Fuzzy People: The Roles of Kinship, Essence, and Sociability in the Attribution of Personhood to Nonliving, Nonhuman Agents

Kathryn A. Johnson and Adam B. Cohen
Arizona State University

Rebecca Neel
University of Iowa

Anna Berlin and Donald Homa
Arizona State University

Evolutionary theories of religion have focused almost exclusively on anthropomorphic representations of God and of God as having a mind. However, religious beliefs extend to notions about material entities as well and, we propose, religious cognition can involve *many* distinct cognitive systems and social motivations including kin care, essentialist beliefs, and social exchange. We refer to the elevation of the social status of nonliving and nonhuman material entities as personification. In 3 studies we assess variability in the personification of a range of nonliving nonhuman entities. In Study 1, perceived kinship and the attribution of an inner essence, spirit, or soul to a particular target were important positive predictors of the personification of material nonliving or nonhuman entities whereas sociability was not. In Study 2, we compare personification among European Americans, Hispanic Americans, and American Indians to show that these perceptions can vary by cultural group. In Study 3, variation in personification was related to individual differences in beliefs about the soul or evolution. In all, we show the importance of perceived kinship bonds and essentialist beliefs in the personification of fetuses, the dead, animals, and objects, over and above the attribution of mental attributes—a new focus for understanding religious cognition.

Keywords: anthropomorphism, essence, personification, theory of mind

> There is nothing as eloquent as a rattlesnake's tail
> —*Native American proverb*

Empirical research in the psychology of religion has mainly focused on monotheistic religion and, consequently, individuals' representations of and attitudes toward God. However, anthropologists have observed that in tribal societies the sun, winds, thunder, trees, animals, and even rocks can be thought of as persons or as kin that must be respected and related with as persons (Bird-David, 1999; Hallowell, 1975/1960; Harvey, 2006; Ingold, 2000; Lee, Beddow, Chan, & Xu, 2015; Morrison, 2000). Others would ascribe personhood to robots (Wallach & Allen, 2009), great apes (Cavalieri & Singer, 1993), or fetuses (English, 1989). In the present research, we investigate the extent to which, and why,

people from different cultural groups personify a wide range of nonliving, nonhuman entities.

Beliefs about God and other nonliving, nonhuman agents are thought to be grounded in folk psychological theories such as theory of mind (Boyer, 2001; Gervais, 2013). However, like our ancestors before us, humans face many cognitive challenges and have developed different cognitive tools and lay theories to understand what exists, what things are made of, and how things work (i.e., folk physics; Gelman & Wellman, 1991), what is alive and which things are kin (i.e., folk biology; Kenrick, Neuberg, Griskevicius, Becker, & Schaller, 2010; Lieberman, Tooby, & Cosmides, 2007), as well as how others feel and how to get along with others (i.e., folk psychology; Medin & Atran, 2004; Sperber, Premack, & Premack, 2002/1995). Although having a mind and emotions—and even being thought of as human—can be important criteria in the personification of various kinds of nonliving or nonhuman entities (Gray, Gray, & Wegner, 2007; Gray, Young, & Waytz, 2012; Haslam, 2012), we hypothesized that beliefs about an inner essence, feelings of kinship, or perceived sociability may be equally or even more important in the attribution of personhood across diverse targets and in different religious and cultural groups. Much of our theorizing owes itself to the understanding that personhood is a flexible category in Native American philosophy and religion, an issue we more explicitly investigate in Study 2.

Psychology of Anthropomorphism

Heider and Simmel (1944) were perhaps the first to empirically demonstrate that humans are not the only targets perceived as agents; people often attribute intentional behavior to bouncing

balls or geometric figures when viewed in nonrandom motion. However, anthropomorphism exists along a continuum (Kwan & Fiske, 2008). Nicholas Epley and his colleagues (Epley, Waytz, & Cacioppo, 2007) have distinguished between strong and weak forms of anthropomorphism:

> Strong forms of anthropomorphism entail behaving as if a nonhuman agent has humanlike traits or characteristics along with explicit endorsement of those beliefs (such as with religious agents), whereas weaker forms may only entail "as if" metaphorical reasoning (such as with one's malevolent computer). (p. 867)

In a recent poll, for example, 50% of pet owners responded that their pets were as much a part of the family as any other member in the family (Associated Press and GFK Roper Public Affairs & Media Polls, n.d.). From an American Indian point of view, anthropologist Graham Harvey (2006) describes persons as "those with whom other persons interact with varying degrees of reciprocity . . . and neither material form nor spiritual or mental faculties are definitive" (p. xvii). American Indians often consider animals to be persons who must be treated with respect and have vigorously contested the desecration of ancient burial lands, arguing that all persons—living and dead—must remain connected to the living land. However, to date, little attention has been given to the psychology of these stronger forms of anthropomorphism which we refer to as personification.

Personification

Although we may have a universal, shared understanding of what is living and what constitutes membership in the biological category "human," the category "person" appears to be a fuzzy set—and one with social, legal, or moral consequences. In the present research, we take the stance that personhood is honorific and that any nonliving or nonhuman target is a person if a perceiver judges or acts toward it accordingly.

We agree with previous theoretical perspectives that people are most likely to attribute personhood to (a) material, morphologically similar beings, (b) who are living, and (c) who are deemed to have a mind. Thus, we would predict that humans are more likely to be personified relative to animals who are less morphologically similar but living and with mental capacities; animals are more likely to be personified relative to robots who are nonliving but with some mental capacities; and robots are more likely to be personified relative to cars which have no mental capacity. However, as Boyer (2001) has argued, cultural beliefs are often counterintuitive. We theorize that, although all people understand the differences between human, animal, and object, these entities may be personified to a greater or lesser extent by some individuals or in certain religious and cultural groups. In other words, again, we view personhood as a social (rather than ontological) category whose exemplars typically include humans but may also include nonhuman entities such as the dead, fetuses, animals, robots, and even the wind, fire, or celestial objects. Thus, we go beyond previous theory regarding human-likeness (Epley et al., 2007) and mind perception (mental, emotional, and moral attributes; Gray et al., 2012) and hypothesize that people sometimes ascribe sociability, kinship, or an inner essence associated with personification to some entities but not to others.

Kinship

Feelings of relatedness or closeness may be an important dimension of personhood over and above perceived mental attributes. As mentioned above, many American Indians think of nonliving or nonhuman persons as being related, or as kin (Hallowell, 1975/1960; Morrison, 2000). We expected to find that American Indians were more likely to personify natural, biological entities and that kinship would often relate to personification.

Essence

Children and adults often perceive an inner essence and believe that the insides of things can be known from observing similarities between entities, a cognitive process referred to as essentialism (Gelman & Wellman, 1991; Rosengren, Johnson, & Harris, 2000). Therefore, belief that the entity has an "inner essence" or soul may be a second attribute leading to personification.

Sociability

In addition to mere mental faculties, social and communicative capabilities have also been shown to be important in interactions with both dogs and robots (e.g., Kwan, Gosling, & John, 2008; Turkle, Taggart, Kidd, & Daste, 2006). Epley and his colleagues (2008) also have shown that loneliness increases anthropomorphic thinking. We expected to find that sociability was an important predictor of personification, particularly in targets such as animals and robots.

Overview of Present Research

In Study 1, we assessed the relative personhood ratings of various targets (fire, angel, human, fetus, the dead, bear, dog, and robot) representing various types of living, nonhuman, and nonliving entities. In Study 2, we focus on perceived kinship as a robust predictor of the personification of living, nonhuman entities across three ethnic groups: American Indians, Hispanics, and Euro Americans. In Study 3, we investigate how perceiver attributes (i.e., loneliness, belief in a soul, and the endorsement of evolutionary theory) might also impact the attribution of personhood.

Study 1: Predictors and Personhood Ratings Across Six Types of Entities

In Study 1, we examined the extent to which, and why, people might ascribe personhood to a variety of nonhuman and/or nonliving entities. First, we considered the personhood ratings of six types of entities to take into account the three universal cognitive processes or modules used to assess all natural kinds: psychology (biologically human vs. nonhuman), biology (living vs. nonliving), and physics (material vs. immaterial). It follows from lay theories of psychology, that intentionality, human-likeness, and the potential for social interaction constitute important criteria for personhood. Thus, humans and human-like animals are most likely to be personified. Next, in accord with folk biology and previous research (Gray et al., 2007), we predicted that living human entities would be more likely to be personified than dead or unborn ones. Finally, we hypothesized that material nonliving entities such as robots and immaterial entities such as fire would be the least likely

to be personified. We then examined the extent to which perceived mental, emotional, moral, kinship, essence, and sociability attributes predicted the personification of each of the entities.

Method

Participants. Participants were 515 undergraduates who completed the survey for extra course credit in introductory sociology, psychology, or statistics courses. Nineteen participants were eliminated for failure to follow instructions or complete the survey. The 496 remaining participants (316 female, 175 male) were mainly Euro American ($n = 342$), but also included 27 Blacks or African Americans, 21 Asians or Asian Americans, 59 Hispanics, 20 American Indians, 11 Middle Easterners, and 16 participants reporting multiethnicity. Religious affiliations included atheist ($n = 37$), agnostic ($n = 94$), Catholic ($n = 143$), non-Catholic Christian ($n = 148$), Latter Day Saints (i.e., Mormon; $n = 20$), Muslim ($n = 9$), Jewish ($n = 13$), and "Other" ($n = 31$; Hindu, Baha'i, Wiccan, Pagan, New Age, Buddhist, Spiritualist, Unitarian, and Native American Traditionalist).

Personhood survey. Participants completed an online survey (available from the authors) in which they rated the extent to which they agreed that each of eight entities (fire, angel, monk, the dead, fetus, bear, dog, and robot) was a person, was human, or possessed each of 21 attributes, including statements about each entity's mental (e.g., bears can think), emotional (e.g., bears can feel joy), moral (e.g., bears have rights), social (e.g., I can communicate with bears), essence (e.g., bears have an inner essence), and kinship attributes (e.g., I feel a sense of kinship with bears). The 21 attribute items were presented in a randomized order, by entity, rated from 1 (*strongly disagree*) to 7 (*strongly agree*). Following the attribute questions, participants rated the extent to which they agreed that (a) the entity is a human, (b) the entity is a person, and (c) the participant was familiar with the entity, again providing ratings from strongly disagree to strongly agree. A photograph of each entity (125×188 pixels) was presented at the top of each computer page, followed by the series of questions pertaining to the perceived attributes of that entity.

Results

Personhood ratings. Figure 1 depicts the mean ratings of personhood and humanness for each entity, with the adult human (monk) being very much a person, followed by fetuses, deceased humans, angels, dogs, bears, robots, and fire. Every entity was rated as being fully a person by at least one participant. Although it may seem surprising, 49 respondents "strongly agreed" (rating of 7) that both dogs and humans are real persons, and 6% of respondents rated fire as being greater than a value of 1 on the 7-point scale, and the mean was significantly greater than 1, $t(485) = 4.68$, $p < .001$.

Paired samples t tests were conducted for each entity to examine differences between human versus personhood ratings. Participants rated fire, angels, the dead, dogs, bears, and robots as each being more person than human, ts ranged from 8.57 to 2.37. In contrast, the fetus, $t(495) = 6.66$, and monk $t(484) = 12.97$, were rated as being more human than person (p's $\leq .018$).

Predictors of personhood. A six-factor solution for the 21 attributes yielded adequate fits of the data across all entities, RMSEAs = .07 to .11; CFI's = .94 to .98; SRMRs = .05 to .09 (factor loadings and fit statistics are available from the authors). The six attribute factors were labeled mental, emotional, moral, social, kinship, and essence, with reliabilities ranging from Cronbach's alpha = .79 to .91.

Multiple regression analyses were conducted to assess the ability of each of the six attributes to predict the personhood of each entity over and above humanness, with a separate regression analysis conducted for each entity. As shown in Table 1, for each entity, different attributes emerged as the best predictors. Perceived humanness was consistently a significant and positive predictor of personification. Regression analyses without controlling for humanness revealed that (a) mental, emotional, and kinship attributes were significant predictors of the personification of fire; (b) kinship and essence predicted the personification of angels; (c) mental, emotional, and moral predicted the personification of monks; (d) moral and essence predicted the personification of the dead and fetuses; (e) kinship predicted the personification of
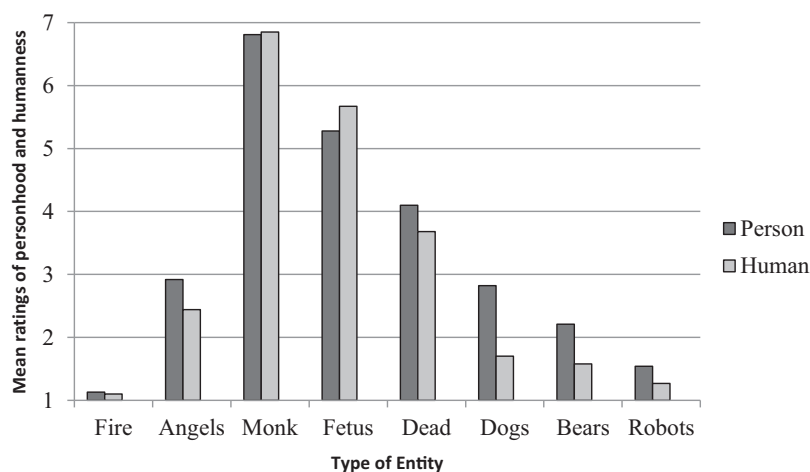

Figure 1. Means of personhood and humanness ratings for each entity, in Study 1. $n = 496$.

Table 1

Hierarchical Multiple Regression Analyses Predicting Personhood From Humanness and Mental, Emotional, Moral, Social, Kinship, or Essence Attributes

	Fire		Angels		Monk		Dead	
Predictor	β	r	β	r	β	r	β	r
Human	.85***	.91	.65***	.75	.88***	.88	.60***	.65
Mental	.10**	.53	.22**	.50	−.07	.49	.03	.26
Emotional	−.01	.51	−.02	.48	.07†	.48	−.07	.24
Moral	.01	.21	−.07	.51	−.01	.52	.09†	.35
Social	.02	.40	.06	.49	.03	.31	.02	.24
Kin	.04	.51	.02	.51	.04	.06	.00	.30
Essence	−.04†	.19	.06	.44	.02	.22	.17***	.33
Familiarity	−.01	−.03	.01	.25	.00	.02	−.02	−.01
Total R^2	.84***		.62***		.78***		.47***	
n	485		483		484		494	

	Fetus		Bears		Dogs		Robots	
Predictor	β	r	β	r	β	r	β	r
Human	.66***	.80	.48***	.53	.43***	.49	.49***	.63
Mental	.04	.40	.00	.18	.04	.23	.06	.36
Emotional	.07	.45	.11*	.15	.02	.16	.13***	.42
Moral	.11**	.64	.06	.15	−.01	.16	.06	.36
Social	.00	.40	−.07	.04	.01	.15	−.01	.25
Kin	−.03	.45	.15**	.28	.21***	.35	.22***	.52
Essence	.09*	.57	.02	.18	.04	.23	.00	.38
Familiarity	.03	.07	−.06	.18	.01	.13	.02	.12
Total R^2	.68***		.32***		.30***		.52***	
n	495		494		494		495	

Note. Fire and Robot are highly right skewed and Monk is highly left skewed, therefore regression results for these entities should be treated with caution.
† $p \leq .08$. * $p \leq .05$. ** $p \leq .01$. *** $p \leq .001$.

animals (bear and dog); and (f) emotion, kinship, and essence predicted the personification of robots.

After controlling for humanness, mental attributes predicted the personification of the immaterial entities only, fire and angels; emotion was a positive predictor of the personification of robots and less so for bears; moral rights were a positive predictor of the personification fetuses; kinship was a positive predictor of the personification of bears, dogs, and robots; and having a soul or spiritual essence was a positive predictor of the personification of fetuses and the dead. In the full model, sociability was not a significant predictor of the personification of any of the eight target entities.

Discussion

In Study 1, we found that personification of nonliving nonhuman entities varied across eight targets chosen to represent six types of entities: immaterial versus material, human versus nonhuman, and living versus nonliving. People personified each of the eight entities to varying degrees, including the clearly nonhuman entities. Further, the characteristics that people used in attributing personhood to each entity differed by target such that perceptions that an entity has a spirit, soul, or inner essence was associated with the personification of dead and unborn humans. Feelings of kinship and relatedness were associated with the personification of animals, whereas emotionality played an additional role in the personification of robots. Mental attributes were associated with

personhood for human, angels, and fire only. This suggests that mental attributes may be important mainly in perceptions of im-material—but not material—nonhuman entities.

Study 2: Kinship as a Predictor of the Personification of Living, Nonhuman Entities

The attribution of personhood may also depend, in part, on perceiver biases. In Study 2, we examined personification in three ethnic groups, American Indians, Euro Americans, and Hispanics. Many American Indians specifically refer to certain natural entities such as bears, eagles, and trees as kin (Hallow-ell, 1975/1960; Harvey, 2006; Scott, 2006). Thus, in Study 2 we compared American Indians' and Euro Americans' personhood ratings across a range of living and nonliving entities and expected to find that perceived kinship was a positive predictor of personification in the American Indian sample. However, if differences were significant, we would not know whether American Indians were high, or Euro Americans were low in their ratings. Because Hispanic individuals often have ethnic roots in both European and American indigenous cultures, we included them as a comparison group.

Participants

Participants were 355 undergraduates at a large southwestern university in the U.S. who participated in exchange for extra class

credit in sociology and introductory psychology courses. Participants who rated Monks as less than 4 in terms of personhood on a 7-point Likert scale and also rated robots greater than 4 were deemed to have reversed the scale or failed to follow instructions, and were excluded from the analyses ($n = 6$). The final sample included 349 participants (199 females). There were 256 Euro Americans, 39 Hispanics/Latinos, and 54 American Indians. American Indians were from 15 tribal nations with 45% being Navajo (Diné).

In terms of religious affiliation, there were 67 atheists, 91 agnostics, 50 Catholics, 53 non-Catholic Christians, 8 Jews, 15 Mormons (Latter Day Saints), 39 "Spiritual but not Religious," 23 Native American Traditionalist, and 3 "other." All of the Hispanics were either secularists (i.e., atheist or agnostic) or Christian (i.e., Catholic or non-Catholic Christian). There were no Euro Americans or Hispanics reporting religious affiliation as Native American Traditionalist and only three secularist American Indians.

Method

The study was administered as an online survey. As in Study 1, participants were asked to provide Likert-scale ratings, anchored at 1 (*strongly disagree*) to 7 (*strongly agree*), for a variety of entities, including three of main interest (bears, eagles, and trees) as well as other entities for comparison purposes from Study 1: monks (i.e., humans), fetuses, the dead, and robots. We also included great apes as a target entity perhaps less familiar to American Indians. We expected American Indians to be significantly more likely to personify bears, eagles, and trees relative to Euro Americans and Hispanics.

As in Study 1, participants rated the mental, emotional, moral, kinship, and essence attributes of each entity immediately prior to providing the personhood rating. However, we made three changes to Study 1. First, we omitted the sociability attribute because it was not a significant predictor for any entity in Study 1. We also changed the wording of two items to the Essence subscale, "[Entity] has a soul" was used to replace "[Entity] can exist without a body," and "[Entity] has an inner essence or spirit" was split into two questions, "[Entity] has an inner essence" and "[Entity] has a spirit." Additionally, we omitted the statement regarding humanness.

Results

The personhood ratings ranged from 1 to 7 (the maximum possible) for each entity, in all three cultural groups, except for Monks with a minimum rating of 4. The relative personhood scores for entity, by cultural group, are shown in Figure 2.

There was a significant main effect of cultural group, $F(14, 680) = 5.44$, $p < .001$; Wilks' $\lambda = .81$; partial $\eta^2 = .10$. As expected, between group differences were not significant for the ratings of personhood for fetus, $F(2, 346) = .44$, $p = .64$, or the dead, $F(2, 346) = .38$, $p = .68$. However, there were significant group differences for the personhood ratings of bears, $F(2, 346) = 13.26$, $p < .001$, partial $\eta^2 = .07$; eagles, $F(2, 346) = 21.58$, $p < .01$, partial $\eta^2 = .11$; and trees, $F(2, 346) = 12.39$, $p < .07$. American Indians were significantly more likely than both Euro Americans ($p < .001$) and Hispanics ($p = .051$) to personify eagles and trees, and significantly more likely than Euro Americans to personify bears ($p < .001$). Unexpectedly, however, differences were also significant for the personhood rating of apes, $F(2, 346) = 7.62$, $p = .001$, partial $\eta^2 = .04$, and robots, $F(2, 346) = 20.88$, $p = .001$, partial $\eta^2 = .11$. Compared with Euro Americans, both American Indians ($p = .003$) and Hispanics ($p = .032$) gave higher ratings, on average, for apes. American Indians' ratings of the personhood of robots was higher than either Euro Americans ($p < .001$) or Hispanics ($p = .011$).

Next, we conducted a multiple regression analysis to investigate to what extent mental, emotional, moral, kinship, or essence attributes were predictive of personification (see Table 2). Kinship was a significant predictor of personhood across all three cultural groups regarding bears, eagles and apes—the three living animate entities. Kinship was a significant predictor of personhood ratings for trees by the American Indian cultural group only. In contrast, kinship was not a significant predictor of personhood ratings for robots in the American Indian group
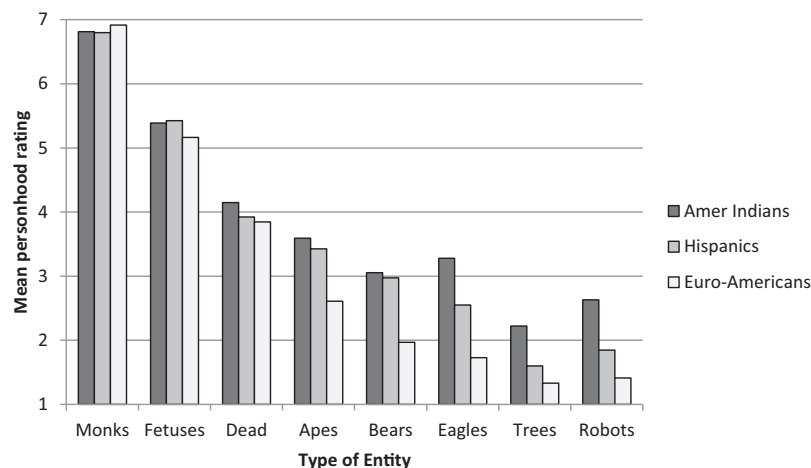

Figure 2. Mean personhood ratings by ethnic cultural group, in Study 2. American Indians, $n = 54$; Hispanics, $n = 40$; Euro Americans, $n = 260$.

Table 2

Standardized Beta Coefficients From Regression Analyses Predicting Personification of Five Entities, by Cultural Group, in Study 2

Entity	American Indians β	Hispanics β	Euro-Americans β
Apes			
Mental	.24	−.01	−.09
Emotional	−.10	−.04	−.07
Moral	.11	−.06	.13
Kinship	.63***	.73***	.46***
Essence	−.25	.21	.11
R^2	.48***	.51***	.26***
Bears			
Mental	.18	.32	.16
Emotional	−.16	−.10	−.20*
Moral	−.10	.01	.10
Kinship	.58***	.62***	.25***
Essence	.01	.04	.15*
R^2	.33***	.57***	.17***
Eagles			
Mental	.01	−.07	−.08
Emotional	.31	.18	.03
Moral	.03	.24	.07
Kinship	.48**	.65***	.52***
Essence	−.28*	.09	.02
R^2	.44***	.70***	.28***
Trees			
Mental	−.05	−.03	.14
Emotional	.39**	.82***	.52***
Moral	−.08	−.18*	−.03
Kinship	.48***	.10	.06
Essence	.24*	.08	.04
R^2	.81***	.85***	.46***
Robots			
Mental	−.11	.02	−.05
Emotional	.20	−.02	.23***
Moral	.36**	−.05	.07
Kinship	.00	.28*	.20***
Essence	.48**	.76***	.37***
R^2	.69***	.89***	.46***
Fetus			
Mental	−.01	−.14	−.02
Emotional	.14	.01	−.07
Moral	.10	.34*	.34***
Kinship	.16	.15	.12
Essence	.32†	.58***	.42***
R^2	.36***	.79***	.52***

Note. Results for the entities Trees and Robot should be treated with caution as the scores for personhood are highly right-skewed.
† $p \leq .08$.　* $p \leq .05$.　** $p \leq .01$.　*** $p \leq .001$.

(however, these results should be treated with caution inasmuch as personhood ratings for robots are low and highly right skewed). Belief in an inner essence, spirit, or soul in a fetus was the best predictor of personhood across the three groups although the results did not reach significance in the American Indian group ($p = .078$). Notably, mental attributes were not predictive of personhood for any entity by any group suggesting, as in Study 1, that beliefs that an entity has a mind are overshadowed by other beliefs in the personification of nonliving, nonhuman entities.

Finally, we note that American Indians reported having had more experience with childbirth, $F(2, 346) = 10.58, p < .001$,

and eagles $F(2, 346) = 24.74, p < .001$, relative to the other two groups. However, when entered into the regression models above, familiarity with childbirth was not a significant predictor of the personification of fetuses and familiarity with eagles was not a significant predictor of the personification of eagles.

Discussion

As predicted, American Indians were much more likely than Euro Americans and, to a lesser extent, Hispanics in their tendency to personify certain living but nonhuman agents (animals, trees, and eagles). For the American Indians, personification was mainly based on feelings of kinship or relatedness to these entities. Consistent with the results of Study 1, we also found that kinship was a positive predictor of the personification of animals even among Euro Americans. In contrast to both Euro Americans and Hispanics, American Indians further extended the boundaries of kinship to include trees (but not robots or human fetuses). An unexpected result in Study 2 was that American Indians, on average, were also more likely to personify robots relative to Hispanics and Euro Americans. However, belief in a soul or inner essence was the best predictor of the personification of robots and not kinship. Indeed, belief in a soul or an inner essence was the best predictor of the personification of robots and fetuses across all three cultural groups.

Study 3: Perceiver Attributes and Personification of Fetuses and Animals

In Study 3, we sought to examine whether differences in an individual's religious worldview might also influence personification. Specifically, we examined belief in an inner essence (i.e., a soul) and belief in the evolution of species as predictors of personification. We predicted that although Christians (Catholics and non-Catholic Christians) may be more likely than Secularists to believe in the existence of a human soul and perhaps to believe that animals also have souls, Christians would nevertheless be less likely to personify animals. This is because animals are often thought to be created by God as a separate, lower species in what is referred to as the great chain of being proceeding from God to angels, angels to humans, humans to animals (see Brandt & Reyna, 2011; Diesendruck & Haber, 2009). We also predicted that belief in evolution as the story of human origins would be associated with the perception that chimpanzees are kin and, consequently, the personification of chimpanzees. In Study 3, we also sought to rule out the possibility that the loneliness of the perceiver (Epley et al., 2008), rather than the perceiver's beliefs, might better account for differences in personification.

Participants

Participants were 616 undergraduates at a large southwestern U.S. university who completed the survey for extra course credit in a variety of online sociology courses. Participants ($n = 30$) who rated Monks as less than 4 and rated robots greater than 4 in terms of personhood, on a 7-point Likert scale, were deemed to have reversed the scale or failed to follow instructions, and were excluded from the analyses.

The sample of 586 (212 males and 365 females, others missing) qualified participants included 371 Euro Americans, 27 African

Americans, 99 Hispanics, 39 Asians or Asian Americans, and 30 of other or multiple ethnicities. There were 34 atheists, 116 agnostics, 156 Catholics, 207 non-Catholic Christians, 3 Buddhists, 2 Muslims, 14 Jews, and 17 "other religions." Participants were college undergraduates and we did not collect information regarding age.

Method

As in Studies 1 and 2, participants completed an online survey in which they were asked to rate the mental, emotional, moral, kinship, and essence attributes and the extent to which each entity was a person, using a 7-point Likert scale from 1 (*strongly disagree*) to 7 (*strongly agree*) for fire, angel, monk, fetus, chimpanzee, dog, bat, and robot. An image of the target entity being rated was at the top of each survey page.

Participants also completed short scales measuring loneliness (Hughes, Waite, Hawkley, & Cacioppo, 2004; $\alpha = .91$), belief in a soul ("I believe that every human being has a soul"; single item), creation ("The Creator spoke all things into existence;" "Humans were created as a unique species;" "God still works miracles;" $\alpha = .83$), and evolution ("The universe has evolved over billions of years without divine intervention;" "All living beings evolved from a common ancestor;" "The laws of physics can never change even for an instant;" $\alpha = .53$). Although the alpha for this evolution scale is low by conventional standards, with only 3 items, we considered it acceptable. Distracter questions regarding preferred learning styles were also included.

Results

As in the previous studies, we found a range of scores from 1 to 7 on a 7-point Likert scale for each entity and a similar progression of means across the six types of entities: Fire ($M = 1.08$, $SD = .48$), Angel ($M = 3.02$, $SD = 2.12$), Monk ($M = 6.83$, $SD = .55$), Fetus ($M = 5.29$, $SD = 2.00$), Chimpanzee ($M = 2.42$, $SD = 1.83$), Dog ($M = 2.26$, $SD = 1.95$), Bat ($M = 1.51$, $SD = 1.20$), and Robot ($M = 1.26$, $SD = .78$).

Belief in a Soul was positively correlated with Creationism, $r = .71$, $p < .001$ and negatively correlated with Evolution, $r = -.14$, $p = .001$ and Loneliness, $r = -.09$, $p < .023$. Creationism was negatively correlated with Evolution, $r = -.30$, $p < .001$ but uncorrelated with Loneliness, $r = .01$, $p = .852$. Belief in evolution and Loneliness were positively correlated, $r = .17$, $p < .001$.

Belief in a human soul and creationism were both positively correlated with the attribution of personhood to fetuses but not chimpanzees or robots (see Table 3). In contrast, and as predicted, the endorsement of evolution was positively correlated with the attribution of personhood to chimpanzees but negatively correlated with the personification of fetuses. As expected, belief in a human soul, creationism, and the endorsement of evolution were uncorrelated with the personification of robots.

In accord with previous research (Epley et al., 2008), loneliness was positively correlated with the personification of robots. Of interest, loneliness was positively associated with the personification of chimpanzees; yet loneliness was negatively correlated with

Table 3

Correlations Between Belief in the Human Soul, Creation, Evolution, and Loneliness, Personhood Ratings, and the Attributes of Personhood

Entity	M	SD	Correlations			
			Soul	Creation	Evolution	Loneliness
Fetus						
Person	5.29	2.00	.29***	.40***	−.21***	−.04
Human	5.78	1.79	.31***	.35***	−.15***	−.04
Mental	2.84	1.55	.15***	.28***	−.17***	.03
Emotional	3.35	1.93	.17***	.33***	−.21***	.08
Moral	4.29	1.45	.35***	.44***	−.24***	−.01
Kin	4.14	1.85	.22***	.36***	−.16***	−.01
Essence	5.21	1.81	.46***	.49***	−.19***	−.05
Chimpanzee						
Person	2.42	1.82	−.03	−.05	.17***	.08*
Human	2.29	1.76	−.05	−.08	.23***	.14**
Mental	6.05	1.01	.13**	.03	.05	−.13**
Emotional	6.24	1.05	.17***	.03	.10*	−.14**
Moral	5.42	1.27	.12**	.05	.15***	−.09*
Kin	3.46	1.72	−.03	−.17***	.31***	.08*
Essence	5.18	1.67	.30***	.10**	.13**	−.09*
Robot						
Person	1.26	.78	−.06	−.05	.03	.10**
Human	1.22	.75	−.05	−.02	.00	.09*
Mental	3.01	1.52	−.07	−.14**	.08*	.03
Emotional	1.51	.99	−.08*	−.05	.07†	.09*
Moral	2.82	1.41	.04	−.03	.08†	.07
Kin	1.38	.81	−.14**	−.07	.03	.15***
Essence	1.55	.98	−.07†	−.07†	.02	.13**

Note. $N = 586$.
† $p \leq .08$. * $p \leq .05$. ** $p \leq .01$. *** $p \leq .001$.

mental, emotional, moral, and essence as attributes of chimpanzees.

To assess the relative importance of target and perceiver attributes, we conducted multiple regression analyses, one for each of the two entities of interest (fetus, chimpanzee), with personhood as the dependent variable and nine predictors: Belief in a Soul, Evolution, Loneliness, and the relevant Mental, Emotional, Moral, Kinship, and Essence variables. Predicting the personhood of fetuses, Emotional ($\beta = .13$, $p = .01$), Moral ($\beta = .31$, $p < .001$), and Essence ($\beta = .42$, $p < .001$) were the only significant predictors. Predicting the personhood of chimpanzees, Moral ($\beta = .12$, $p = .02$) and Kinship ($\beta = .32$, $p < .001$) were the only significant positive predictors. Mental ($\beta = -.16$, $p = .003$) was a significant and negative predictor.

We might also expect to see differences in the personification of fetuses and chimpanzees (but not robots) in different religious groups as well. Therefore, we created a subset of the data to test religious group differences. First, to hold ethnic group constant, we excluded participants from ethnic groups other than Euro American. Because there were not enough participants in any of the other religious groups to test for differences, we also excluded participants from any non-Christian religious tradition.

The 335 participants in the data subset comprised 112 Secularists (atheists and agnostics), 75 Catholics, and 148 non-Catholic Christians, all of whom were Euro American. Of these, 214 were female and 121 were male with the same proportions of females in each religious group, $\chi^2 = .629$.

There were no significant differences in loneliness between the three groups, $p = .786$. As expected, Catholics ($M = 6.31$, $SD = 1.17$) and non-Catholic Christians ($M = 6.42$, $SD = 1.11$) were significantly more likely than Secularists ($M = 4.80$, $SD = 1.90$) to believe that "every human being has a soul," $F(2, 329) = 45.10$, $p < .001$. Also secularists ($M = 4.87$, $SD = 1.15$) were more likely than Catholics ($M = 4.18$, $SD = 1.32$) who were, in turn, more likely than non-Catholic Christians ($M = 3.48$, $SD = 1.40$) to endorse evolution, $F(2, 329) = 36.25$, $p < .001$.

A one-way between-groups multivariate analysis of variance was performed to investigate religious group differences between Secularists and Christians (Catholics and non-Catholic Christians) in the personification of five entities (see Figure 3), $F(10, 652) = 7.53$, $p < .001$; Wilks' $\lambda = .80$; partial $\eta^2 = .10$. Religious group differences in the personification of angels, $F(2, 330) = 20.47$, $p < .001$, partial $\eta^2 = .11$; fetuses, $F(2, 330) = 10.81$, $p < .001$, partial $\eta^2 = .06$; and chimpanzees, $F(2, 330) = 5.02$, $p = .007$, partial $\eta^2 = .03$, were all significant. As expected, Catholics and non-Catholic Christians were more likely than Secularists to personify fetuses, $p \leq .001$. In contrast, Secularists were more likely than non-Catholic Christians to personify chimpanzees, $p = .017$. In contrast to our predictions, Catholics did not differ from Secularists in the personification of chimpanzees, $p = .570$. There were no significant group differences in the personification of robots, $F(2, 330) = .62$, $p = .541$ or dogs, $F(2, 330) = 1.68$, $p = .19$.

Being in favor of abortion was negatively correlated with the personification of fetuses, $r = .36$, $p < .001$, but uncorrelated with the personification of animals or robots. Being in favor of animal rights was positively correlated with the personification of chimpanzees, $r = .19$, $p < .001$, but uncorrelated with the personification of fetuses or robots. Being in favor of robotics research and development was positively correlated with the personification of robots, $r = .18$, $p < .001$, and animals, $r = .12$, $p = .005$, but uncorrelated with the personification of fetuses.

Discussion

Belief in a human soul was strongly and positively associated with personification of a human fetus. We found that belief in a human soul is also likely to be extended and positively correlated with beliefs that animals (i.e., chimpanzees) have an inner essence, spirit, or soul; and, to a lesser extent, even robots were thought of as having a soul. However, there seem to be boundary conditions of personhood and belief in a human soul was not associated with the *personification* of chimpanzees or robots.

In contrast, the endorsement of evolutionary theory as an explanation of human origins was positively associated with feelings of kinship with, and the personification of, animals. Again, however, there were boundary conditions and the endorsement of
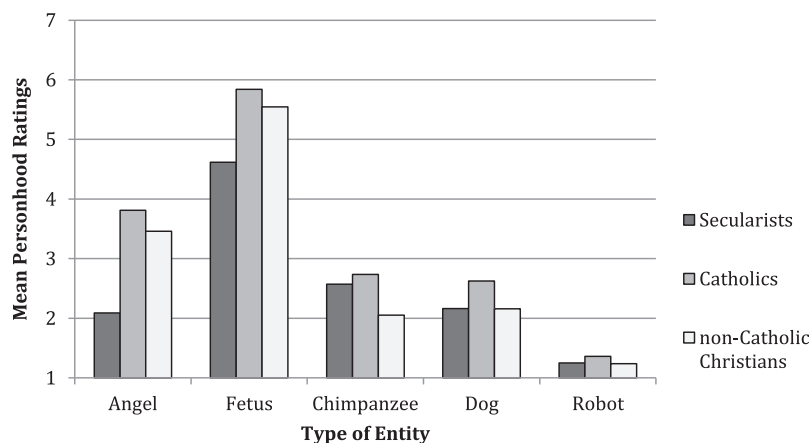

Figure 3. Mean personhood ratings by religious cultural group, in Study 3. Secularists, $n = 112$; Catholics, $n = 75$; Non-Catholic Christians, $n = 148$.

evolution was negatively associated with the personification of a human fetus.

Finally, we note that loneliness played almost no role in the attribution of personhood. We do not dispute that the need for social connection is often predictive of anthropomorphic thinking (Epley et al., 2007, 2008). However, our results suggest that in strong forms of anthropomorphism (i.e., personification), other more culturally determined beliefs may be more influential.

General Discussion

Belief in the existence of God has been the cornerstone of much theorizing about the evolution of anthropomorphic religious beliefs—how those beliefs evolved, whether they are adaptations or byproducts, and what functions those beliefs serve (e.g., Gervais, in press). Of all of the anthropomorphic traits that nonhuman or nonliving agents could have, from having a big toe to having the jealousy and vindictiveness of the Greek demi-gods, it is most often the agents' mental abilities that have garnered theoretical attention.

Our general claim is that perceptions of nonhuman and/or nonliving entities' knowledge and mental abilities are one important piece in understanding anthropomorphism, but only one of many. Accordingly, we theorized that the notion of *personhood*—the strong form of anthropomorphism—is an important and culturally constructed category that captures the perceiver's affective or intended behavioral responses to the target entity. In the present research, we assessed personhood as a social category that may or may not include particular exemplars of the species *homo sapiens*. This suggests that a deeper understanding of the personification of nonliving and nonhuman agents is critical to understanding a wider range of religious cognition.

First, we found that the criteria for personhood differ for various types of entities. For example, mental attributes best predict the personification of an immaterial force such as fire, but kinship best predicts the personification of animals. Importantly, although mental attributes were highly correlated with both humanness and personhood, the composite mental ability of an entity (to think, learn, remember the past, make plans for future, and have responsibilities) was not the best predictor of personhood for material entities. Material, nonhuman entities (whether living or nonliving) such as apes, dogs, bears, and robots may be thought of as having minds and/or mental capabilities, but that does not mean they will be perceived as *persons*. Instead, what mattered most was a sense of kinship, relatedness, or felt closeness to the entity. Further, that sense of kinship seemed to be grounded in either greater familiarity with the entity (e.g., the personification of trees in our American Indian sample) or beliefs about the origins of humans (i.e., humans being related to other living things in accord with evolutionary theory in our Euro American, Secularist sample).

However, we show here that personhood is a fuzzy category. Just as nonhuman entities may be thought of as persons, there are also biological humans that may be de-personified, such as the unborn and the dead. Gray et al. (2007) also found that the unborn and the dead received low ratings on the "moral agency" dimension. The critical determinants of personhood for these targets in the present study (in addition to being human) were moral patiency (deserving respect, respectfulness, and having rights) and having

an inner essence, spirit, life force, or soul; mental attributes were insignificant in the personification of these entities.

Finally, previous theoretical perspectives have predicted that as people become increasingly familiar with or knowledgeable about an entity, anthropomorphic thinking should decrease (Epley et al., 2007). Although we do not dispute that increased familiarity may decrease weaker forms of anthropomorphic thinking, the results shown here indicate that there may be culturally influenced boundaries to current theories of anthropomorphism. In cultures where a class of nonhuman agents is explicitly personified (e.g., animals in American Indian culture or fetuses in certain religious cultures), thinking of these agents as persons may actually increase with familiarity.

Implications

Differing notions of personhood have created great controversy. Peter Singer, Jane Goodall, Richard Dawkins, and others have declared that chimpanzees and gorillas should be members of a "community of equals" with humans (Cavalieri & Singer, 1993), with rights to life, individual liberty, and freedom from torture. On the other hand, religious fundamentalists seem to be less empathetic toward animals and animal rights (DeLeeuw, Galen, Aebersold, & Stanton, 2007). In contrast, officials of the Catholic Church and Christian pro-life advocates such as the "Mississippi Personhood" initiative argue that personhood ought to be conferred on unborn humans. Robotics engineers, too, have expressed concerns about the social, legal, or moral status of increasingly human-like machines (Roese & Amir, 2009). In addition to industrial robots, technology leaders in Japan and the U.S. expect to have socially assistive robots in the near future to care for the elderly, sick, or developmentally impaired, as well as service robots responsive to situational changes and able to meet objective goals (Congressional Bi-Partisan Robotics Caucus, 2009). Thus, it will be increasingly important to understand how different populations perceive and interact with robots and robotic devices.

Limitations and Future Directions

The present research is in the nascent stage and is limited in several ways. First, our results are based on self-reported survey data. Future studies should focus on a language-free assessment of attitudes regarding personhood. For example, card sort tasks or paired comparisons of photographs could be analyzed using multidimensional scaling techniques. Reaction time tasks could also provide useful additional information.

Second, we have measured personhood with, admittedly, anthropocentric criteria. Entities such as trees, blood, land, or demons may also be related with in very social ways but not possess the properties we have measured here. Therefore, this study may not have revealed (or may have mistakenly found) biased or context-dependent classification schemes. Similarly, we also recognize that in some cultures, personhood, agency, and 'life' are *potentials* and not *possessions* (Bird-David, 1999; Shweder & Bourne, 1984).

Another limitation is that we have focused here on personification to the exclusion of working on de-personification. Given the theoretical and practical importance of work on de-personification, including how it facilitates conflict and genocide, it will be im-

portant to know whether the same kinds of factors assessed here might also influence de-personification and also whether there may be predictable individual or group differences in de-personification.

Conclusion

In terms of theory building, the results presented here suggest that it may be more fruitful to reframe the psychology of anthropomorphism in terms of *personhood* as well as in terms of humanness. For people from diverse cultural and religious backgrounds, the world is populated with nonhuman or nonliving entities who may include immaterial or material, animate or inanimate, human or nonhuman personified beings who must be acknowledged, related with, and who may be deemed to have special rights and responsibilities. In that sense, anthropomorphized entities are not simply more or less "human," they are more or less social and moral agents, *persons*, in the lives of those for whom they are real, cared about, or influential.

Furthermore, in a more ecologically valid and multicultural psychology of religion, it seems particularly important to consider the influence of nonliving and/or nonhuman entities on religious cognition, perhaps shifting from an anthropocentric model of religious cognition to a more circumspect, *socio*-centric model by broadening our understanding of what it means to be a person.

References

Associated Press and GFK Roper Public Affairs & Media Polls. (n.d.). The AP-Petside.com poll. Retrieved August 12, 2009, from http://surveys.ap.org/data%5CGfK%5CAP-GfK%20Petside%20Topline%20final%20060309%20Q4%20added.pdf

Bird-David, N. (1999). "Animism revisited": Personhood, environment and relational epistemology. *Current Anthropology, 40,* S67–S91. http://dx.doi.org/10.1086/200061

Boyer, P. (2001). *Religion explained: The evolutionary origins of religious thought*. New York, NY: Basic Books.

Brandt, M. J., & Reyna, C. (2011). The chain of being: A hierarchy of morality. *Perspectives on Psychological Science, 6,* 428–446. http://dx.doi.org/10.1177/1745691611414587

Cavalieri, P., & Singer, P. (Eds.). (1993). *The great ape project: Equality beyond humanity*. New York, NY: St Martin's Press.

Congressional Bi-Partisan Robotics Caucus. (May 21, 2009). A roadmap for US robotics: From internet to robotics. *Congressional Robotics Caucus*. Washington, DC.

DeLeeuw, J. L., Galen, L. W., Aebersold, C., & Stanton, V. (2007). Support for animal rights as a function of belief in evolution, religious fundamentalism, and religious domination. *Society & Animals: Journal of Human-Animal Studies, 15,* 353–363. http://dx.doi.org/10.1163/156853007X235528

Diesendruck, G., & Haber, L. (2009). God's categories: The effect of religiosity on children's teleological and essentialist beliefs about categories. *Cognition, 110,* 100–114. http://dx.doi.org/10.1016/j.cognition.2008.11.001

English, J. (1989). Abortion and the concept of a person. In R. M. Baird & S. E. Rosenbaum (Eds.), *The ethics of abortion: Pro-life! vs. pro-choice!* (pp. 83–92). Amherst, NY: Prometheus Books.

Epley, N., Akalis, S., Waytz, A., & Cacioppo, J. T. (2008). Creating social connection through inferential reproduction: Loneliness and perceived agency in gadgets, gods, and greyhounds. *Psychological Science, 19,* 114–120. http://dx.doi.org/10.1111/j.1467-9280.2008.02056.x

Epley, N., Waytz, A., & Cacioppo, J. T. (2007). On seeing human: A three-factor theory of anthropomorphism. *Psychological Review, 114,* 864–886. http://dx.doi.org/10.1037/0033-295X.114.4.864

Gelman, S. A., & Wellman, H. M. (1991). Insides and essences: Early understandings of the non-obvious. *Cognition, 38,* 213–244. http://dx.doi.org/10.1016/0010-0277(91)90007-Q

Gervais, W. M. (2013). Perceiving minds and gods: How mind perception enables, constrains, and is triggered by belief in gods. *Perspectives on Psychological Science, 8,* 380–394. http://dx.doi.org/10.1177/1745691613489836

Gervais, W. M. (in press). Perceiving minds and gods: How mind perception enables, constrains, and is triggered by belief in gods. *Perspectives on Psychological Science*.

Gray, H. M., Gray, K., & Wegner, D. M. (2007). Dimensions of mind perception. *Science, 315,* 619. http://dx.doi.org/10.1126/science.1134475

Gray, K., Young, L., & Waytz, A. (2012). Mind perception is the essence of morality. *Psychological Inquiry, 23,* 101–124. http://dx.doi.org/10.1080/1047840X.2012.651387

Hallowell, A. I. (1975). Ojibwa Ontology, Behavior and World View. In D. Tedlock & B. Tedlock (Eds.), *Teachings from the American Earth* (pp. 141–178). New York, NY: Liveright. (Original work published 1960)

Harvey, G. (2006). *Animism: Respecting the living world*. New York, NY: Columbia University Press.

Haslam, N. (2012). Morality, mind, and humanness. *Psychological Inquiry, 23,* 172–174. http://dx.doi.org/10.1080/1047840X.2012.655236

Heider, F., & Simmel, M. (1944). An experimental study of apparent behavior. *The American Journal of Psychology, 57,* 243–259. http://dx.doi.org/10.2307/1416950

Hughes, M. E., Waite, L. J., Hawkley, L. C., & Cacioppo, J. T. (2004). A short scale for measuring loneliness in large surveys: Results from two population-based studies. *Research on Aging, 26,* 655–672. http://dx.doi.org/10.1177/0164027504268574

Ingold, T. (2000). *The perception of the environment: Essays in livelihood, dwelling, and skill*. New York: Routledge. http://dx.doi.org/10.4324/9780203466025

Kenrick, D. T., Neuberg, S. L., Griskevicius, V., Becker, D. V., & Schaller, M. (2010). Goal-driven cognition and functional behavior: The fundamental-motives framework. *Current Directions in Psychological Science, 19,* 63–67. http://dx.doi.org/10.1177/0963721409359281

Kwan, V. S., & Fiske, S. T. (2008). Missing links in social cognition: The continuum from nonhuman agents to dehumanized humans. *Social Cognition, 26,* 125–128. http://dx.doi.org/10.1521/soco.2008.26.2.125

Kwan, V., Gosling, S. D., & John, O. P. (2008). Anthropomorphism as a special case of social perception: A cross-species social relations model analysis of humans and dogs. *Social Cognition, 26,* 129–142. http://dx.doi.org/10.1521/soco.2008.26.2.129

Lee, Y.-T., Beddow, M., Chan, X. N., & Xu, C. (2015). Evolutionary and cross-cultural investigation of totemism and Daoism. *Psychology of Religion and Spirituality, 7,* 278–285. http://dx.doi.org/10.1037/rel0000029

Lieberman, D., Tooby, J., & Cosmides, L. (2007). The architecture of human kin detection. *Nature, 445,* 727–731. http://dx.doi.org/10.1038/nature05510

Medin, D. L., & Atran, S. (2004). The native mind: Biological categorization and reasoning in development and across cultures. *Psychological Review, 111,* 960–983. http://dx.doi.org/10.1037/0033-295X.111.4.960

Morrison, K. M. (2000). The cosmos as intersubjective: Native American other-than-human persons. In G. Harvey (Ed.), *Indigenous religions: A companion* (pp. 23–36). New York, NY: Cassell.

Roese, N. J., & Amir, E. (2009). Human–android interaction in the near and distant future. *Perspectives on Psychological Science, 4,* 429–434. http://dx.doi.org/10.1111/j.1745-6924.2009.01150.x

Rosengren, K. S., Johnson, C. N., & Harris, P. L. (Eds.). (2000). *Imagining the impossible: Magical, scientific, and religious thinking in children*. Cambridge, UK: Cambridge University Press. http://dx.doi.org/10.1017/CBO9780511571381

Scott, C. (2006, March). Spirit and practical knowledge in the person of the bear among Wemindji Cree hunters. *Ethnos, 71,* 51–66. http://dx.doi.org/10.1080/00141840600603178

Shweder, R. A., & Bourne, E. J. (1984). Does the concept of the person vary cross-culturally? In R. A. Shweder & R. A. LeVine (Eds.), *Culture theory: Essays on mind, self, and emotion* (pp. 158–199). Cambridge, UK: Cambridge University Press.

Sperber, D., Premack, D., & Premack, A. J. (Eds.). (2002). *Causal cognition: A multidisciplinary debate*. Oxford, UK: Clarendon Press. (Original work published 1995)

Turkle, S., Taggart, W., Kidd, C. D., & Daste, O. (2006). Relational artifacts with children and elders: The complexities of cybercompanionship. *Connection Science, 18,* 347–361. http://dx.doi.org/10.1080/09540090600868912

Wallach, W., & Allen, C. (2009). *Moral machines: Teaching robots right from wrong*. Oxford, UK: Oxford University Press. http://dx.doi.org/10.1093/acprof:oso/9780195374049.001.0001

New Editors Appointed

The Publications and Communications Board of the American Psychological Association announces the appointment of 6 new editors. As of January 1, 2016, manuscripts should be directed as follows:

- *American Psychologist* (www.apa.org/pubs/journals/amp/) **Anne E. Kazak, PhD, ABPP,** Nemours Children's Health Network, A.I. du Pont Hospital for Children

- *Developmental Psychology* (http://www.apa.org/pubs/journals/dev/) **Eric F. Dubow, PhD,** Bowling Green State University

- *International Perspectives in Psychology: Research Practice, Consultation* (www.apa.org/pubs/journals/ipp/) **Stuart Carr, PhD,** Massey University

- *Journal of Consulting and Clinical Psychology* (www.apa.org/pubs/journals/ccp/) **Joanne Davila, PhD,** Stony Brook University

- *School Psychology Quarterly* (www.apa.org/pubs/journals/spq/) **Richard Gilman, PhD,** Cincinnati Children's Hospital Medical Center

- *Sport, Exercise and Performance Psychology* (www.apa.org/pubs/journals/spy/) **Maria Kavussanu, PhD,** University of Birmingham, UK

Electronic manuscript submission: As of January 1, 2016, manuscripts should be submitted electronically to the new editors via the journal's Manuscript Submission Portal (see the website listed above with each journal title).

Current editors Norman Anderson, PhD, Jacquelynne Eccles, PhD, Judith Gibbons, PhD, Arthur M. Nezu, PhD, Shane R. Jimerson, PhD, and Jeffrey J. Martin, PhD will receive and consider new manuscripts through December 31, 2015.