induced to represent the world concretely might seek additional information that ultimately improves the quality of their decisions. Although researchers have not yet documented IOEDs in the domains of financial and family planning, the generality of the construal-based mechanism suggests that real world construal-based interventions might significantly improve people's wellbeing across these and other domains.

Although we have shown evidence for an illusion of political sophistication, further research is needed to show that similar IOEDs emerge when people assess their knowledge in other social-cognitive domains. For example, people tend to overestimate their ability to understand others (e.g., Pronin et al., 2004; Pronin, Kruger, Savitsky, & Ross, 2001), a normally robust bias that might arise in part because people construe others too abstractly. This interpretation is consistent with the observation that people so readily construe others according to abstract category memberships (e.g., Tajfel, 1981) and stereotypes (for a review, see Fiske, 1998) and only form more concrete, individuated impressions with great cognitive effort (e.g., Fiske & Neuberg, 1990). Imposing a concrete frame on attempts to understand other people might lead to a more accurate sense of what one does and does not understand about those people.

Finally, although the literature has exclusively documented IOEDs, it is possible to imagine illusions of explanatory shallowness, where people underestimate their ability to explain a target concept. In contrast to IOEDs, illusions of explanatory shallowness might emerge when the default, abstract construal of a target suggests that the target is more complex than it actually is. For example, students of mathematics are often overwhelmed by the apparent complexities of a formula-rich math problem, when in fact, they are more than capable of solving the problem when they approach it methodically. This reversal of the standard effect might occur when the target concept seems esoteric in abstraction, although its component parts are easier to understand at a concrete level.

Related Overconfidence Illusions

The IOED is both similar to and distinct from a range of overconfidence biases documented in the social psychological literature (e.g., Alicke, 1985; Kruger & Dunning, 1999; Pronin et al., 2004). Like other overconfidence biases, the IOED occurs because people fixate on information that generates flawed self-insights. For example, according to one account, egocentric overconfidence effects tend to emerge because people anchor on their own subjective experiences and fail to adequately account for the experiences and abilities of other people (e.g., Pronin et al., 2001; Windschitl, Kruger, & Simms, 2003). In contrast to this anchoring-based mechanism, the IOED emerges when people fail to construct an accurate mental representation of the target concept and believe they understand it more deeply than they actually do. The IOED emerges less from a failure to imagine the target at all than from a failure to imagine the target using an appropriate level of construal.

Other researchers have suggested that people are overconfident because they prefer to participate in activities in which they succeed, so their memories tend to be overpopulated with successes rather than failures (Armor & Taylor, 1998). Consequently, a competent golfer who cannot play tennis tends to perceive himself as a good sportsman generally, because he focuses on his many successful rounds of golf rather than his few unsuccessful tennis matches. This source of overconfidence arises because people disproportionately form memories of successes rather than failures, not because they are focusing on the appropriate set of information using an inappropriate construal style.

Yet another account (Moore & Healy, 2008) suggests that overconfidence is an artifact of the *regression to the mean* principle. People have better access to their own abilities than to the abilities of others, so they tend to assume that others perform at an average level of competence. When considering how well they perform simple tasks (e.g., driving) relative to others, people systematically assume they are highly competent, while assuming that others are moderately competent. Because this account requires that people compare their abilities with those of others, it cannot account for the IOED, which arises in the absence of social comparison.

Although we have distinguished the IOED from these four alternative overconfidence mechanisms, our explanation of the IOED is designed to complement, rather than supplant, these accounts. Misconstrual is almost certainly only one of many mechanisms that are likely to generate a complex phenomenon like metacognitive miscalibration. Each account is helpful because it enhances our understanding of the phenomenon at large and prompts researchers to consider theoretically driven interventions that are designed to attenuate the bias.

Conclusion

One of the critical questions in social cognition is why people believe that they understand far more about natural processes, their abilities, other people, and future events than they actually do. Our research suggests that one possible explanation for these IOEDs is that people perceive questions that demand concrete introspections through an inappropriately abstract lens. Instead of focusing on the parts of a mechanical device, their ability to complete each step in a serial process, or what politicians believe specifically about each in a series of issues, people gloss over the granular details and instead focus on the big picture. Although folk wisdom suggests that people often fail to see the forest for the trees, sometimes the greater concern is that people fail to see the trees for the forest.

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