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MAKING MEANING BY SEEING HUMAN

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On October 3, 2003, entertainers Siegfried and Roy took the stage to perform in their legendary show—a combination of magic, illusions, and stunts performed with live tigers—at The Mirage in Las Vegas. Although the duo had been performing on the Vegas strip for almost 30 years, that night they experienced something they never had before. One of the trained tigers attacked Roy, biting him in the neck and causing him massive blood loss. Following the uproar that the event generated, comedian Chris Rock expressed his surprise at the public response to the incident and disdain for the public’s view that “the tiger went crazy.” Rock stated, “That tiger didn’t go crazy—that tiger went *tiger!*” This incident, and Rock’s response, illustrate people’s tendency to turn to anthropomorphic descriptions to explain the actions of nonhumans when things do not go according to plan. Given such an unexpected event as this tiger attack, many people sought to explain the tiger’s actions in more mentalistic, human terms. However, as Rock suggested, the actions of the tiger were not psychotic, they were merely the

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characteristic action of a tiger taken from its natural habitat and forced to perform on a Vegas stage.

Many years earlier, in attempting to explain the origins of religion, the philosopher David Hume (1757/1957) came to a similar conclusion about people's proclivity for anthropomorphism as a means of sense making:

There is a universal tendency among mankind to conceive all beings like themselves, and to transfer to every object, those qualities, with which they are familiarly acquainted, and of which they are intimately conscious . . . No wonder, then, that mankind, being placed in such an absolute ignorance of causes, and being at the same time so anxious concerning their future fortune, should immediately acknowledge a dependence on invisible powers, possessed of sentiment and intelligence. The unknown causes, which continually employ their thought, appearing always in the same aspect, are all apprehended to be of the same kind or species. Nor is it long before we ascribe to them thought and reason and passion, and sometimes even the limbs and figures of men, in order to bring them nearer to a resemblance with ourselves.

This statement reveals Hume to have had insights about humans' attributional tendencies that psychologists would not test until a quarter millennium later. In particular, Hume described the conditions under which people tend to attribute human characteristics to nonhuman entities. This insightful account, however, also overstated humans' proclivity toward anthropomorphism, which he described as a process in which humans engage promiscuously rather than as a process activated by specific psychological factors and circumstances.

Anthropomorphism, at its essence, is the attribution of higher order mental states (e.g., beliefs, desires, thoughts, feelings, intentions) to nonhuman entities (Epley, Waytz, & Cacioppo, 2007). Although the *capacity* to perceive mental states is nearly universal, the tendency to apply these mental states to other entities and to treat nonhumans as humanlike mental agents is not as inevitable as Hume suggested (Waytz, Klein, & Epley, in press). Rather than a *universal* tendency that people apply to *all* beings and *every* object, the attribution of minds to nonhumans in anthropomorphism is a process in which people engage only when they are triggered to do so. Hume's major insight from his description of anthropomorphism is his identification of the triggers that play a major role in turning this tendency on or off. "Being placed in an ignorance of causes, and being at the same time so anxious concerning [one's] future fortune" describes both the experience of causal uncertainty and unpredictability that commonly motivates a desire for predictability, understanding, and sense making (Berlyne, 1962; Kelley, 1967; Weary & Edwards, 1996; Weiner, 1985; White, 1959). This motivation is a major determinant of anthropomorphism as well.

THE DESIRE FOR MEANING AND ANTHROPOMORPHISM

White (1959) termed the all-encompassing desire to have effective interaction in one's environment through establishing control, predictability, and understanding as *effectance motivation*. In 2007, my colleagues and I (Epley et al., 2007; see also Chapter 5, this volume) identified effectance motivation as one of three primary psychological determinants of anthropomorphism, in addition to sociality motivation (i.e., the motivation for affiliation and belonging) and the elicitation of anthropocentric knowledge (i.e., the extent to which the concept "human" is accessible and activated). Scholars from a variety of disciplines linked effectance with anthropomorphism, yet a formal and comprehensive theory of anthropomorphism's determinants had not yet been developed. For example, linguists described how people use anthropomorphic metaphors (e.g., "inflation has attacked the foundation of our economy") to explain complex concepts such as financial markets (Lakoff & Johnson, 1980). Anthropologists described how anthropomorphism facilitated the evolution of agriculture and hunting by providing a useful way of making sense of complex artifacts and tools (Humphrey, 1983; Mithen, 1996). Religious scholars described religious traditions function as fundamentally explanatory systems that elucidate the workings of universe through anthropomorphism of the physical world (Guthrie, 1993). Computer scientists and artificial intelligence researchers described how the anthropomorphism of technology can be used to facilitate effective user interaction with intelligent systems (Kiesler & Goetz, 2002).

Philosophers such as Daniel Dennett (1987) have similarly described how considering an entity's behavior in terms of mental properties can provide explanation. Dennett (1987) wrote the following in his landmark work on the topic, *The Intentional Stance*:

Here is how it works: first you decide to treat the object whose behavior is to be predicted as a rational agent; then you figure out what beliefs that agent ought to have, given its place in the world and its purpose. Then you figure out what desires it ought to have, on the same considerations, and finally you predict that this rational agent will act to further its goals in the light of its beliefs. A little practical reasoning from the chosen set of beliefs and desires will in most instances yield a decision about what the agent ought to do; that is what you predict the agent will do. (p. 17)

Here, Dennett described how treating an entity as though it has intentions and reason can provide a framework for making predictions about its behavior.

The first mention of the relationship between effectance and anthropomorphism in psychology comes from discussion of the first study of anthropomorphism in psychology. In 1944, Heider and Simmel presented

30 participants with animations of shapes moving around a screen. When asked to describe what was occurring in the scene, all participants except one described the scene as a human drama, with each shape an actor that possessed its own intentions, motives, and feelings. Heider (1958/1964) described these findings:

As long as the pattern of events shown in the film is perceived in terms of movements as such, it presents a chaos of juxtaposed items. When, however, the geometrical figures assume personal characteristics so that their movements are perceived in terms of motives and sentiments, a unified structure appears. . . . But motives and sentiments are psychological entities. . . . They are “mentalistic concepts,” so-called intervening variables that bring order into the array of behavior mediating them. (pp. 31–32)

Heider’s interpretation of his subjects’ attributions suggests that without mentalistic terminology, it would be difficult for them to create a coherent story about the shapes’ movement. Ascribing mental states to these shapes, on the other hand, creates a sense of meaning within the scene. Hume, Heider, and Dennett all converge on the same idea that the desire to see meaning in the world—manifested in needs for explanation, order, and prediction—serves as a major cause of anthropomorphism.

POSSIBLE MECHANISMS

Although there appears to be agreement across various disciplines that people anthropomorphize to attain a sense of meaning and order, it is not completely clear why humanizing a nonhuman entity should provide this sense of meaning. Three possible nonexclusive mechanisms exist for why people employ anthropomorphism as a means of sense making: (a) pattern completion, (b) information seeking, and (c) inductive reasoning.

Pattern completion refers to the identification of a meaningful and coherent relationship between stimuli that may or may not in fact be related. A recent set of studies demonstrated the relationship between pattern perception and the desire for meaning by showing that participants induced to experience a loss of control were more likely to seek out patterns than participants who did not experience a loss of control (Whitson & Galinsky, 2008). In these studies, some participants experienced a lack of control either through receiving random feedback in response to performance on a concept formation task or through writing about a time when they lacked control; other participants did not experience a lack of control. Participants induced to experience a loss of control were subsequently more likely to perceive stable patterns in the stock market and to perceive concrete objects in images of fuzzy dots. These participants were also more

likely to develop belief in superstitions and conspiracies as a means of making sense of events. Just as these studies demonstrate that being deprived of control increases pattern perception, in the case of anthropomorphism, attributing intentions and desires to a nonhuman entity's actions can similarly generate a meaningful pattern of behavior rather than—in Heider's (1958/1964) terms—"a chaos of juxtaposed items."

The second reason why the motivation for mastery might increase anthropomorphism is because mental states are informative to understanding another agent's behavior. Knowing what an entity is thinking, intending, wanting, or feeling provides insight into its actions, and successful communication requires understanding what others are thinking (Barr & Keysar, 2007). Even the egocentric use of one's own mental states to make inferences about others can be useful and accurate (Dawes & Mulford, 1996; Hoch, 1987; Neyer, Banse, & Asendorpf, 1999). Anthropomorphism as mental state inference, therefore, may be a reasonable strategy because it provides additional information about an entity's behavior.

A third reason that anthropomorphism serves as a reasonable strategy for sense making is through inductive reasoning. Anthropomorphism can be thought of as a form of induction whereby we reason about some lesser known entity (e.g., a nonhuman animal, a technological gadget, a supernatural agent) by applying the features of a very well-known concept, human. There is perhaps no concept with which humans are more familiar than the self, the prototypical human. Furthermore, the concept of the self is highly accessible and therefore is an immediately available source of knowledge for reasoning about others (Epley, Keysar, Van Boven, & Gilovich, 2004; Nickerson, 1999). Just as humans use the self to reason about other people, so too do they use this rich knowledge base for reasoning about nonpeople as well. Young children from industrialized, urban cultures, for example, tend to reason anthropocentrically about nonhuman animals—attributing human capacities to living things—before they have developed a more sophisticated biological understanding (Carey, 1985; Inagaki & Hatano, 1987). When knowledge about a particular entity is lacking, using a familiar concept can provide a guide for making inferences about that entity's behavior.

EVIDENCE FOR ANTHROPOMORPHISM AS AN ATTEMPT AT MEANING MAKING

In recent years, psychologists have begun directly testing the hypothesis that the motivation for mastery leads people to anthropomorphize. Support for this hypothesis comes from multiple lines of work and shows how people

anthropomorphize stimuli of all types—animals, technological gadgets, and supernatural beings—when the need for mastery is heightened.

One set of studies examines people's proclivity for teleological explanations of natural events. *Teleology* refers to the tendency to explain events (e.g., why the sun radiates) in terms of intentional design (e.g., to nurture life). Individuals who lack well-developed causal reasoning abilities, such as young children (DiYanni & Kelemen, 2005) and Alzheimer's patients (Lombrozo, Kelemen, & Zaitchik, 2007), show a teleological bias in their reasoning about nature. These populations tend to state that rocks, trees, and the sun exist for some purposeful function. In addition, normal adults, when placed under cognitive load, demonstrate this same teleological bias, endorsing descriptions of natural events as intentionally caused (Kelemen & Rosset, 2009). Cognitive load diminishes the ability for more elaborate causal reasoning, and when causal uncertainty decreases, the tendency to attribute intentions to the workings of nature increases.

Endorsing teleological explanations often implies a belief in the presence of some divine creator, and in line with the research on teleology, people often endorse belief in an anthropomorphic God when they seek meaning. For example, when people are reminded of their death—a situation that evokes existential meaninglessness—they are more likely to report belief in God as well as other supernatural agents (Norenzayan & Hansen, 2006). When they encounter the death of a loved one, they are also likely to turn to God (e.g., McIntosh, Silver, & Wortman, 1993; Spilka, Hood, & Gorsuch, 1985; Wuthnow, Christiano, & Kuzloski, 1980). Similarly, individuals who encounter suffering or are asked to explain a situation in which people suffered are more likely to do so in terms of invoking a God with plans and purpose (Gray & Wegner, 2010). In addition, threats to one's sense of certainty increase religious belief (McGregor et al., 2008; McGregor, Nash, & Prentice, 2010) and experiencing a loss of control or encountering randomness increases people's belief in an agentic God with plans and intentions (Kay et al., 2008; Kay, Moscovitch, & Laurin, 2010). These findings suggest that a desire for meaning increases the tendency to seek God, an agent often depicted in a humanlike form.

In addition to studies on religious belief, a recent number of studies demonstrate that factors that directly increase the motivation for mastery and meaning increase the attribution of mind to nonhumans. In one study, experimenters either did or did not provide participants the opportunity to control a set of animate marbles and then asked them to describe the marbles (and coded their description for anthropomorphic language). Participants who controlled an electromagnet that moved the marbles rarely attributed intentions to the marbles, but those who did not control the magnet were significantly more likely to use intentional language (Barrett & Johnson, 2003).

Having control in this case enabled people to predict the marbles' movements and therefore required no attribution of intentional agency, whereas a lack of control required an appeal to some other causal force, in this case intentionality in the marbles themselves. In a separate set of studies, participants played a series of monetary exchange games with an unknown agent. When the games resulted in negative outcomes (losses or unfair distributions of money to the participant), participants were more likely to infer that they were playing with an intentional agent rather than with a mindless computer (Morewedge, 2009). Negative outcomes tend to be outcomes that require more explanation than positive outcomes (Taylor, 1991; Weiner, 1985), and thus, participants attributed greater intentionality to the agent when motivated to explain their circumstances.

Other studies point to the tendency for people to anthropomorphize when they encounter unpredictability. In one, participants who expected interaction with an unpredictable robot (compared to participants expecting interaction with a predictable robot, or participants not expecting interaction) anthropomorphized the robot more (Eyssel, Kuchenbrandt, & Bobinger, 2011). In another study, participants completed a measure of dispositional desire for control and viewed a video of two dogs—one moving in a relatively predictable manner and one moving in a relatively unpredictable manner. After viewing the video, participants rated both dogs on anthropomorphic characteristics. Results from this study showed that participants were more likely to anthropomorphize the unpredictable dog (versus the predictable dog) likely because of a greater need to explain this dog's behavior. In addition, participants high in desire for control were more likely to anthropomorphize both dogs (Epley et al., 2008). These studies suggest that when people are deprived of control or encounter stimuli that require explanation, they are more likely to anthropomorphize nonhuman entities.

In the most comprehensive test of the hypothesis that the motivation for mastery and meaning increases anthropomorphism, my colleagues and I conducted five studies in which participants evaluated technological or robotic entities (Waytz et al., 2010). In a first study, participants reported how often their personal computers malfunctioned and how much they considered these computers to have minds. The more people's computers malfunctioned, the more they attributed mental states to these gadgets probably because computer malfunction heightens the need for explanation and understanding. In three separate studies, participants evaluated gadgets and robots that operated in a predictable manner as well as gadgets and robots that operated in an unpredictable manner. Across all three studies, participants attributed more mental states to entities that operated unpredictably and evoked a greater desire for mastery. These results manifested not only in self-reported anthropomorphism but also in increased activation in brain

regions associated with mentalizing when participants evaluated unpredictable entities. In one additional study, participants watched videos of a robot and were randomly assigned either to a condition in which they received money to predict the robot's behavior or to a condition in which they did not receive money for predicting the robot's behavior. After viewing the videos, participants rated the robot on anthropomorphic and nonanthropomorphic characteristics. Participants who were incentivized to predict the robot's behavior reported greater anthropomorphism of the robot. Taken together, these studies provide considerable evidence for mastery motivation as a primary determinant of anthropomorphism.

OUTSTANDING QUESTIONS

The relationship between mastery motivation and anthropomorphism presents three questions for future research: (a) What are the consequences of anthropomorphism for perceptions of a particular entity's behavior? (b) Does anthropomorphism, in fact, satiate this desire for meaning and provide a real sense of mastery? (c) If the desire for mastery increases humanization, does the converse hold true—that satisfying this desire increases dehumanization? The remainder of this chapter addresses these questions.

Anthropomorphizing an entity to understand its behavior entails seeing its behavior as driven by intentions. This perception of intentionality can make its behavior seem patterned and purposeful. For example, research demonstrates that describing the stock market in anthropomorphic terms can make people feel that trends in the market are more likely to continue (Caruso, Waytz, & Epley, 2010; Morris, Sheldon, Ames, & Young, 2007). Intentional behavior often implies the presence of skill (Malle & Knobe, 1997), and when people perceive behavior as skillfully driven, they often intuit that the pattern of behavior will continue (Gilovich, Vallone, & Tversky, 1985). Additional research is necessary to test the full extent to which anthropomorphism leads people to see an entity's behavior as more routine and patterned.

Another open question is whether anthropomorphizing actually satiates the desire for mastery. One study my colleagues and I conducted speaks to this question (Waytz et al., 2010). In this study, participants viewed short movies of four different stimuli—a set of animate shapes, a puppy, a mobile alarm clock, and a humanoid robot. Participants were instructed to write anthropomorphically about two of the stimuli and to write objectively about the other two. After each writing exercise, participants rated how much they understood and felt they could predict the behavior of the stimulus, as a measure of perceived mastery. Participants reported greater mastery over stimuli that they anthropomorphized, compared with those they treated objectively. Although this study

provides preliminary evidence that anthropomorphism can provide perceived mastery, future studies must address whether anthropomorphism can provide *real* mastery. For example, is one more likely to win a chess match against a computer if one anthropomorphizes the computer? Is one more likely to beat cancer if one anthropomorphizes the disease? Can one master the stock market by treating it like an intentional agent? As of now, it is unclear whether anthropomorphism can provide actual mastery or simply illusions of control.

Finally, future research can test the inverse prediction that satisfying the desire for mastery enables dehumanization by lessening the extent to which one must see others as having minds. Some evidence already exists in support of this hypothesis, demonstrating that people induced to experience power—that is, to have control and mastery over their social environments—are more likely to dehumanize others. One set of studies showed that putting people in high-power roles increased their tendency to objectify others and to treat them as means to an end rather than as mindful agents (Gruenfeld, Inesi, Magee, & Galinsky, 2008). Another set of studies showed that powerful people or people induced to experience high power were less likely to describe out-group members using traits that are distinctively human (Lammers & Stapel, 2011). These findings suggest that people who have attained a sense of mastery have a reduced need to explain and understand the actions of others and therefore are more likely to treat others as mindless entities rather than as the humans they really are.

CONCLUSION

Seeing human is one method by which people make sense of the world around them. Imbuing trees, animals, gadgets, and gods with humanlike feelings and intentions may not be as automatic as Hume suggested, but it is a widespread tendency. By seeing things as human, people attempt to create the familiar in relatively unfamiliar entities. It is for future research to determine the consequences of this process, for both perceivers of nonhumans and the entities perceived, and to determine whether satisfying the motivation for mastery and meaning may, in fact, diminish the desire and tendency to see others as fundamentally human.

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