

Purpose-Based Thinking Affects Belief in the Existence of Everyday Objects

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Abstract

When we reason about the physical world, we don't just think about physical facts. For example, in judging why an object exists, or belongs to a particular category, we often appeal to intentions, functions, and purpose (e.g., “knives exist for cutting”). Such “teleological” thinking is common, but intuitively it has limits: For example, *whether* an object exists appears to depend only on the objective *physical* state of the world. In contrast, we present evidence that intentions can influence people's judgments of whether an everyday object exists. Participants read stories about an object being disassembled. Controlling for the physical status of the object, people's judgments about whether the object existed were sensitive to the purpose guiding the disassembly. These results serve as a case study in the psychological power of intentions: Apparently straightforward judgments about the physical world can be shaped by the state of the mental-world.

Keywords: teleological thinking; object concepts; singular concepts; ontology; physical reasoning; intentions

Introduction

Everyday thinking about the physical world goes beyond just physical facts. For example: why are knives sharp? Though we can answer this by appealing to the physical forces that lead to knife-sharpening in knife-factories, it seems more natural to say that knives are sharp because they are used for cutting. This second type of explanation is an example of “teleological” thinking. Teleological thinking is concerned with intentions, functions, or purposes (e.g., knives are for cutting things), and we can contrast such a purpose-based approach with thinking about physical processes (e.g., knife-sharpening).

Teleological thinking is pervasive in human cognition. Both adults and children are sensitive to teleological information in their categorization judgments (especially for artifacts). For example, if told that an object looks like an umbrella but was intended to be a lampshade, adults categorize it as a lampshade (Rips, 1989; see also Gutheil, Bloom, Valderrama, & Freedman, 2004; Matan & Carey, 2001). Adults prefer teleological explanations over physical explanations for artifacts (e.g., knives) and biological parts (e.g., noses; Kelemen, 1999). This preference is even stronger in children, who readily extend teleological explanations to almost all categories, living (e.g., “tigers are for biting”) and non-living (e.g., “mountains are for climbing”; Kelemen, 1999). Given the prevalence and broad developmental origins of teleological thinking, some researchers have argued that it is a natural default, which is suppressed with age and schooling (Kelemen & Rosset, 2009).

Though teleological thinking is natural, it has intuitive limits—that is, it seems not to apply to certain domains. For example, it is natural to think about the purpose behind a knife's creation in reasoning about *why* it exists; but *whether* a particular knife exists seems to be a fact that depends only on the physical state of the world. “Object *o* exists at time *t*” seems like a clear case of an objective physical fact.

The present paper examines the limits of teleological thinking, given this particularly strong test case: Can teleological information affect simple judgments of whether an everyday object exists?

In order to answer this, it is helpful to think about how teleological thinking affects other types of judgments, such as categorization. When naming an artifact, adults (and children as young as six years) focus not only on its current physical structure and appearance, but also on the artifact's history, i.e., how it got to its current state (e.g., Gutheil et al., 2004). Another factor in categorization is an object's future. For example, adults will categorize an animal, based not just on its current appearance, but also on what type of offspring it ends up having (Rips, 1989).

Might we expect analogous effects of an object's past and future on judgments about that object's existence? Imagine you encounter a pile of chair parts. You are told that yesterday these parts were made in a factory and that tomorrow they will be assembled into a chair and sold to a furniture company. Does the chair exist today? In answering this question, people may focus on the physical state of the chair [parts] today, ignoring how the parts got into that state or what's going to happen to them. However, it is also plausible that people will be sensitive to the fact that these parts were made with the *intention* of becoming a chair, and that they will soon become a chair. People might think of the chair as on an “upward trajectory” into existence. Similarly, if shown an identical pile of chair parts, and told that these parts were intentionally disassembled so they could be thrown into a landfill, people might think of the chair as being on a “downward trajectory” out of existence.

However, not all trajectory-based scenarios imply teleological thinking. Imagine you are told that the chair parts were just disassembled and will soon be rotting in a landfill. This may influence your judgment about whether the chair exists simply because these facts provide clues to the physical state of the chair. These facts could cause you to wonder why the chair was disassembled or why it will soon be rotting. Many potential answers to these questions would imply that the physical state of the chair is compromised (e.g., *the chair hardly existed after the termite*

infestation; it was just a shell of a chair). This in turn would make you less likely to say the chair exists.

In contrast, the present experiments ask whether teleological information can *directly* influence participants' judgments about the existence of an everyday object, even when controlling for the physical state of that object. Participants read a story about a man who disassembled his computer into each of its parts. Across conditions, the stories varied (a) the man's purpose in disassembling the computer, and (b) the final state of the computer—all while holding constant the computer's current physical state. Participants decided whether the computer existed immediately after disassembly, before its eventual fate.

If information about the intentions or the eventual fate of the computer alters participants' judgments, this would suggest that people sometimes use teleological information to make decisions about the existence of everyday objects. This would provide a strong demonstration of the prevalence of teleological thinking in human cognition: Teleological information can influence even apparently objective judgments made without time-pressure.

Experiment 1

Participants read a story about a man who built a computer and later decided to take it apart. In the "reassemble" condition, participants learned that the man intended to disassemble the computer because he wanted to clean the parts, and that he went on to clean them and reassemble the computer. In the "keep disassembled" condition, participants were told that he intended to disassemble the computer because he wanted to clean and then sell the parts, and that he went on to do so. The ultimate fate of the computer always

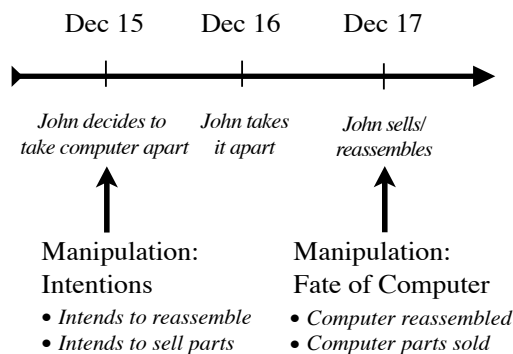


Figure 1: A summary of the manipulations in the story.

matched the intentions in this experiment. Figure 1 summarizes these manipulations.

Participants were then asked whether they thought the computer existed on the date it was first disassembled. Importantly, the intentions being formed, the computer's disassembly, and the final outcome for the computer, were all separate incidents. While the intentions and the outcome varied, the physical state of the computer on the key date was the same across both conditions. Therefore, any differences across conditions should be due to teleological factors: either intentions, fate, or some combination of the two.

Method

Materials For participants in both conditions, the beginning of the story was the same:

John was a nice man in his mid-30s, who lived in a large apartment building. John was a bit of a technology enthusiast, and he needed a new computer. On January 1st, John ordered some computer parts online from a couple different retailers. On January 2nd, the various packages of computer parts arrived, he took them out of their packaging, and he put them on his desk. On January 3rd, John built his very own computer from the parts. The computer had 10 parts, and was a Windows computer. John happily used the computer for about a year.

At this point, the story diverged depending on condition.

On December 15th, John decided that he wanted ...
[Reassemble Condition] ...to clean the inside of his computer. He decided that, the next day, he would take his computer apart and clean all the parts. Once it was cleaned, he could put it back together.

[Keep Disassembled Condition] ...a new computer. He decided that, the next day, he would take his computer apart, clean all the parts, and find out what they were worth so that he could sell them.

On December 16th, John disassembled his computer into its ten parts, and cleaned each part.

[Reassemble Condition] This tired him out and he decided to finish up the next day.

[Keep Disassembled] Condition: Using his smart phone, he looked up what each part was worth at various online resellers. This tired him out and he decided to finish up the next day.

On December 17th, John...

[Reassemble Condition] ...took the computer parts and reassembled them as they had originally been assembled. He sat down, turned his computer on, and started using it.

[Keep Disassembled Condition] ...set up the sales online with various retailers, packaged the parts in several boxes, drove to the post office, and had the parts sent off to their new owners.

Procedure Participants read all the material on a computer screen. On the first screen, participants were presented with the story about John and his computer. On the second screen, participants saw this story again and answered several questions about the computer's existence at three dates in the story. They were to "Rate your agreement with the following statement: By the end of [date] the computer exists." Participants responded on a 7-point scale, with 7 marked "Agree- Definitely Exists," 1 marked "Disagree— Definitely Does Not Exist," and 4 marked "Not sure."

The dates were: January 1st (before the computer was first built); January 3rd (immediately after the computer was first assembled and working); and December 16th (immediately after the computer was disassembled, either for cleaning or for selling—but before reassembly or selling occurred).

Participants Twenty-one participants were recruited on Amazon's Mechanical Turk for monetary compensation.

Results & Discussion

We are interested in participants' ratings for whether the computer exists—specifically, their ratings for December 16th. Responses for Jan. 1st & 3rd serve as a control, since in both conditions, the computer's existence (or non-existence) was unambiguous on both dates. This allows us to check whether participants were paying attention. Any participant who marked 7 ("definitely exists") for January 1st (before the computer parts had even been shipped from the various retailers) is excluded from further analysis. Likewise, any participant who marked 1 ("definitely does not exist") for January 3rd (immediately after the computer had been fully assembled and was working) is also excluded from analysis. In this experiment, two participants were excluded. As expected, for each of the first two questions, ratings did not differ significantly across conditions: either for Jan. 1st ($t(17)=.86, p=.40$) or Jan 3rd ($t(17)=.70, p=.49$).

On December 16th, the same thing happened to the computer in both conditions: The computer was disassembled into ten parts. In the reassemble condition, the mean rating for this day was in the middle of the scale, near the "not sure" mark, as shown in Figure 2. However, in the keep-disassembled condition, the mean rating for December 16th was at the bottom of the scale, near the "does not exist" mark. These ratings differed significantly, $t(17)=2.26, p=.037$. In the reassemble condition, ratings did not differ significantly from 4 (the "not sure" midpoint), $t(9)=.66, p=.53$. However, in the keep-disassembled condition, ratings were significantly lower than the midpoint, $t(8)=5.75, p < .001$.

In summary, in the keep-disassembled condition, participants were confident that the computer did not exist; however, in the reassemble condition, there was little agreement about whether the computer existed. Though ratings for December 16th differed across conditions, the *physical state* of the computer on December 16th did not: Participants in both conditions were told that the computer was taken apart into its ten parts and cleaned. What differed across conditions was teleological information: John's intentions (on Dec. 15th) and the ultimate fate of the computer (on Dec. 17th). So the differing ratings across conditions seem to have been driven by this teleological information.

Experiment 2

The results so far are consistent with the idea that people sometimes use teleological information when making judgments about existence. However, these results do not pinpoint *what* teleological information people use: We did not vary independently the intentions for the object and what eventually happened to it. The present experiment is similar to the first, except that these two factors are orthogonal. This involved a change to the end of the story. Here, before John can follow through with his intentions for the computer parts, these computer parts are stolen. The thief either reassembles the computer and donates it to charity, or steals the individual parts and donates them. So

the ultimate fate of the computer parts—either sold or reassembled—is independent of John's original intentions.

Method

Materials and procedure Participants saw the same information as in the previous experiment for all dates through December 16th. Participants in both conditions then read about a man who broke into John's house while he was sleeping. Half the participants read that this man reassembled the computer, checked that it was functional, and then stole it and donated it to charity. The other half read that the man stole the individual parts and donated each to a separate charity. Therefore, this experiment independently manipulated (a) the intentions guiding the computer's disassembly and (b) the ultimate fate of the computer.

Participants were divided into four groups, corresponding to each cell of the 2x2 design. The procedure was otherwise the same as in Experiment 1.

Participants Eighty participants were recruited on Amazon's Mechanical Turk platform and received monetary compensation. We excluded 15 participants on the same basis as in Experiment 1.

Results & Discussion

The main variable of interest is participants' ratings for December 16th. Figure 2 shows that participants who were told that John intended to reassemble the computer rated it more likely to exist ($M=4.16, SD=2.44$) than those told that John intended to sell the computer parts ($M=2.45, SD=2.15$), $F(1,61)=9.20, p=.004$. However, the ratings for stories in which the computer parts were ultimately reassembled ($M=3.67, SD=2.42$) were roughly the same as for those in which the computer parts were ultimately scattered ($M=2.91, SD=2.43$), $F(1,61)=1.89, p=.18$. There was also no interaction between intention and fate, $F(1,61)=.68, p=.41$.

Collapsing across the fate manipulation and looking only at the 'intention' manipulation reveals a pattern similar to the first experiment. When participants learned that John disassembled the computer with the intention of reassembling it, their mean ratings for Dec. 16th were not significantly different from the midpoint of the scale, $t(32)=.36, p=.72$. However, when participants were told John disassembled the computer with the intention of selling the parts, participants' mean rating was significantly lower than the midpoint of the scale, $t(32)=4.13, p<.001$.

As in the previous experiment, participants' ratings did not significantly differ across conditions for the first two dates. For Jan. 1st, an ANOVA revealed no main effects (fate: $F(1,61)=.071, p=.79$; intention: $F(1,61)=2.82, p=.098$) or interactions ($F(1,61)=.49, p=.49$). Likewise, for Jan 3rd there were no main effects (fate: $F(1,61)=1.15, p=.29$; intention: $F(1,61)=.30, p=.59$) or interactions ($F(1,61)=1.70, p=.20$).

The results of this experiment help clarify the role of teleological information in judgments about existence.

When deciding whether the computer exists after its disassembly on December 16th, participants were heavily influenced by the purpose guiding this disassembly. However, they were minimally influenced by what happened to the computer after December 16th. When deciding whether something exists, people do not seem to consider all types of teleological information, but are instead uniquely sensitive to relevant intentions.

These results also help rule out alternative explanations for the first experiment's results. Taken in isolation, one might worry that the results of Experiment 1 could have been due to participants' sensitivity to task demands, or confusing key dates in the story. For example, if participants had mixed up December 16th and 17th, their differing judgments about the computer's existence could have been driven by the difference in the computer's physical state on December 17th. However, in the present experiment, there was no effect of the computer's state on December 17th, rendering this explanation unlikely.

Because there was no main effect of fate or an interaction between fate and intentions, the following experiments follow Experiment 1 in combining these factors. This allows the stories to be easier to understand.

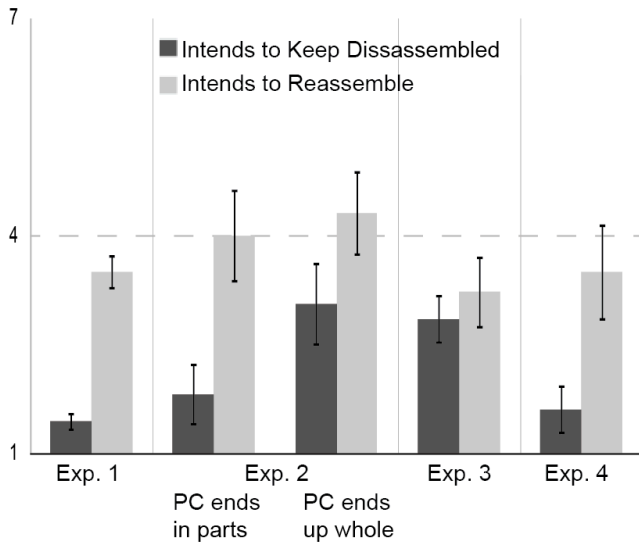


Figure 2: Participants ratings for whether the computer exists on Dec. 16th. The 7 rating corresponds to “definitely exists”, and the 1 corresponds to “definitely does not exist.” For Experiments 1, 3, & 4, the legend refers to both John’s intentions and to the fate of the computer. For Experiment 2, the legend only refers to John’s intentions, and the fate of the computer is specified below the bars.

Experiment 3

These results suggest that intentions can influence existence judgments. However, it is unclear under what conditions intentions will matter. In order for intentions to affect judgments about an object’s existence, how do these intentions have to relate to the object?

One possibility is that the intentions must connect, perhaps causally, to the physical state of the object. We know from the previous experiments that intentions bias existence judgments, even controlling for the object’s physical state. But it still may be important that a connection between intentions and state exists. In the stories of Experiments 1 and 2, John’s intention to take the computer apart was the reason the computer was disassembled. What if John’s intentions were incidental? For example, if some other causal force put the computer into its disassembled state, so that John’s intentions had nothing to do with it, we might predict that his intentions would no longer influence existence judgments.

Alternatively, intentions may not need to be connected to an object’s state in order to influence judgments about whether it exists. Simply having the intentions to destroy the computer may influence decisions about whether the computer exists.

The following experiment was designed to distinguish these two possibilities. Participants were given a story similar to that in Experiment 1, but with the ordering of certain events reversed. In the previous story, John’s intentions for the computer resulted in the computer’s physical state. In the present experiment, however, the computer is first disassembled, and only then does John decide what to do with it. Participants were told that an important screw fell loose from the computer, resulting in the computer falling apart into all ten components, otherwise undamaged. On the morning of December 16th, John comes upon the computer, and decides whether he wants to reassemble or get rid of the parts.

As in earlier experiments, participants were asked whether they thought the computer existed on December 16th—after the computer has been disassembled and after John has decided what to do with it, but before he actually carried out his intention. In this experiment, however, John’s intentions had no role in the computer’s disassembly. If his intentions nevertheless influence existence judgments, this would suggest that intentions bias these judgments, regardless of the role those intentions play in the physical state of that object.

Method

Materials and Procedure The procedure in this experiment was identical to Experiment 1. Like Experiment 1, there were two conditions: keep disassembled and reassemble. The story that participants read was identical to that of Experiment 1, up until the events of December 15th.

Participants in both conditions were told that, while John was asleep on the evening of December 15th, an important screw came loose in his computer. The screw fell out, causing the computer to fall apart into each of its ten parts. Participants were told that none of the parts were damaged.

For December 16th, participants in both conditions read that John happened upon the computer and noticed that none of the parts were damaged.

Participants in the keep-disassembled condition read that, though John knew it would be trivial to reassemble the computer, he decided that he “didn’t feel like it.” They were told that he had to run to work, and would get rid of the old parts and look for a new computer the next day. They were then told that, on Dec. 17th, he got rid of the old computer.

Participants in the reassemble condition instead read that, since John knew it would be trivial to reassemble the computer, he decided he would do so. They were told he had to run to work, and would reassemble it the next day. They were then told that, on Dec. 17th, he reassembled the computer.

Participants Seventy-one participants were recruited online for monetary compensation. Using the same criteria as in the previous experiments, we excluded 10 participants.

Results & Discussion

In contrast to previous experiments, Figure 2 shows that the mean rating in the reassemble condition and in the keep-disassembled condition did not differ significantly, $t(59)=.65, p=.52$. Therefore, participants’ judgments in this experiment were not influenced by the differing intentions. As in previous experiments, for each of the first two questions, ratings also did not differ significantly across conditions: either for Jan. 1st ($t(59)=1.12, p=.27$) or Jan. 3rd ($t(59)=1.40, p=.17$).

These results suggest that only certain intentions can influence judgments about an object’s existence—specifically, intentions that are somehow connected to that object’s physical state. One explanation for these results is that participants do not find intentions relevant for an object’s existence at a time unless they are causally connected to that object’s physical state at that time.

However, this causal explanation may seem odd in view of our earlier findings. All of the experiments so far have controlled for the physical state of the computer across conditions. The connection between the intentions and the physical state of the computer did not make any tangible difference. Why then should a causal connection matter?

An alternative explanation is that participants engage in “magical” thinking about the computer’s existence. Even though John’s intentions do not have any tangible effects on the computer’s physical state, perhaps participants still think of the intentions as imparting something *intangible*. This sort of thinking might fall under the “law of contagion,” which is the belief that, through physical contact, special intangible properties or essences can be transmitted (e.g., you might be reluctant to buy a sweater that was previously worn by Hilte; Nemeroff & Rozin, 1994; Newman, Diesendruck, & Bloom, 2011). Participants may believe that, when John has the intent to destroy the computer and then comes into physical contact with it, he imparts to it an extra bit of non-existence.

Experiment 4

The contagion explanation predicts that the key difference between Experiments 1-2 and Experiment 3 is physical

contact: In Experiment 3, John did not come into contact with the computer (with the intent to destroy/clean it) until after December 16th. In contrast, the causal explanation predicts that the key difference between experiments is the causal connection between the intentions and the computer’s state: In Experiment 3, John’s intentions were not responsible for the computer’s state on Dec. 16th.

The present experiment compares these two explanations. The story in this version is similar to that in the first experiment, except John never comes into contact with the computer. However, John still causes the computer’s disassembly. If John’s intentions influence participants’ responses (as they did in Experiments 1 & 2), this would suggest that his intentions need to be causally (but not physically) connected to the computer’s physical state in order for these intentions to influence judgments about the computer’s existence.

Method

Materials and Procedure Participants read a story similar to that of Experiment 1, except John was out of town on December 15th and December 16th. Participants in the keep-disassembled condition were told that John wanted a new computer, and participants in the reassemble condition were told he wanted his computer cleaned.

Participants in both conditions were told that on Dec. 16th John called his personal assistant to have him disassemble the computer, and that “John’s personal assistant was a loyal and unquestioning employee, and didn’t even ask or think about why he was taking the computer apart.” The personal assistant disassembled the computer into all ten parts and cleaned the parts. On Dec. 17th, John returned home and sold/reassembled the parts (depending on condition).

Participants Twenty-three Northwestern undergraduates participated for course-credit. Using the same criteria as in the previous experiments, three participants were excluded

Results & Discussion

As expected, for each of the first two questions, ratings did not differ significantly across conditions: either for Jan. 1st ($t(18)=.60, p=.56$) or Jan. 3rd ($t(18)=1.50, p=.15$).

Figure 2 displays the mean ratings for the two conditions in this experiment. In contrast to Experiment 3, and like Experiments 1 and 2, the mean rating in the reassemble condition was significantly higher than that in the keep-disassembled condition, $t(18)=2.53, p=.021$. This experiment also replicated Experiment 1 and 2’s qualitative difference in responses across conditions: Ratings were significantly lower than 4 (“not sure”) in the keep-disassembled condition ($t(18)=7.06, p<.001$), but not in the reassemble condition ($t(18)=0.75, p=.48$).

These results, coupled with those of Experiment 3, are consistent with the idea that a causal connection is what matters in order for intentions to affect existence judgments. When assessing whether an everyday object exists, participants are influenced by intentions that play a causal

role in that object's physical state. But these results suggest that physical contact between the person with intentions and the object is not necessary.

General Discussion

In the four experiments in this paper, we found a remarkably consistent pattern of teleological information influencing judgments about an object's existence. The intentions causally responsible for an object's physical state changed judgments about whether it existed, shifting people from uncertainty (not sure if the object exists) to certainty (confident the object does not exist). In cases where an object's existence is somewhat ambiguous, the intent to destroy that object can be enough to convince people it has gone out of existence.

This finding suggests that teleological information can shape seemingly objective judgments. This conclusion fits with prior research showing that other types of seemingly "objective" judgments—e.g., judgments about causation or about mental states—can be influenced by surprisingly non-objective factors like moral or functional norms (for a review, see Knobe, 2010). Future work can explore whether the effect found here taps into the same basic cognitive phenomenon as this previous research.

How do the effects found in the present experiments generalize to other kinds of entities? These experiments focused on only one object: a computer. An important next step is to verify that these effects extend to other artifacts. Additionally, future studies can examine whether these effects occur for natural kinds as well.

It is possible that, as is the case for categorization, adults restrict their teleological thinking about existence to only artifacts, like computers or chairs. However, there is a notable difference between the effects found here and those found for artifact categorization. For artifact categorization, *creator's* intentions are privileged: adults categorize an object based on its creator's ultimate intent, even if this intent played no causal role in the artifact's appearance or function (Chaigneau, Castillo, & Martinez., 2008). In contrast, the results of Experiments 3 and 4 suggest that, when judging whether an object exists, the causal role of intentions may be important. This opens the door to the possibility that intentions will matter in judging the existence of *any* object, as long as those intentions are responsible for that object's state. The object's ownership or kind (natural or artificial) may matter less than whether that object has come under human influence.

Another open question is the relation between purpose *for* an object—e.g., John's intentions for the computer—and the purpose *of* an object—e.g., the function of the computer relative to the function of the computer parts. Recent evidence suggests that the latter may influence how people make judgments about the existence of objects. Rose & Schaffer (in prep.) presented vignettes about objects that were fused together, and asked participants to judge whether the result constituted one or two objects. They found that people use teleological information to individuate objects: for

example, two rats clamped together for no reason are two separated entities, but two rats clamped together because they jointly make an excellent bomb-sniffing device are one entity. Rose & Schaffer concluded that participants' judgments were driven by whether the fused object had a function.

Could this explanation be extended to the present study? John's intention to keep his computer may emphasize its function as a whole, while his intention to sell the individual parts may emphasize the functions of the parts. This in turn may influence whether participants think the disassembled computer exists as a whole or whether it is "just" parts.

Future research can explore these possibilities. It may be that intentions play a privileged role in deciding whether an object has a purpose, and this in turn plays a privileged role in deciding whether that object exists. Alternatively, intentions for an object and that object's function could each play a separate and independent role in influencing existence judgments. In either case, teleological information (considered broadly as encompassing intent, purpose, and function) seems an important part of how humans make seemingly objective judgments about existence.

Acknowledgements

We thank Brock Ferguson, John Glines, Nicholas Leonard, Kelly Sheehan, bethany ojalehto, Joshua Knobe, Sid Horton, and Dedre Gentner for helpful discussion of these studies, and John Glines for research assistance.

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