BRILL

Deer Who Are Distant
Response Congruency to Relative Pronouns Across Human and Nonhuman Entities

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Abstract

The study explores the influence of relative pronouns WHO or THAT on attributions of humanness across four categories of entities (unnamed nonhuman animals, named animals, machines, and people). Eighty-three university students performed an attribution task where they saw a priming phrase containing one category item with either WHO or THAT (e.g., deer who are ...) and then two trait attribute items (Uniquely Human UH/ Human Nature HN word pairs; e.g., distant-nervous), from which they selected the trait attribute most meaningfully suited to the phrase. Data were analyzed with a repeated measures 2 (humanness: HN traits, UH traits) × 2 (pronoun: WHO, THAT) × 4 (category: unnamed animals, named animals, machines, people) ANOVA. Participants responded relatively faster to HN trait attributes than to UH traits, and responded faster to named animals than to all other entities. Faster responses also ensued for people-WHO pairings than people-THAT pairings, and vice versa for named animals.

Keywords

attributions of humanness – relative pronouns – language and behavior

The study of language processes is important because humans communicate with each other primarily via the written and spoken word. The influence of language on behavior can be subtle (e.g., Hart & Albarracín, 2009), but should

not be ignored. For example, language offers insight into people's mental health, and some therapies involving language are effective in improving mental health (Pennebaker, 2002). As for the specific choice of words we use for referent categories, Brown (1958), an eminent psychologist in the area of child language development, reminded us that "there is a sense in which lexicon determines cognition and inferences about cognition can be based on lexicon" (p. 245). Put simply, we can get a sense of how people are thinking through what they choose to say.

Importantly also, cognitive psychology research has shown that, when faced with a discrepancy between language and belief, people will change one or the other to reduce what is known as cognitive dissonance. In the context of animal advocacy, the choice to include nonhuman animals in the same category of living entities as humans is reflected in subtle language practices such as pronoun use (e.g., hens who suffer in egg factories) (Dunayer, 2001). Another such practice involves metaphors whereby nonhuman animal characteristics are used to infer derogatory evaluations of people (e.g., women who are perceived as overly protective are "clucky") by emphasizing their "animal" nature which is somehow perceived to be less than human (Dunayer, 2001). In recent years, psychological research interest has extended from the content of a message to the linguistic style of the message (e.g., Pennebaker & King, 1999)—that is, how individuals phrase what they wish to say (Pennebaker, Mehl, & Niederhoffer, 2003). Linguistic style is reflected, for example, in the way one uses function words (Pennebaker, 2002) including THE, MY, WHO, WHICH, and THAT.

Function Words

The class of function words is extremely important, as they give meaning and context to nouns, adjectives, and verbs (Chung & Pennebaker, 2007). They are also some of the most commonly used words in the English language. Although people may pay little attention to function words, they can influence listeners or readers strongly, and provide insight into writers' and speakers' thoughts (Chung & Pennebaker, 2007). Relative pronouns are examples of function words. Of particular interest in the current study are the relative pronouns WHO and THAT.

Cambridge Dictionaries Online (2016) says the relative pronoun THAT is used "to introduce defining relative clauses. We can use that instead of who, whom or which to refer to people, animals and things. That is more informal than who or which." In comparison, the entry on WHO states this relative pronoun is used to refer to people "and sometimes to pet [sic] animals." This latter usage is all the more common (and probably expected) if an animal has an individualized

name (e.g., Peter the parrot who loves his seeds, versus the wild parrot that ate the bird seed). Jacobs (2005) described the renowned scientist Jane Goodall's struggle to have her first scientific paper accepted in its original form, with chimpanzees referred to as *he* or *she*, and as *who*, whereas the journal editor wanted these amended to *it* and *which*, respectively. However, it seems the practice of using WHO to refer to nonhuman animals is becoming more commonly accepted. Anecdotal evidence also indicates that the word THAT is frequently used when referring to humans (e.g., Students that study hard do well in their exams).

Gilquin and Jacobs (2006) examined the variance in the usage of the pronoun WHO with regard to nonhuman animals over the past 40 years. They compared grammar rules relating to the correct use of the pronoun WHO listed in 45 reputable sources and found that it could be acceptable to use WHO when speaking of nonhuman animals, although only in limited contexts. Some factors that helped determine when the use of WHO was appropriate included mention of the animal's gender, the writer's or speaker's attitude toward the animal, and whether the animal had a name (e.g., Fluffy the cat).

Regarding the use of THAT, anecdotal evidence suggests the word is being used as a replacement for WHO when referring to humans. This may be because grammatically correct use of THAT is not restricted to a particular type of target; consider as examples extracts from news reports (e.g., "throngs [of people] that showed up," Hussain, 2010) and articles posted on reputable websites (e.g., "Children that are secondhand smokers could have extended sleep problems," 2009). In some instances, this may be a way for writers to distance either themselves or their audience from bad news.

Some examples include personal reflections of missing children (e.g., "a group of children that were not lucky enough to be sitting at home with their family," Barrett, 2009) and a news report concerning child murderers (e.g., "Robert Kinscherff, a clinical psychologist and senior associate at the US' National Centre for Mental Health and Juvenile Justice, said children that kill usually fall into one of three categories …"; Brook, 2016). In referring to people as THAT, there could be an element of dehumanization through inclusion in a broader category that includes animals and things instead of the relatively narrower category that includes just people and companion animals. However, more research is required before a more conclusive statement can be made.

Other media, such as classic literary works, are further evidence that the use of THAT as a human referent is pervasive and has been for some time. In *The Catcher in the Rye* (Salinger, 1984/1951), the protagonist Holden Caulfield consistently uses THAT to refer to people (e.g., "that lunatic … that lived in tombs," p. 54). The narrator in *The Scarlet Letter* (Hawthorne, 1997/1850) also uses THAT in several instances to refer to people; for example, in the introduction, he narrates about "some of the characters that move in [the house]" (p. 37).

The phrasing of a sentence in the English language often has implications with regard to dehumanization or, conversely, to the attribution of humanness to nonhumans (e.g., Gupta, 2006). People often attribute humanness to non-human entities (anthropomorphism; Kwan & Fiske, 2008; e.g., "my computer is being stubborn") and sometimes ascribe lesser humanness to other people (dehumanization; Haslam, 2006). The attribution of human traits to nonhuman entities can be used purposely for effect, especially in art and literature, as first noted by Ruskin (1856). Either through "willful fancy" or by "an excited state of feelings," the pathetic fallacy involves the attribution of the characteristics of a living creature to an inanimate entity. For example, a poet might write metaphorically about dancing leaves or of the cruel sea. Similarly, anthropomorphism is defined for scientific purposes (i.e., in Reber's 1985 *Dictionary of Psychology*) as "attributing human characteristics to lower organisms or inanimate objects" with the caution to be "careful not to imbue non-humans with what may be species-specific human characteristics" (p. 42).

In an example of dehumanizing language and thinking, Khanna (2008, p. 41) explores a human-based distancing effect through relatively current events in South Africa. She draws on Hannah Arendt's analogy whereby Arendt aligns refugees with dogs in their status as dehumanized individuals. In her chapter on the decline of the nation state, and writing about minorities and stateless people, Arendt (1951) argued that, as fame might improve a refugee's chances of rising through the social strata, so does a stray dog's chance of survival improve through the individuating act of naming.

Only fame will eventually answer the repeated complaint of refugees of all social strata that "nobody here knows who I am"; and it is true that the chances of the famous refugee are improved just as a dog with a name has a better chance to survive than a stray dog who is just a dog in general (p. 287).

However, Khanna noted suggestions that most police dogs in South Africa should be killed because they are "too psychologically sick to be rehabilitated" (p. 42). Further, as a consequence of a 1998 police-dog attack on illegal immigrants, the connotations of the expression "like a dog" came to be reconsidered such that the act of killing the police dogs involved in the attack on the immigrants could somehow serve as a remediation for human dignity by maintaining a distance between human and dog/animal. Khanna gives literary examples (including Kafka) through which we see that the notion to "die like a dog" is taken to mean death without rights or dignity. Khanna also uses an example from J. M. Coetzee's novel, *Disgrace*, as a contrast whereby "the only possibility for dogs like these [i.e., police dogs involved in acts of violence against humans] is for them to die with dignity or to be given the gift of death" (p. 42). In contrast, those killed by the police dogs are in the position of dehumanized individuals without recourse to either dignity or grace.

Language use, in turn, may influence behavior (Carroll, 1956). Some research on sexist language supports this view. For instance, Brooks (1983) found that female eighth-grade students in a female-biased language condition rated Occupational Therapist lower on gender appropriateness than did male students. Chartrand, Fitzsimons, and Fitzsimons (2008) were of the opinion that attributing human traits to a nonhuman entity could result in a person unthinkingly reacting to the entity in a particular way. In their experimental study where participants were set up to think about (i.e., primed with) either dogs (loyal), cats (not loyal), or canaries (neutral), dog-primed participants scored higher on a loyalty questionnaire than did cat-primed or canary-primed participants. The effect was independent of participants' self-identification as a dog/cat/bird person. In the preceding paragraphs, there is some support for the idea that language may influence attitudes to both dehumanization and attributions of humanness, and this, in turn, may affect behavior. Gupta (2006) documented examples wherein the pronoun WHO attributed human traits (sentience and personality) to nonhuman animals (foxes).

She investigated the use of WHO in foxhunting discourse published on the Internet and found (perhaps what some might consider as counterintuitive) that supporters of foxhunting tended to anthropomorphize foxes more than horses or hounds. Supporters seemingly described the fox in anthropomorphic terms as a worthy opponent so as to thereby boost their own status as successful hunters. Those who were pro-foxhunting were also more likely than those who were anti-foxhunting to use WHO as a referent to the fox. To explain this point, Gupta drew on Biber, Johansson, Leech, Conrad, and Finegan's reference work (1999, pp. 317-318, as cited in Gupta, p. 108) wherein *he* and *she* form types of "personal reference," while *it* is categorised as "non-personal." As Gupta herself quotes from Biber et al.: "Personal reference expresses greater familiarity or involvement. Non-personal reference is more detached" (p. 108).

She goes on to note that fox-hunting behavior in itself fosters familiarity with foxes through observation of their habits and habitat, and it is perhaps this greater familiarity with foxes that promotes at the same time affection for them. Further, Gupta argues that the greater the attribution of sentience to the fox as prey, the greater the creature's worth as an opponent for the hunter. Sentience is often ascribed more strongly to humans than to nonhuman animals, so humanized attributions to a prey, such as bravery and cunning, increase the esteem of a successful hunter. Says Gupta, "personalizing an animal does not preclude hunting the animal and is not necessary for its defence" (p. 119). It also appears that even within the people category there are degrees of perceived humanness.

Humanness and Dehumanization

In a series of experimental studies, Haslam and his colleagues (Haslam, 2006; Haslam & Bain, 2007; Haslam, Bain, Douge, Lee, & Bastian, 2005) reported evidence for the notion that attributions to humanness range on a continuum from traits believed to be uniquely human (UH) (e.g., moral sensibility) to traits believed to be part of typical human nature (HN) (e.g., interpersonal warmth). Although the former may be unique to humans, not every person has all of these traits; UH traits develop over time and differ from culture to culture, while, in contrast, HN traits are thought to be innate (Haslam, 2006). In addition, although humans share HN traits with other animals, these traits are viewed as an essential part of being human (Haslam, 2006).

Given the evidence for these two types of human attributes, and that dehumanization is defined as the denial of humanness to a target, it stands to reason that there are two corresponding forms of dehumanization. Haslam (2006) identifies these as (a) animalistic dehumanization, where UH traits are denied to a target, likening the target to a nonhuman animal, and (b) mechanistic dehumanization, where HN traits are denied to a target, likening the target to a robot or some other machine. As an outcome of his review of "manifestations and theories of dehumanization," Haslam proposed that dehumanization is not extraordinary or exercised only in extremity. Instead:

> An expanded sense of dehumanization emerges, in which the phenomenon is not unitary, is not restricted to the intergroup context, and does not occur only under conditions of conflict or extreme negative evaluation. Instead, dehumanization becomes an everyday social phenomenon, rooted in ordinary social-cognitive processes. (p. 252)

In the obverse, Gupta's finding that fox hunters tended to humanize the fox is an example of another social phenomenon whereby, to paraphrase Loughnan and Haslam, humanization need not occur only under conditions of harmony or extreme positive evaluation. Loughnan and Haslam (2007) found some support for the idea that the two types of dehumanization exist. They discovered that artists and nonhuman animals were implicitly associated with HN traits, whereas businesspeople and automata[1] were implicitly associated with UH traits. However, their study aims did not extend to exploring whether social cognitive processes influence the humanization of animals.

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1   Automata in this sense refers to a moving mechanical device that replicates some form/s of human function.

The current study builds upon Loughnan and Haslam (2007) in that it examines attributions of humanness to four types of nonhuman and human entities. However, instead of social categories of people (i.e., artists, businesspeople), the focus remains on humans and nonhumans, while nonhuman entities are extended to include named animals in addition to unnamed animals and automata as employed in Loughnan and Haslam. The four types of entities are thus unnamed animals², named animals, machines, and people. An additional element in the present study involves the influence of the relative pronouns WHO and THAT on attributions of humanness to entities in the four categories, which is a foray into a relatively new area of research.

As such, the main hypothesis of the current study states that attributions of humanness to entities in four categories—animal, named animal, machine, and people—would be influenced by the use of either WHO or THAT in a priming phrase (e.g., [priming phrase] Deer who are / [humanness trait pair HN-UH] NERVOUS-DISTANT). McNamara (2005) defined priming as, "an improvement in performance in a perceptual or cognitive task, relative to an appropriate baseline, produced by context or prior experience" (p. 3). Among other common findings in priming tasks, McNamara explained that a response congruency effect comes from an incongruence between primes and targets that vary on meaning dimensions such that only when a meaning is congruent to the target is there unconscious activation (hence faster response times). In the context of the current study, the priming phrase includes an entity plus a pronoun that arguably most strongly indicates either a being (WHO) or a thing (THAT). The target here is the humanness trait attribution which, according to Haslam and his colleagues, extends along a continuum of humanness and can indicate dehumanization towards the status of nonhuman animal or, at the other end of the continuum, towards the status of nonliving entities such as machines.

Materials and Methods

Materials
Category Items
A pilot study was conducted to ascertain if entities allocated to four categories were representative. The four types of entities were animal, machine, named animal, and people. For the animal and named animal entities, words that carried strong metaphorical human connotations (e.g., SHARK) were, as much as possible, excluded.

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2   For the purposes of brevity, the category of "unnamed animals" is from here-on-in referred to as "animals."

Data regarding the lexical characteristics (e.g., word frequency, word length) of 80 word items representing the four types of entities—20 per category— were obtained from the English Lexicon Project[3] (ELP, Balota et al., 2007) website from which researchers can gain such information. Their lexical characteristic data has been collated from thousands of studies using word and nonword stimuli. Due to the nature of language, word frequency distributions are inherently skewed (a small group of high-frequency words and many low-frequency words leads to positive skewness), so a log transformation was used on the raw frequency data to reduce skewness (Zipf, 1935). A single-factor ANOVA revealed that the 80 words were similarly matched on Log frequency across categories (F (3, 76) = 1.65, p = .18), and words were also equivalently matched on number of syllables and letters. As frequency data were unavailable for ANDROID[4], the value used in the calculations for this entity was the mean Log frequency value calculated for other entities in the machines category.

Ten editors, proofreaders, and writers involved in English language publications were recruited via the snowballing method. It was assumed that as these professionals are highly fluent in the English language and are practiced in semantic assessment as part of their job, they would be suitable judges of whether the entities were representative of the respective categories.

The volunteers were asked to rate how representative each entity was of its category on a visual analogue scale (VAS), a 10-cm-long continuous line where the leftmost end indicates "not at all representative" and the rightmost end of the line, "very representative." From each category, the 10 most representative entities were selected, resulting in 40 entities in total (Appendix 1).

Human Attribute Items

The UH and HN attributes were chosen from Haslam's previous studies (Haslam & Bain, 2007; Loughnan & Haslam, 2007), and there were an equal number of attributes carrying positive and negative connotations. The humanness attributes along with their affective connotations are shown in Table 1. Of note, DISTANT was selected to replace COLD, which was the original stimulus used in Loughnan and Haslam (2007), as COLD can be interpreted in various ways and was considered to be ambiguous.

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3 "The English Lexicon Project (supported by the National Science Foundation) affords access to a large set of lexical characteristics, along with behavioral data from visual lexical decision and naming studies of 40,481 words and 40,481 nonwords." http://elexicon.wustl.edu/

4 Data collection preceded the advent of the Google Android operating system in 2013.

The attribute terms were matched on lexical characteristics such as length and Log frequency, using data from the ELP website (Balota et al., 2007). The same HN word was always paired with the same UH word (see Table 1), although the position of the word on the screen—whether it was presented above or below—was counterbalanced. Affect valence (i.e., positive/negative connotations) was not considered in analyses or discussion, because it was included as a control feature only to ensure that neither HN nor UH attributes were skewed in either direction connotatively.

Apparatus

The attribution task was generated via the computer program E-Prime Version 2.1 (2008) and run using the associated program, E-Run, which provides millisecond accuracy in timing. Both these programs were installed on a laptop, which was used to collect experimental data; responses were recorded via pressing designated keys on the keyboard. All other programs (including screensavers) were deactivated so as to minimize lag and ensure that the response times recorded were accurate.

Design

The 40 entities (10 in each of the 4 categories) were each presented 12 times—once for each of the six UH/HN attribute pairs with WHO, and once for each of the six attribute pairs with THAT. This resulted in a full set of 480 experimental item sets.

TABLE 1   *HN and UH human attribute item Pairs matched on lexical characteristics*

	Human attribute trait types	
Affect valence	Human Nature (HN)	Uniquely Human (UH)
Positive	CURIOUS	ORGANIZED
	FRIENDLY	HUMBLE
	TRUSTING	POLITE
Negative	JEALOUS	SHALLOW
	AGGRESSIVE	RUDE
	NERVOUS	DISTANT

The attribution task thus consisted of 480 trials, with an additional 12 practice trials prior to the experimental trials to allow participants to familiarize themselves with the experiment. The trials were split into two blocks (block A, block B) of 240 trials each, and the blocks were counterbalanced—half of the participants were presented with the blocks in A-B order, and the other half in B-A order. Within each block, the trials were randomized.

All instructions and text were shown in white font on a black background, the only exception being the "No response detected" screen, which was shown in red font on a black background.

Questionnaire

A questionnaire administered after the experiment collected demographic data (e.g., age and gender) and assessed participants' basic grammatical knowledge in a short grammaticality test comprising 10 questions checking if participants knew how to properly use WHO and THAT (modeled after Jacobs, 2005), and a section to ascertain that participants understood the meaning of the humanness items. For the latter, they were to put a checkmark next to the attribute words that they understood.

The 10 questions were based on simple statements used in English language classes to test understanding of basic rules of grammar. Participants were to select the word (either WHO or THAT) best suited to fill in the blank in the sentence. An example of one of the grammaticality test items is "Yesterday I saw a lawyer _____ was really old."

Participants

Eighty-three participants took part in the experiment. All participants were Psychology students from James Cook University (Singapore campus), recruited via an advertisement posted on the research recruitment notice board. All participants had English as their first language, and normal or corrected-for-normal vision. Respondents received partial course credit for participating, although four participants were not eligible for credit and received no incentive.

The majority of the participants were female (78%), with 18 males (22%) in the sample, and participant age ranged from 18 to 40 years (M = 22.47 years, SD = 4.61 years). The sample consisted primarily of students of Chinese ethnicity (63%), and 24% of the sample was of Indian ethnicity. The rest of the sample were either from other ethnic groups (e.g., Malay, Caucasian) or of mixed ethnicity (e.g., Chinese-Indian).

Participants generally exhibited a good grasp of basic grammar; the majority (81%) obtained a perfect score on the grammaticality test, and the lowest score on the test was 7 out of 10 (one participant). Most participants indicated

that they understood all 12 human attribute words (95%), with 9 being the low-est number of words understood.

Procedure

Participants completed the task individually and independently. As part of the verbal briefing before the task, participants were warned that although the trials would seem repetitive, it was very important that they continually use the same decision-making process throughout the experiment; that is to say, they had to choose the most suitable attribute of the two presented after the probe phrase for every trial. Additionally, they were cautioned that they had to respond within a certain amount of time, after which they would see a screen displaying the phrase "No response detected." They were told that if this screen appeared, they should respond more quickly afterward.

For each trial, participants were presented with a fixation cross in the middle of the screen for 500 ms to focus their attention on the center of the screen, followed by the probe phrase (e.g., "monkeys who are") for 2,000 ms, then the UH/HN pair words for 2,000 ms. The sequence either ended with a response from the participant selecting one of the two attributes on screen, or the sequence timed out after 2,000 ms and the "No response detected" screen was displayed. The inter-stimulus interval was set at 500 ms.

Results

Analysis of Data

For all participants, response times faster than 500 ms were replaced with blank responses. Missing data, recorded in E-Run as 0 ms, were also replaced with blank cells. Data collected from 15 participants were excluded, as more than 25% of their overall data were blank and it was suspected that participants had been responding as rapidly as possible as a strategy to move through items quickly. In addition, data from three participants were lost due to corruption of files or computer program errors.

After all exclusions and losses of data, 65 data sets were analyzed using SPSS, with the alpha level set to .05 for all analyses. A repeated measures 2 (Humanness: HN, UH) × 2 (Pronoun: WHO, THAT) × 4 (Entity category: animals, named animals, machines, people) ANOVA was run. Partial eta squared is reported throughout (η_p^2). According to Cohen's (1988) recommendations, η_p^2 values below .01 are considered small, .06 as moderate, and .14 and above as large.

Across all analyses, skewness and kurtosis statistics fell in the +2 to—2 range; hence, the assumption of normality was not violated. The assumption

of homogeneity of variance was violated when data were analyzed across categories. However, ANOVA is generally robust even when assumptions are violated (Howell, 2002), so we proceeded with parametric analyses. Mean response times across all conditions are displayed in Table 2. Mean response times for individual items across HN-primary and UH-primary pairs are presented in Appendix 1a-b.

Main and Interaction Effects

A main effect for humanness was found, $F(1, 64) = 4.64$, $p = .035$, $\eta_p^2 = .068$. However, even though the difference is statistically significant and the effect size is moderate, in practical terms response times to HN items and to UH items differ very little, by only about 6 ms (Figure 1).

A main effect for pronoun was absent, $F(1, 64) = .98$, $p = .326$, $\eta_p^2 = .015$, but a significant main effect for entity category was observed, $F(3, 62) = 4.33$, $p = .008$, $\eta_p^2 = .173$, indicating that participants responded differently to stimuli from the four entity categories. Regardless of pronoun, the fastest response times were for the named animal category, followed by the animal category, the people category, and the machine category (Figure 2).

An interaction between pronoun and entity category was found to be statistically significant, $F(3, 62) = 3.17$, $p = .03$, $\eta_p^2 = .133$. Given an initial expectation that the effect of pronoun use would be subtle, this interaction is reassuring. The interaction between entity categories and pronouns is shown in Figure 3.

TABLE 2   *Mean response times in milliseconds (and standard deviations) for items across all conditions (humanness, pronoun, entity category)*

Entity categories	Human nature		Uniquely human	
	That	Who	That	Who
Animals	1,055	1,047	1,066	1,068
	(43.84)	(52.92)	(52.33)	(49.72)
Named animals	1,066	1,076	1,085	1,078
	(40.44)	(48.42)	(49.22)	(39.19)
Machines	1,046	1,055	1,053	1,056
	(39.88)	(45.55)	(40.19)	(35.22)
People	1,081	1,065	1,079	1,059
	(34.31)	(46.60)	(45.20)	(33.15)

To test the for simple main effects of pronoun, four paired-samples *t* tests (two-tail) were performed to test the difference between mean response times to priming phrases including THAT and WHO across each of the four entity categories. The values used in the calculations were average response times collapsed across the two humanness conditions, and a new alpha of .0125 was applied using the Bonferroni correction for familywise error in multiple comparisons. No significant difference was found for entity categories of animals, t (58) = 0.33, p = .74, named animals, t (58) = -0.81, p = .42, or machines, t (58) = -0.16, p = .87. There was a significant difference in mean response times for trait attributions when paired with either THAT or WHO when it came to people, t (58) = 2.69, p = .01. Participants responded more slowly when trait attributes were paired with the relatively incongruent THAT (e.g., "Farmers that are friendly") than when paired with WHO.

The three-way interaction among humanness, pronoun and category was not significant, F (3, 62) = .81, p = .491, η_p^2 = .038. The lack of a statistically significant interaction among the three variables means the main hypothesis of the study was not supported.

Discussion

The main hypothesis—that attributions of humanness to entities such as animals, named animals, machines, and people would be influenced by the use of
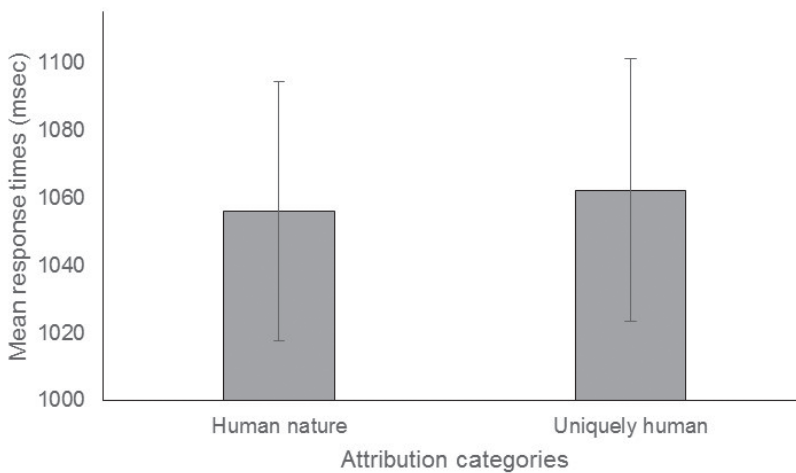
FIGURE 1   *Mean response times in milliseconds to HN attribute words and UH attribute words. The error bars indicate 95% confidence intervals.*
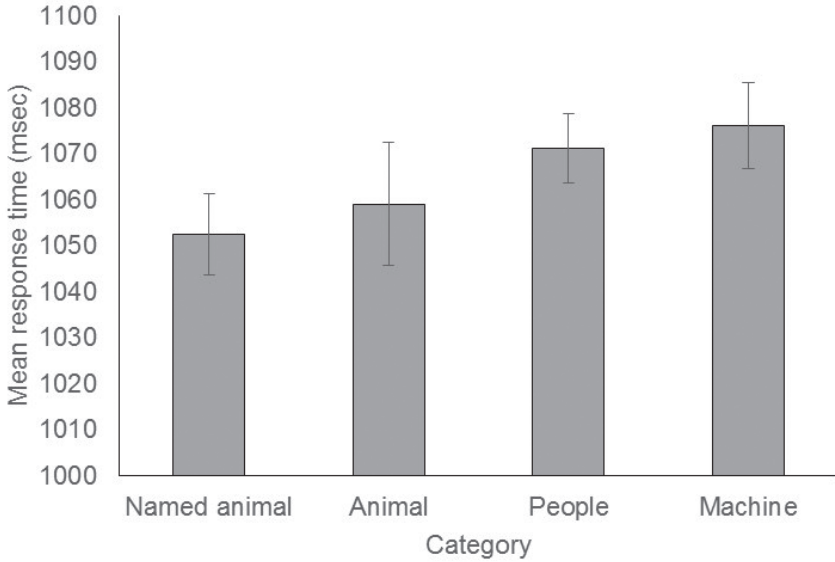
FIGURE 2   *Mean response times in milliseconds to items from the four categories: animals, machines, named animals and people. Error bars indicate 95% confidence intervals.*
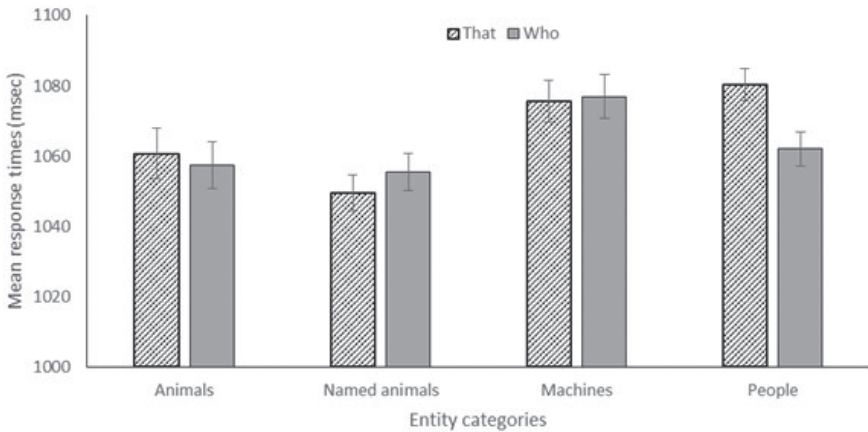
FIGURE 3   *Interaction between entity category and pronoun, which was found to be significant across subjects and bordered significance across items. Error bars indicate standard error.*

either WHO or THAT in a priming phrase—was not supported by the data collected in this study. However, the results still present interesting information that adds to the literature.

A strong main effect for category (large effect size) was found, indicating that people responded differently according to the entities in the four categories. This makes logical sense, as one would expect participants to find some congruence with other humans relative to other entities. As for attributing humanness to the various types of entities, verbal feedback from participants indicated that most found it extremely odd to attribute human traits to machines in particular, and this is reflected in the relatively slower response times to machine items. However, the people category produced the second slowest response times and this was not anticipated; one would expect that response times to items in the people category would be fastest, as all UH and HN word choices are related to people but not all of them are related to the other categories.

A possible explanation for this might be that the humanness attribute words chosen for the study were incongruent with particular items in the people category, as certain professions are stereotypically linked to specific characteristic human traits (Loughnan & Haslam, 2007). For example, journalists may be stereotyped as curious people and soldiers may be seen as aggressive, but aggression and curiosity may not fit into the stereotyped perceptions of journalists and soldiers, respectively. This incongruence may have resulted in relatively slower response times on particular items, thereby affecting the overall category mean. Further study regarding attributions of humanness across various professions may be of assistance in explaining the results of the current study.

The observed main effect for humanness, with significantly slower responses when uniquely human trait attributes were used as primes compared with human nature trait attributes provides partial support for Haslam's concept of humanness (Haslam, 2006). That responses to HN and UH attribute items differed in a statistically significant manner provides support for the idea that UH and HN traits each collectively convey psychologically different meanings. While in practical terms the difference of 6 ms appears minimal, the effect size is moderate and indicates that further exploration could be fruitful.

The interaction between pronoun and category was statistically significant. Nevertheless, the t-test analyses revealed that the significant interaction was due to the pronoun difference for items in the people category with slower mean response times for primes including THAT than WHO. From a grammatical viewpoint, the results make sense, as WHO should be the most appropriate referent to people items relative to other entities, resulting in easier, faster processing and so the briefest response times. Since Loughnan and Haslam (2007) already found artists to be associated with HN traits and businesspeople to be associated with UH traits, a possible avenue of study may involve the

investigation of how WHO and THAT may influence the attribution of humanness to artists and businesspeople. By focusing on these two specific examples about which information is already available, the research may help to clarify the results of the current study.

Aside from statistical results, several noteworthy observations were also generated from the experiment. Firstly, not many participants voluntarily mentioned the WHO/THAT discrepancy in the 480 experimental items. Of those who did, the most common complaint was that the probe phrases were referentially incorrect (e.g., "printers who are …"). However, when the WHO/THAT discrepancy was pointed out, most acknowledged that they had noticed some items featured WHO and others featured THAT. Incongruous combinations were most often noticed and remembered, and machine items with WHO were noted as the most distinctive (e.g., "treadmills who are …"). A few participants also said they had not noticed the WHO/THAT variations at all.

Although the main hypothesis was not supported, it may be premature to conclude that WHO and THAT primes did not have an effect on attributions of humanness across various types of human and nonhuman entities. It could be that the phenomenon is so subtle that the current experimental design did not register it; as mentioned previously, even though statistically significant differences were found, in reality these differences in response time were very small. This is not to say that the current design was ineffective; in general, statistical power was found to be good and the overall design was strong (e.g., within-subjects design, ample representation per category, sufficient repetitions). However, to find the most appropriate methodology, future research could compare the efficacy of the attribution task used here with other suitable methods such as a lexical decision task.

Of course, we must also consider the limits to ecological validity intrinsic to experimental designs. Neither the study reported here nor any proposed experimental studies could properly capture the lived experience of people's daily encounters with and deployment of language, intentional or otherwise. This is not to say experimental studies such as this one are not valuable in being able to capture measurable responses to nuances of difference in linguistic constructions—they certainly can. However, corpus analyses via searches through Google or other large corpora such as those employed by Gupta (2006) and Jacobs (2005) have their own limitations in the onus of having to read through large quantities of text to locate patterns. Gupta acknowledged the need to "reduce the number of hits to a figure that is small enough for me to read and large enough for me to see some patterns" (p. 111).

What might be considered another limitation of the study is that the limited participant sample does not allow us to examine potential cultural variation. However, given that this is a novel attempt to address a previously untested

research question, it cannot be expected that we could control for potential cultural variation in the representations of nonhuman animals (or machines for that matter). The aforementioned corpus analysis methodology might also be better suited to determine cultural variations so that these are more clearly identified, prior to any attempt to incorporate these as a factor in an experimental design.

Conclusion

As concerns the current study, another possible explanation for the non-significant results obtained for the three-way interaction is that WHO may be no longer closely linked to humanness and therefore nullifying the response congruency effect in this context. In terms of rhetorical strategies employed in both human and nonhuman animal advocacy, the current study findings offer the insight that people seem to have no unconscious leaning towards perceiving nonhuman animals as only things in that there was no obvious response congruency effect between THAT or WHO for entities in the animal and named animal categories. Gupta's finding that fox hunters readily referred to foxes as WHO is perhaps not so much an overt exploitation of language to justify violence but rather an unconscious shifting of foxes along the humanness continuum through acknowledging their human nature characteristics. The response congruency effect was evident for the people category such that participants appeared to find some incongruence when people were referred to as THAT (e.g. "musicians that are …"), which perhaps reduces the notion of beingness. Unfortunately, this neither explains the relatively common use of THAT in reference to people in everyday communication nor provides any further insight into the theorized humanness continuum with respect to people.

Gilquin and Jacobs (2006) and Gupta (2006) both found that WHO is no longer solely used to refer to humans. In particular, Gilquin and Jacobs (2006) examined the use of WHO with nonhuman animals over the past 40 years, indicating that language changes are likely to be gradual such that most people may not notice. Considering how widespread is the generalized use of THAT in reference to humans (e.g., in novels such as the still-popular *The Catcher in the Rye*, and in current newspaper articles), it could be that any previously strong link between WHO and humanness is fading, as people begin to replace the relative pronoun WHO with THAT. In short, it is possible that WHO is gradually being replaced by THAT, to the extent that it no longer carries humanizing, phenomenological connotations of being. There is scope for further text analysis studies tracking the use of WHO and THAT in relation to humanness attributes or dehumanizing words (respectively) to properly document this hypothetical shift in language use.

Acknowledgments

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Appendix 1a: Mean response times (ms) for HN-primary pairs

Item	Stimulus pairs HN primary (HN stimuli)	(UH stimuli)	unnamed animal	Pronoun "that"	Pronoun "who"	named animal	Pronoun "that"	Pronoun "who"	machine	Pronoun "that"	Pronoun "who"	people	Pronoun "that"	Pronoun "who"
1	curious	organized	bears	976	1035	Bessie the cow	979	1064	androids	990	1103	actors	1123	1035
2	friendly	humble		988	968		1047	984		1023	998		1075	1027
3	trusting	polite		1040	1155		1038	1021		1055	1140		1128	1073
4	jealous	shallow	beavers	1060	1029	Bubbles the goldfish	1035	1159	automobiles	1055	1134	ambassadors	1085	1074
5	aggressive	rude		1039	1047		1120	1089		1089	1080		1034	1100
6	nervous	distant		1060	1068		1084	1058		1047	1134		1125	1122
7	jealous	shallow	coyotes	1016	1030	Cyrus the rooster	1071	1119	cars	1110	1073	farmers	1093	1122
8	aggressive	rude		1045	992		1047	1045		1082	1138		1060	1078
9	nervous	distant		1024	1013		1095	1077		1107	1065		1098	1083
10	curious	organized	deer	1034	1004	Jack the goat	993	1026	computers	1011	995	journalists	1083	1083

Item	Stimulus pairs HN primary — HN stimuli	UH stimuli	unnamed animal	Pronoun "that"	Pronoun "who"	named animal	Pronoun "that"	Pronoun "who"	machine	Pronoun "that"	Pronoun "who"	people	Pronoun "that"	Pronoun "who"
11	friendly	humble		1007	1024		983	995		1047	982		1068	980
12	trusting	polite		1051	1045		1011	1039		1045	1004		1122	1050
13	curious	organized	jackals	1043	1005	Mary the sheep	1036	1034	facsimiles	1042	1011	mayors	1070	994
14	friendly	humble		1024	934		1016	1051		1019	1001		1045	1046
15	trusting	polite		1104	1118		1091	1078		1051	1057		1055	1048
16	jealous	shallow	lions	1103	1049	Mike the hamster	1076	1116	generators	1112	1044	musicians	1052	1102
17	aggressive	rude		969	943		1004	1031		1063	1091		1128	1072
18	nervous	distant		1095	1081		1095	1091		1046	1073		1075	1073
19	jealous	shallow	monkeys	1072	1085	Paris the cat	1036	1029	printers	1061	1099	nurses	1109	1094
20	aggressive	rude		1041	1035		1093	1036		1146	1067		1054	1035
21	nervous	distant		1085	1080		1099	1143		1076	1124		1097	1055

(cont.)

Item	Stimulus pairs HN primary		unnamed animal	Pronoun "that"	Pronoun "who"	named animal	Pronoun "that"	Pronoun "who"	machine	Pronoun "that"	Pronoun "who"	people	Pronoun "that"	Pronoun "who"
	HN stimuli	UH stimuli												
22	jealous	shallow	moose	1133	1050	Polly the parakeet	1048	1091	robots	1105	1092	sailors	1114	1149
23	aggressive	rude		1028	1014		1074	1014		1009	1148		1072	1062
24	nervous	distant		1050	1136		1087	1047		1092	1065		1115	1079
25	curious	organized	tigers	1074	1041	Prince the dog	1015	1084	shredders	1028	1052	soldiers	1057	1133
26	friendly	humble		1060	1100		1019	954		1091	1095		1041	984
27	trusting	polite		1101	1120		1015	1046		1132	1137		1128	1099
28	curious	organized	wolves	1065	1083	Silver the horse	1043	1087	treadmills	1028	1073	tourists	1031	1051
29	friendly	humble		1098	1032		976	1013		1086	1080		998	947
30	trusting	polite		1163	1098		1062	1040		1138	1110		1095	1107

Appendix 1b: Mean response times (MS) across items for UH-primary pairs

Item	Stimulus pairs UH stimuli (UH primary)	HN stimuli	unnamed animal Pronoun "that"	Pronoun "who"	named animal Pronoun "that"	Pronoun "who"	machine Pronoun "that"	Pronoun "who"	people Pronoun "that"	Pronoun "who"
1	rude	aggressive	bears 1012	1040	Bessie the cow 1030	1009	androids 1037	1058	actors 1069	1033
2	shallow	jealous	1053	1080	1104	1069	1141	1025	1076	996
3	distant	nervous	1146	1111	1022	1096	1078	1078	1059	1029
4	polite	trusting	beavers 1068	1105	Bubbles the goldfish 1080	1077	automobiles 1133	1137	ambassadors 1140	1042
5	humble	friendly	1037	1035	1060	1068	1152	1074	1062	1024
6	organized	curious	1031	1021	1003	1054	1053	1116	986	1038
7	polite	trusting	coyotes 1126	1022	Cyrus the rooster 1098	1111	cars 1057	1060	farmers 1042	1075
8	humble	friendly	1091	1088	1020	1076	1016	1095	1055	1068
9	organized	curious	981	1022	1006	1044	1034	1085	1116	1089
10	rude	aggressive	deer 1035	1035	Jack the goat 1027	1038	computers 1088	1094	journalists 1010	1007
11	shallow	jealous	1032	1061	1069	1083	1045	1073	1167	1089

(cont.)

Item	Stimulus pairs UH primary		unnamed animal	Pronoun "that"	Pronoun "who"	named animal	Pronoun "that"	Pronoun "who"	machine	Pronoun "that"	Pronoun "who"	people	Pronoun "that"	Pronoun "who"
	UH stimuli	HN stimuli												
12	distant	nervous		1054	1098		1065	1067		1136	1032		1055	1025
13	rude	aggressive	jackals	1021	990	Mary the sheep	1029	1027	facsimiles	1022	1025	mayors	1026	1040
14	shallow	jealous		1014	1065		994	1069		1064	1082		1048	1091
15	distant	nervous		1021	1063		1031	1008		1020	1078		1084	1040
16	polite	trusting	lions	1189	1129	Mike the hamster	1082	1103	genera-tors	1193	1072	musicians	1072	1129
17	humble	friendly		1056	1121		981	1039		1074	1184		1108	1046
18	organized	curious		1060	1025		1047	990		1069	1073		1100	1115
19	polite	trusting	monkeys	1124	1159	Paris the cat	1093	1133	printers	1128	1115	nurses	1088	1076
20	humble	friendly		1046	1023		1069	1067		1124	1077		1047	1072
21	organized	curious		1004	1008		1012	1040		1008	980		1075	1024
22	polite	trusting	moose	1086	1140	Polly the parakeet	1178	1076	robots	1100	1086	sailors	1143	1089
23	humble	friendly		1046	1044		1040	1013		1146	1090		1013	1042

Item	Stimulus pairs UH primary			unnamed animal		named animal		machine		people	
	UH stimuli	HN stimuli		Pronoun "that"	Pronoun "who"	Pronoun "that"	Pronoun "who"	Pronoun "that"	Pronoun "who"	Pronoun "that"	Pronoun "who"
24	organized	curious		1096 / 1006	1059 / 1011	1134 / 1088		1061 / 1067			
25	rude	aggressive	tigers / Prince the dog / shredders / soldiers	1058 / 1053	1028 / 1056	1057 / 1099		1072 / 1029			
26	shallow	jealous		1124 / 1123	1077 / 1034	1101 / 1035		1180 / 1100			
27	distant	nervous		1185 / 1074	1056 / 1027	1017 / 1072		1102 / 1072			
28	rude	aggressive	wolves / Silver the horse / treadmills / tourists	1009 / 1011	1071 / 1007	1099 / 1104		1116 / 1059			
29	shallow	jealous		1109 / 1177	1091 / 1091	1134 / 1131		1129 / 1110			
30	distant	nervous		1078 / 1102	1064 / 1087	1083 / 1032		1083 / 1047			

Note: For each category the two values are Pronoun "that" / Pronoun "who".

Category labels by column — unnamed animal: tigers (25), wolves (28); named animal: Prince the dog (25), Silver the horse (28); machine: shredders (25), treadmills (28); people: soldiers (25), tourists (28).