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The Moral Consequences of Teleological Beliefs About the Human Species

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Adults in prior work often endorse explanations appealing to purposes (e.g., “pencils exist so people can write with them”), even when these “teleological” explanations are scientifically unwarranted (e.g., “water exists so life can survive on Earth”). We explore teleological endorsement in a novel domain—human purpose—and its relationship to moral judgments. Across studies conducted online with a sample of U.S.-recruited adults, we ask: (a) Do participants believe the human species exists for a purpose? (b) Do these beliefs predict moral condemnation of individuals who fail to fulfill this purpose? And (c) what explains the link between teleological beliefs and moral condemnation? Study 1 found that participants frequently endorsed teleological claims about humans existence (e.g., humans exist to procreate), and these beliefs correlated with moral condemnation of purpose violations (e.g., condemning those who do not procreate). Study 2 found evidence of a bidirectional causal relationship: Stipulating a species’ purpose results in moral condemnation of purpose violations, and stipulating that an action is immoral increases endorsement that the species exists for that purpose. Study 3 found evidence that when participants believe a species exists to perform some action, they infer this action is good for the species, and this in turn supports moral condemnation of individuals who choose not to perform the action. Study 4 found evidence that believing an action is good for the species partially mediates the relationship between human purpose beliefs and moral condemnation. These findings shed light on how our descriptive understanding can shape our prescriptive judgments.

Public Significance Statement

Participants in our online U.S.-based sample of adults frequently endorse the belief that the human species exists for a purpose—for example, that humans exist to reproduce or to care for the environment. We find evidence of a relationship between their belief in purpose and moral condemnation of individuals who fail to fulfill their purpose—for example, people who cannot or choose not to reproduce. These studies could have important implications for understanding moral condemnation of individuals who are unable to or choose not to have children. This and other implications, along with possible interventions, are discussed in the article.

Keywords: teleology, morality, human purpose, is–ought fallacy, explanation

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Casey Lewry served as lead for data curation, investigation, project administration, and writing—original draft. Deborah Kelemen contributed equally to supervision and served in a supporting role for formal analysis, project administration, and visualization. Tania Lombrozo served as lead for funding acquisition, supervision, and writing—review and editing and served in a supporting role for project administration. Casey Lewry, Deborah Kelemen, and Tania Lombrozo contributed equally to conceptualization, methodology, and resources. Casey Lewry and Tania Lombrozo contributed equally to visualization and formal analysis. Casey Lewry and Deborah Kelemen contributed equally to writing—review and editing.

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Don't get me wrong, I've got nothin' against gay people. But what I don't get is why they'd choose to be selfish and not have a family and kids—like which is what we're here for, how's you's go against evolution by not continuin' the line cause you's can't help the species without having kids. Just seems selfish-like to me. (Bering, 2010, para. 2)

Here, psychologist Jesse Bering quotes a stranger whom he met at a pizza shop in Northern Ireland. The stranger expresses his belief that humans exist for the purpose of reproduction and, therefore, people who are gay (and who do not reproduce) are acting immorally. This sentiment is also expressed in formal texts, such as the Catholic Church's teaching that using birth control is morally wrong because it inhibits God's purpose for humans to bear children (Paul VI, 1968). In both cases, the belief that the human species exist for a purpose relates to the judgment that failing to fulfill this purpose is morally wrong. However, are such beliefs limited to religious teachings and the occasional man in a pizza shop, or are they shared by a broader population? In this article, we ask this question within a sample of adult participants recruited within the United States. We explore whether these participants believe that humans exist for some purpose (such as reproduction, or caring for the Earth), and if so, whether these beliefs have consequences for their moral judgments.

There is widespread evidence that people ascribe purpose to a variety of entities in the natural world, even when such ascriptions are not scientifically warranted (e.g., “birds transfer seeds to help plants germinate,” “water exists so that life can survive on Earth”; Kelemen & Rosset, 2009). Yet prior research has not investigated whether people tend to think teleologically about the existence of the human species, and if so, what consequences this might have for moral judgment.¹ In the present research, we address three questions: (a) Do the participants in our sample think that the human species exists for a purpose? (b) Do teleological beliefs in this domain predict moral condemnation of individuals who fail to fulfill this purpose? And if so, (c) what explains the link between teleological beliefs on the one hand, and moral condemnation on the other?

Answering these questions is important for a number of reasons. With regard to the first question, there are ongoing debates about the scope of teleological thinking (Keil, 1992; Kelemen, 1999; Lombrozo et al., 2018). For instance, in one influential set of studies, adults were much more selective than children in their ascriptions of purpose to nonhuman species (e.g., they typically rejected the claim that “tigers are for going in the zoo”; Kelemen, 1999). Generalizing from nonhumans to humans, adults in our sample could be similarly reticent in ascribing purpose to humans. On the other hand, humans are often regarded as exceptional among species (Coley, 2007), and a number of studies have found that participants speak in purposive terms regarding human lives and life events (e.g., Banerjee & Bloom, 2014; Heywood & Bering, 2014; Ryan & Deci, 2001). Better understanding the extent to which people think of humans in teleological terms thus has implications for the scope of teleological thinking more broadly, and for accounts of species-level teleological thinking in particular.

With regard to the second and third questions, prior work has found a relationship between descriptive beliefs (“is”) and moral judgments (“ought”) across various domains (e.g., Eidelman et al., 2009; Foster-Hanson & Lombrozo, 2022; Tworek & Cimpian, 2016). If individuals do believe that humans exist to pursue some function (e.g., reproduction, caring for the Earth), this would represent a generic assumption about humans (an “is”) that might prompt

the conclusion that it is morally wrong for individuals to do otherwise (an “ought”). As such, it would be an interesting instance of a broader pattern of “is–ought” reasoning. At the current time, however, little is known in general about why relationships between “is” and “ought” obtain, particularly when the “ought” concerns the immorality of an individual's intentional actions (vs. institutional or political structures; Jost & Banaji, 1994).

At a more practical level, characterizing the relationship between species-level teleological beliefs and morality might explain the psychological basis for certain moral judgments. For example, if a woman is censured for choosing not to have children, this judgment could be partially driven by a belief that humans exist to reproduce. At a broader scale, societies that emphasize the importance of humans' capacity to reproduce could foster a culture of moral blame against those who are infertile (McLeod & Ponesse, 2008; Sandelowski, 1990). Characterizing the relationship between teleology and morality would allow us to better understand—and perhaps prevent—unwarranted or harmful evaluations. At the same time, understanding how teleological beliefs support prescriptive judgments could be useful for promoting positive social change. For example, to encourage attitudes that it is wrong not to care for the environment, it could be useful to talk about environmental care as an element of human purpose.

In the remainder of the introductory paragraph, we lay out the two major theoretical motivations for this article: clarifying the scope of species-level teleological thinking and identifying whether and why teleological claims about species might have consequences for moral evaluations of individuals. We then offer an overview of the four studies we go on to report.

The Scope of Teleological Thinking

To our knowledge, no prior work has investigated whether any populations tend to think about human existence teleologically. However, there is considerable evidence from research in developmental, cross-cultural, and cognitive psychology concerning the scope of teleological thinking in other domains. This work supports competing predictions: While some supports the hypothesis that adults in our sample will reject teleological claims about the purpose of an entire species, other findings suggest that adults readily describe species as having “a true purpose,” at least when the species in question is nonhuman (e.g., spiders or bees), such that participants in our sample might readily endorse claims about human purpose.

Developmental research suggests that young children from American, British, and Chinese samples are often willing to attribute purpose to entire (nonhuman) species (e.g., “birds exist to make nice music”; Kelemen, 1999, 2003; Schachner et al., 2017; but see Greif et al., 2006). With age, however, this tendency becomes much more selective: adults from the same populations typically restrict teleological explanations to cases for which they take the property or

¹ This article includes phrases and stimuli such as “humans exist to procreate and perpetuate the species” or “humans exist to care for the Earth” to describe teleological beliefs that some people might endorse. However, we (as authors) do not endorse such beliefs nor the problematic ideas that they potentially imply (e.g., that all humans can reproduce or that someone ought to reproduce). These potential implications are some of our primary motivations for studying these topics, which make it necessary to use this language in the article.

entity in question to have resulted from intentional design (human or divine) or from natural selection (Kelemen & DiYanni, 2005; Lombrozo & Carey, 2006). For instance, adults might accept the claim that eyes are for seeing, but not that fingernails are for painting, because the former has a more plausible origin in design or selection. Consistent with this, greater exposure to western science and greater scientific expertise (both of which presumably refine people's understanding of causal etiology) are associated with lower endorsement of teleological explanations (Casler & Kelemen, 2008; Kelemen et al., 2013).

This body of work supports the prediction that adults might only explain the human species teleologically (by appeal to some purpose) if they believe the posited purpose came about through intentional design, natural selection, or a similarly function-driven process. For example, someone who believes that God created humans to care for each other might endorse such care as the purpose of the human species; someone who believes that the human species exists because the species "evolved to reproduce" might endorse reproduction as the purpose of the human species (whether or not such a claim can be made biologically respectable). We should therefore expect only a modest subset of adults (those who hold particular function-driven causal beliefs about human origins) to assign purpose to the human species as a whole.

On the other hand, a handful of results point to an alternative possibility: that belief in human purpose might be much more widespread. First, causal background beliefs are often vague or poorly specified: Intuitions about a Gaia-like natural force predict greater acceptance of teleological explanations of the natural world (Kelemen et al., 2013), even though it is highly unlikely that many people can articulate a causal mechanism via which such a force might generate functional properties or objects. Relatedly, adults typically evaluate teleological explanations in the face of considerable ignorance concerning how and why a property or entity came about. One study found that under such conditions, participants seemed to rely on heuristic cues to the viability of a teleological explanation, such as structure-function fit: the correspondence between form (e.g., having large paws) and function (e.g., to balance; Liquin & Lombrozo, 2018). Perhaps for these reasons, many adults accept scientifically unwarranted teleological explanations concerning targets other than the human species (e.g., "earthworms tunnel underground to aerate the soil") and are even more likely to do so under speeded conditions (Griffiths et al., 2009; Kelemen et al., 2013; Kelemen & Rosset, 2009) or when experiencing other cognitive impairments (Lombrozo et al., 2007). These results suggest that even if only select groups of adults would explicitly articulate and defend teleological explanations for the human species, a far broader range may unreflectively accept or even generate such claims.

Finally, there is also some evidence that adults based in the United States readily make teleological claims at the species level, at least when the species in question is strongly associated with a particular function. Rose and Nichols (2019) asked participants about the "true purpose" of various animals (e.g., "What is the true purpose of spiders?") and found that they provided consistent responses (e.g., "the true purpose of spiders is to spin webs"). While these claims are not identical with teleological explanations for the species as a whole (e.g., "spiders exist to spin webs"), this work provides evidence that adults readily extend teleological thinking to the species level, at least for the nonhuman cases investigated in this work (Rose & Nichols, 2019, 2020). As noted, however, it remains an open

question whether many people would readily generate or endorse teleological claims about the human species, such as "the true purpose of humans is to reproduce."

It is important to differentiate the claims of human purpose we explore here—concerning special-level teleology—from two related senses in which we might talk about human purpose. First, while the present research aims to test teleological beliefs about the existence of the human species itself ("anthropic teleology"), prior research has tested teleological beliefs about the existence of nonliving natural kinds that serve human purposes ("anthropocentric teleology"). Specifically, Preston and Shin (2021) investigated beliefs about the existence of nonliving natural kinds (e.g., the ozone layer, oxygen produced by trees) with respect to human interests. Participants in this study were more likely to endorse teleological statements about the functions of natural phenomena when the statements were framed as promoting human interests rather than the interests of other species (e.g., Earth has an ozone layer to protect people [giraffes] from harmful radiation). However, Preston and Shin did not investigate teleological beliefs about humans themselves. Second, when one sees the term "human purpose," the first thing that might come to mind is the idea that events in one's life have a larger meaning. For example, if one unexpectedly loses a job, it is natural to wonder what larger meaning this event has in one's life. There is evidence that both religious and secular adults think teleologically about events in their own lives, believing that they happen for a purpose (Banerjee & Bloom, 2014; Heywood & Bering, 2014), and a vast literature has investigated human purpose in this sense. However, finding meaning in life events is distinct from the phenomenon we are examining here—believing that the entire human species exists for a purpose.

In sum, despite extensive research on teleological thinking across domains, including anthropocentric teleology and attributions of purpose to human life events, no prior work has investigated species-level teleological beliefs about human existence. Our first aim in the present research was therefore to determine whether adults in our sample endorse teleological claims about human existence, and whether they do so at comparable rates to other forms of scientifically unwarranted teleology. Understanding anthropic teleology is also important because we expect such beliefs to have consequences for how we judge individual humans, as we discuss further below.

From Teleological "Is" to Moral "Ought"

If someone believes that humans exist for a purpose (a descriptive claim), they might also expect humans to fulfill that purpose, or even think they have an obligation to do so (a normative claim). The logic of such reasoning from descriptive claims to normative claims, or "is" to "ought," is fallacious because it is missing a premise: Just because something "is" a certain way does not entail that it "ought" to be that way (or that it is immoral for it to be otherwise), unless one also asserts that it is moral or good for things to be the way they are. Nonetheless, as our introductory example of human reproduction suggests, people may be inclined to reason from human purpose to normative conclusions about the immorality of individuals' actions. The second aim of the present research is to determine whether teleological beliefs about human existence lead to moral condemnation of species members who fail to fulfill this purpose, and if so, why.

Studies across numerous domains suggest that people readily engage in is-ought reasoning. Since this research has been conducted across domains in different areas of psychology, different

terms (e.g., “existence bias,” “is–ought fallacy,” “naturalistic fallacy,” “status quo bias”) have been used to refer to a similar pattern of reasoning: Something’s existence, naturalness, or other descriptive properties lead people to infer that it ought to have the properties observed. For example, in some studies, participants judged outcomes more favorably when they were “natural” rather than artificial, genetically modified, or caused by environmental factors, suggesting that they used naturalness to determine goodness (Banks et al., 2021; Blancke et al., 2015; Ismail et al., 2012).

Is–ought reasoning has also been observed in cases involving intentional human action: arbitrary and minimal regularities within a group can lead people to judge that individuals should conform to those regularities (Roberts et al., 2019; Roberts, Gelman, & Ho, 2017; Roberts, Ho, & Gelman, 2017). For example, learning that Glerks eat a certain kind of berry leads children (and less frequently, adults) to negatively evaluate an individual Glerk who eats a different kind of berry (Roberts, Gelman, & Ho, 2017).

These studies provide evidence that people judge what exists or what is natural as good in a variety of domains. However, this prior work has not investigated the relationship between “is” and “ought” in the domain of species-level function (e.g., do people ascribe moral value to reproduction because they believe humans exist to reproduce?). In addition, these studies provide very limited insight into our next question: why?

Why Is Goodness Inferred From Naturalness?

Why might people infer “goodness” from what is “natural,” infer value from existence, or infer ought from is? Eidelman et al. (2009) describe the inference from is to ought as a heuristic which is simple and efficient. Banks et al. (2021) propose that the naturalness–goodness link occurs because people view nature as a divine entity that has moral authority. Blancke et al. (2015) hypothesize that people view nature as a beneficial agent, so interventions against it are immoral. Roberts, Gelman, and Ho (2017) speculate that descriptive regularities about social groups lead people to reason that conformity is important for the functioning of the individual and the group. While the corresponding studies offer evidence that the posited inference from a descriptive claim to a normative claim occurs, they do not assess the proposed mechanism. Those studies that have assessed mechanisms (e.g., for why existing political systems are regarded as good; Kay et al., 2009) do not apply to the case of human purpose.

Most relevant to the present work, Foster-Hanson and Lombrozo (2022) suggest that attributions of function or purpose can support normative conclusions because a teleological claim establishes a normative standard against which to evaluate what is better or worse with respect to the specified function. For example, if one explains zebras’ stripes by appeal to camouflage, one is more likely to believe that an individual zebra “ought” to have stripes, and this is because stripes are better for camouflage. While this study supports the notion that functional “is” explanations (at least about features, if not species) can drive “ought” judgments, the relevant “ought” claims involved teleological norms (e.g., that Zebras ought to have stripes in the sense that it would be best for a zebra to have stripes). In fact, Foster-Hanson and Lombrozo found that teleological explanations for biological traits did not license moral condemnation of individuals (e.g., participants rejected the claim that a zebra without stripes has done something wrong). If our prediction is correct that

anthropic teleology prompts moral condemnation of individuals who choose not to fulfill their human purpose, then the operative mechanism must be distinct.

In sum, despite good evidence that people often draw inferences from “is” to “ought,” as well as evidence for mechanisms that might explain such inferences in particular circumstances, it is currently unknown what would explain the posited link between anthropic teleological claims on the one hand, and moral condemnation of individuals, on the other. In the present research, we hypothesize that within the domain of human existence, an action being a species’ purpose leads participants to infer that performing that action is *beneficial to the species as a whole*, and that species members who fail to perform that action are therefore immoral. This offers a candidate answer to our third question: What explains the link between teleological beliefs on the one hand, and moral condemnation of individuals who fail to fulfill that function on the other?

Overview of Experiments

Across four studies, we tested the hypotheses that adults in our sample endorse teleological explanations for human existence (Study 1), and that species-level teleological beliefs relate to moral condemnation of purpose violations (Studies 1–4). We then explored whether this relationship exists because species-level purpose leads participants to infer a species-level good that ought to be achieved (Studies 3–4). We began by assessing the correlational relationship between explicit endorsement of anthropic teleological claims (e.g., that humans exist to procreate and perpetuate the species) and moral condemnation of individuals who do not perform the corresponding action (e.g., judging people who choose not to reproduce immoral; Study 1). Next, to assess whether this relationship might be causal, we manipulated species-level teleology by introducing participants to entirely unfamiliar (alien) species (Study 2). We again used alien species and introduced novel actions (e.g., “daxing”) to manipulate whether an action is harmful or beneficial to the species (Study 3). This allowed us to test whether this relationship occurs because species-level purpose supports the inference that the corresponding actions are beneficial for the species as a whole. Finally, we returned to the human domain to assess whether the inference that some actions are species-beneficial at least partially mediates the relationship between belief in human purpose and moral condemnation of purpose violations by individual humans (Study 4).

Study 1

In Study 1, we presented teleological statements that ascribed a function to an entity from one of three domains: *anthropic* (e.g., “humans exist to procreate and perpetuate the species”), *nonanthropic biological* (“bees frequent flowers to aid pollination”), and *nonbiological* (“water exists so that life can survive on Earth”). Participants were asked to indicate whether each statement is true or false. This allowed us to address our first question: Do teleological beliefs extend to human purpose? This also allowed us to compare anthropic teleological endorsement with other types of teleological endorsement that have been the focus of prior work.

Our anthropic teleological claims ascribed one of five possible subcategories of purpose to human existence: Humans exist to reproduce, to care for others, to care for the environment, to contribute to society, or to live fulfilling lives. These categories broadly correspond to the categories of “individual purpose” identified in prior

work. In this prior work, an individual's purpose generally refers to a far-reaching goal that is treated with significance (Dik et al., 2011). Studies have suggested that these goals can be achieved through caring for others (Emmons, 2003; Quinn, 2017), connecting with nature (Pritchard et al., 2020), contributing to society (Quinn, 2017; Yeager & Bundick, 2009), or gaining a sense of personal fulfillment (Ryan & Deci, 2001; Ryff, 2018). While this sense of individual purpose is quite distinct from anthropic teleology (which explains human existence by appeal to some purpose), focusing on corresponding purposes gives us some assurance that our anthropic teleological claims covered a range of plausible purposes for human existence.

Importantly, every anthropic teleological item was matched with a moral evaluation item. For example, the statement "The human race exists so that it can care for the earth" was matched with the statement "people who do not always care for the earth are (immoral/neutral)." We predicted that participants who tend to endorse anthropic teleological claims would also tend to judge purpose violations immoral, rather than neutral. This allowed us to address our second question: Is there a relationship between endorsement of human purpose and moral condemnation of purpose violations?

Finally, Study 1 included two additional kinds of statements as controls. First, in addition to our target teleological claims, we included a variety of true and false control statements to obscure the purpose of the study, and to ensure that all participants received some statements that they would classify as true and some as false. Second, while some participants were asked to evaluate anthropic teleological claims, others evaluated matched descriptive claims, which were designed to include the same descriptive content (e.g., a generic claim that humans reproduce) but without invoking that content to explain human existence. We predicted that the anthropic teleological items would be associated with moral judgments, but that the descriptive control statements would not be. This finding would suggest that it is the teleological content of the anthropic teleological claims that predicts moral judgments, not the descriptive content that they presuppose.

Method

Transparency and Openness

All studies were approved by the IRB at Princeton University (#10662). All data, code, and research materials are available at <https://osf.io/pckhx/>. Data were analyzed using *R*, Version 4.1.3 (R Core Team, 2022). Studies 1 and 2 were not preregistered.

Participants

Participants were 188 adults (79 women, 109 men, $M_{\text{age}} = 36$ years, age range = 20–72 years) recruited via Amazon Mechanical Turk. An additional 12 respondents were excluded for failing attention checks (described below); one respondent was excluded for not being fluent in English. Sensitivity analyses indicated that we had sufficient power to detect our main effect (sensitive to $R^2 = .004$; actual $R^2 = .11$). Most participants reported their religious beliefs as agnostic (27%), followed by non-Catholic Christian (23%), Catholic (22%), atheist (15%), and other (13%). Racial demographic information was provided by all participants: 1% identified as American Indian or Alaska Native, 5% as Asian, 12% as Black, 80% as White, and 2% as multiracial. Across studies, these racial demographics of our sample are similar to the United States at

large as of 2022 (U.S. Census Bureau, 2022), and we do not expect that our findings would significantly vary across racial groups. However, since our sample is restricted to online workers in the United States, we cannot claim that results generalize to all adults. We revisit this point in the General Discussion. Participants were paid at a rate of \$7.50 per hour, prorated to our 15-min task, and participation was restricted to workers in the United States who had completed at least 100 prior tasks.

Materials and Procedure

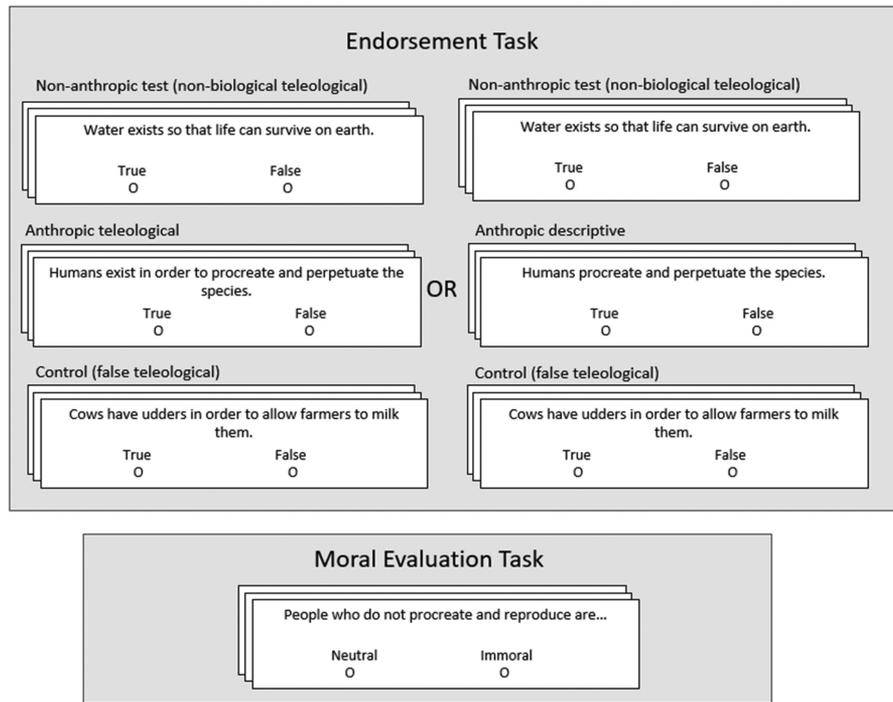
Participants completed two tasks in which they read statements and responded to them (see Figure 1, for overview of design). In the "endorsement task," participants reported their endorsement of either teleological or descriptive anthropic statements in addition to other teleological and control statements. In the "moral evaluation task," participants reported their moral evaluations of each of the anthropic actions. The order of these tasks was counterbalanced, such that half received the endorsement task first and half received the moral evaluation task first. After completing these, participants completed a series of other questionnaires described in detail below.

Endorsement Task. In the endorsement task, participants were randomly assigned to evaluate either teleological (test; $n = 101$) or descriptive (control; $n = 87$) statements in a two-condition, between-subjects design. Participants were instructed that they would see "a series of sentences explaining why things happen" and asked to respond based on whether they "think the sentence is a true or false explanation." After participants completed four practice statements, we presented 131 statements serially and participants judged whether each statement was true or false.

The teleological test condition contained 25 teleological statements about human existence ("anthropic teleological items"), divided into five subcategories: biological, care for others, environmental, societal, and personal fulfillment. The descriptive control condition contained 25 descriptive statements about humans ("anthropic control items"), designed to be nonteleological versions of the test condition statements, divided into the same five subcategories as the test items (see Table 1). These were included to ensure that an association between anthropic test items and moral judgments, if found, was due to the teleological content of the test statements. We thus predicted that descriptive control statements would not be associated with moral judgments.

The 25 anthropic teleological or descriptive sentences were randomly intermixed with additional items based on prior research (see Table 2; Kelemen et al., 2013). These included 16 teleological statements about the existence of nonbiological entities (e.g., "water exists so that life can survive on Earth"), 14 teleological statements about biological entities ("lemurs have adapted to avoid extinction"), 10 control statements that were teleological and true ("pencils exist so that people can write with them"), 10 control statements that were teleological and false ("cows have udders to allow farmers to milk them"), 20 control statements that were mechanistic and true ("icicles melt because the temperature increases"), and 30 control statements that were mechanistic and false ("chocolate is brown because it contains a significant amount of sugar"). The battery of statements additionally included two attention checks (e.g., "if you are still paying attention, choose True"). The nonbiological and biological teleological statements were included so that we could compare participants' levels of anthropic teleology against other types of explicit

Figure 1
Design of Study 1



Note. The study consisted of two main tasks, the endorsement task and the moral evaluation task, the order of which was counterbalanced. In the endorsement task, participants were assigned to a teleological (test) or descriptive (control) condition, and all statements were presented in a random order. Instructions were provided before each phase, and all participants completed secondary measures and demographics after these tasks.

teleological endorsement that have been documented in prior work (e.g., Kelemen et al., 2013; Liquin & Lombrozo, 2018).

Moral Evaluation Task. In the moral evaluation task, participants reported whether it was immoral or “neutral” to fail to perform each of the anthropic actions described in the endorsement task. Participants were told that they would see “a series of sentences about actions done by people.” They could respond that the action was “neutral” or “immoral.” They then responded to 31 items that were presented serially. Twenty-five of these items were designed to match the anthropic actions described in the previous task, with five for each of the five subcategories: biological (“people who do not procreate and reproduce are ...”), care for others (“people who do not always try to help others live good lives are ...”), environmental (“people who do not always care for the earth are ...”), societal (“people who do not work to ensure that society progresses are ...”), and

personal fulfillment (“people who do not attempt to live fulfilling lives are ...”). There were additionally four practice items (presented first) and two attention checks (randomly intermixed within the task statements, which were also presented in a random order).

Additional Measures. Finally, participants completed several additional measures. The full measures for all studies are available on OSF (<https://osf.io/pckhx/>). Participants rated their beliefs about God/higher powers (e.g., “I believe in the existence of some kind of higher power/God/gods”; four items, $\alpha = .93$; Järnefelt et al., 2015) and Gaia (belief in the intrinsic agency of nature, e.g., “I believe that Nature is a powerful being”; four items, $\alpha = .89$; Järnefelt et al., 2015). Religious and Gaia beliefs were collected because previous research has found that these factors predict teleological endorsement (e.g., Kelemen et al., 2013). Then, participants completed a “perceived frequency” survey in which they rated, for

Table 1
Examples of Anthropocentric Teleological (Test) and Descriptive (Control) Sentences

Subtype	Anthropic teleological (test)	Anthropic descriptive (control)
Biological	Humans exist to procreate and perpetuate the species.	Humans procreate and perpetuate the species.
Care for others	People are alive on earth to help others live good lives.	People help others live good lives.
Environmental	The human race exists so that it can care for the earth.	The human race cares for the earth.
Societal	Humans exist so that they can improve civilization.	Humans engage in actions that improve civilization.
Personal fulfillment	People are alive to live fulfilling lives.	People live fulfilling lives.

Table 2
Examples of Nonanthropic Sentences

Sentence type	Subtype	Item
Test	Nonbiological teleological	Water exists so that life can survive on Earth.
Control	Biological teleological	Lemurs have adapted to avoid extinction.
	True teleological	Pencils exist so that people can write with them.
	False teleological	Cows have udders to allow farmers to milk them.
	True mechanistic	Icicles melt because the temperature increases.
	False mechanistic	Chocolate is brown because it contains a significant amount of sugar.

example, what portion of the population “regularly cares for others by providing financial, emotional, or physical assistance” to reflect the “care for others” purpose (along with similar items for all five subcategories; five items, $\alpha = .75$). This measure was included to test whether the perceived frequency of an action predicts corresponding teleological or moral beliefs. For example, if someone believes that few people in the population reproduce, this may affect their judgment that humans exist to reproduce or that it is immoral not to reproduce. Moreover, prior work on biological features has found that feature frequency can itself prompt teleological explanations (Foster-Hanson & Lombrozo, 2022) and that functional features are assumed to be more frequent (Lombrozo & Rehder, 2012). Participants also completed surveys that measured their levels of essentialism (31 items, $\alpha = .89$), since at least in some cases, adults associate a species’ essence with the function the species fulfills (Bastian & Haslam, 2006; Levy et al., 1998; Rose & Nichols, 2019). Additionally, children sometimes use norms about actions being “unnatural” to infer that something is morally wrong, in part because unnaturalness acts as one component of purity judgments (Rottman & Kelemen, 2012). To test whether these purity norms are affecting participants’ moral judgments, we also measured beliefs about purity (five items, $\alpha = .82$; Graham et al., 2009). Finally, participants indicated their age, gender identification, and religious affiliation.

Results

Endorsement of Anthropic Teleology

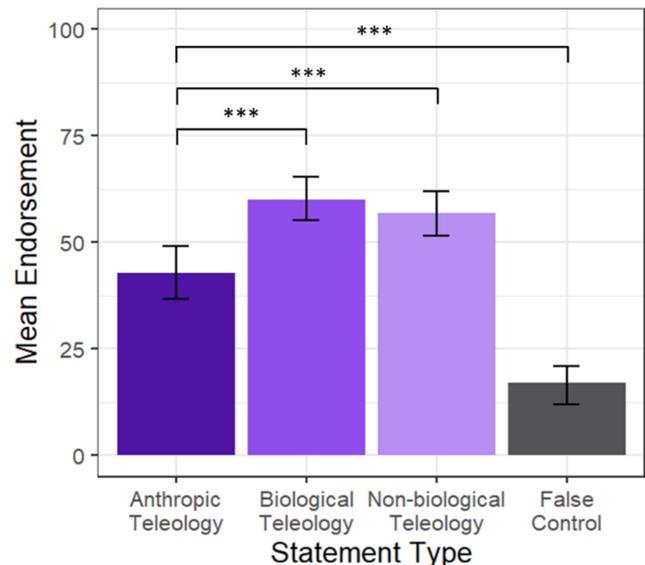
Teleological claims that were rated *true* received a score of “1,” and those that were rated *false* received a score of “0.” For each participant, we calculated an average endorsement score across all items within an item type (e.g., an endorsement average for all anthropic teleological items). These averages are reported here as percentages.

Given that prior work has not investigated endorsement of anthropic teleological claims, our first aim was to document the frequency with which such claims were endorsed, both in absolute terms and compared to other types of teleology. We first conducted a repeated measures analysis of variance (ANOVA) restricted to the anthropic test condition, with endorsement level as the dependent variable. This revealed a main effect of statement type, $F(3, 300) = 113.225$, $p < .001$, $\eta_p^2 = 0.26$ (see Figure 2). Anthropic teleological statements were endorsed somewhat less frequently than teleological statements involving living and nonliving things, but much more frequently than false control statements. A separate analysis comparing the anthropic test and descriptive control conditions revealed that endorsement of anthropic teleological test items ($M = 43\%$, $SD = 31\%$) was significantly lower than endorsement of anthropic descriptive control items ($M = 86\%$, $SD = 17\%$), $t(160) = -11.79$, $p < .001$.

Given that anthropic teleological claims were in fact endorsed by some participants, our second aim was to compare subcategories of anthropic teleology. A repeated-measures ANOVA with endorsement level as the dependent variable revealed that anthropic teleological endorsement also varied as a function of anthropic subcategory, $F(4, 752) = 27.549$, $p < .001$, $\eta_p^2 = 0.07$. The most highly endorsed subcategory was biological purpose, followed by care for others and personal fulfillment, with societal and environmental endorsed least often (see Table 3). Post hoc paired-sample *t*-tests revealed that biological purpose was endorsed significantly more often than all other subcategories ($ps < .001$) and that endorsement of all other subcategories did not significantly differ ($ps > .37$).

We also examined the relationship between individual differences and anthropic teleological endorsement. Anthropic teleological endorsement was correlated with Gaia beliefs ($r = .580$, $p < .001$) and religious beliefs ($r = .501$, $p < .001$), as well as perceived frequency ($r = .360$, $p < .001$). However, we did not find that

Figure 2
Mean Endorsement Levels by Statement Type in Study 1



Note. Significant differences from anthropic teleological endorsement are indicated on the figure ($***p < .001$). In addition, the false control items were endorsed significantly less often than biological and nonbiological teleological items ($ps < .001$), and there was no significant difference between endorsement of nonbiological and biological teleological items ($p = .41$). Error bars correspond to 95% confidence interval. See the online article for the color version of the figure.

Table 3*Mean Anthropic Endorsement, Mean Moral Condemnation, and Correlations Between These Values Across Conditions and Subcategories*

Subcategory	Teleological (test) condition			Descriptive (control) condition		
	Mean anthropic endorsement (SD)	Mean moral condemnation (SD)	Correlation	Mean anthropic endorsement (SD)	Mean moral condemnation (SD)	Correlation
All subcategories	43% (31%)	24% (22%)	$r(101) = .33, p < .001$	86% (17%)	30% (22%)	$r(87) = -.01, p = .93$
Biological	63% (32%)	18% (22%)	$r(101) = .16, p = .10$	88% (20%)	20% (21%)	$r(87) = -.26, p = .01$
Care for others	41% (37%)	28% (30%)	$r(101) = .37, p < .001$	90% (19%)	28% (28%)	$r(87) = .11, p = .32$
Environmental	36% (39%)	40% (36%)	$r(101) = .23, p = .02$	73% (33%)	55% (39%)	$r(87) = -.02, p = .89$
Societal	36% (37%)	21% (28%)	$r(101) = .19, p = .05$	87% (21%)	32% (30%)	$r(87) = .00, p = .98$
Personal fulfillment	39% (37%)	13% (26%)	$r(101) = .30, p = .002$	91% (18%)	16% (29%)	$r(87) = -.19, p = .07$

endorsement was related to purity beliefs ($r = .041, p = .687$) or to essentialism ($r = .086, p = .394$).

Associations Between Teleology and Moral Evaluation

Moral statements that were judged *immoral* received a score of “1,” and those that were judged *neutral* received a score of “0.” For each participant, we averaged scores to represent by-participant levels of moral condemnation, which are reported here as percentages. Overall, participants indicated that statements were immoral 27% ($SD = 22%$) of the time, though this varied across subcategories (see Table 3).

To test our prediction that moral judgments would be predicted by endorsement of anthropic teleological test items, but not by endorsement of anthropic descriptive control items, we fit a linear model predicting moral judgment score with item type as a binary predictor (teleological test vs. descriptive control), teleological/descriptive item endorsement level as a continuous predictor, and an interaction term between item type and endorsement level (see Figure 3). As predicted, we found a significant interaction between item type and endorsement level, $R^2 = .53, F(3, 184) = 70.62, \beta = 1.06, p < .001$. To interpret this interaction, we regressed moral judgment scores on endorsement of anthropic teleological test items, revealing that they significantly predicted moral judgments, $R^2 = .11, F(1, 99) = 12.51, \beta = .237, p < .001$. By contrast, an equivalent regression with endorsement of anthropic descriptive control items did not significantly predict moral judgments, $R^2 < .001, F(1, 85) = 0.01, \beta = -.0122, p = .928$.

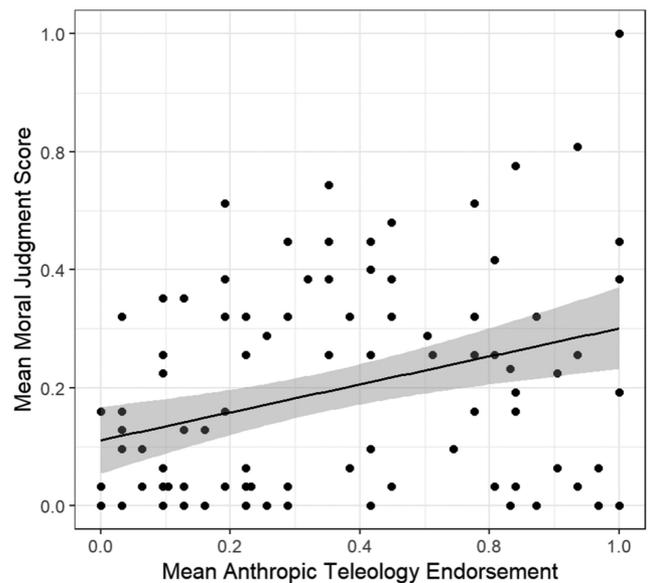
Additionally, we measured the correlation across participants between endorsement of each teleological item and its corresponding moral judgment (e.g., “Humans exist to procreate and perpetuate the species” and “People who do not procreate and reproduce are ...”) and between each control item and its corresponding moral judgment (e.g., “Humans procreate and perpetuate the species” and “People who do not procreate and reproduce are ...”). The average of these correlation coefficients was significantly different from zero for teleological items, mean $r = .17, SD = 0.08, t(24) = 10.38, p < .001$, but not for control items, mean $r = -.04, SD = 0.15, t(24) = -1.37, p = .18$. These averages were significantly different from each other, $t(38) = -6.28, p < .001$. As such, teleological beliefs about human purpose, not simply the belief that humans perform the associated actions, were related to moral condemnation of individuals who do not perform the corresponding actions.

To investigate whether the association between anthropic teleological endorsement and moral judgments persisted after controlling for other individual differences, we fit a regression model predicting

moral judgments with anthropic teleological endorsement, Gaia beliefs, religious beliefs, purity ratings, the perceived frequency of each type of purpose, and essentialism. The only significant predictors of moral judgments were anthropic teleological endorsement ($\beta = .212, p = .01$) and perceived frequency ($\beta = .090, p = .01$).

Discussion

Study 1 successfully addressed our first question: Do people think that the human species exists for a purpose? The answer for our sample is a qualified “yes”: anthropic teleological claims were endorsed 43% of the time, with 95% of participants endorsing at least one anthropic teleological claim. While rates of anthropic teleological endorsement fell below those documented within other domains (biological and nonbiological) in prior research, they were well above those for false control statements.

Figure 3*Relationship Between Anthropic Teleological Endorsement and Moral Judgments in Study 1*

Note. Relationship between anthropic teleological endorsement and moral judgments in Study 1, where higher moral judgment score indicates greater moral condemnation. Each jittered point corresponds to one participant, lines indicate best fit line from regression analysis, and error bars indicate standard error.

Study 1 also took initial steps towards addressing our second question: Do anthropic teleological beliefs predict moral condemnation of individuals who fail to fulfill the posited purpose? Again, the answer is a qualified “yes”: Endorsement of human purpose predicted moral condemnation of purpose violations, even when controlling for the perceived frequency of an action. As an example, failing to care for the earth was judged to be more morally wrong when caring for the earth was considered a purpose of the human species. Notably, anthropic control claims (e.g., “The human race cares for the earth”) did not predict moral judgments. This suggests that the teleological content of the anthropic teleological claims was necessary to drive moral condemnation; the descriptive content that they presupposed was not sufficient to do so. This is consistent with Roberts, Gelman, and Ho (2017), who found that adults in their sample did not typically provide negative evaluations of individuals who did not conform to generic claims (e.g., “Hibbles eat this kind of berry”), despite the fact that children up to age 13 did so. While this prior work only used novel groups as stimuli, Study 1 suggests that these findings extend to judgments about humans. Our answer is nonetheless qualified because the results of Study 1 were correlational rather than causal. We address this in Study 2.

Study 2

Study 1 found a relationship between anthropic teleological beliefs and moral judgments. In Study 2, we used an experimental paradigm to explore the directionality of this relation, untangling whether anthropic teleological judgements cause moral judgements, moral judgements cause anthropic teleological beliefs, or whether the relationship is bidirectional. We introduced participants to alien species, rather than using humans, so that the stimuli were entirely unfamiliar and we could stipulate their properties. Aliens and other unfamiliar groups have previously been used as stimuli in experimental research for similar purposes (e.g., Lombrozo, 2007; Pacer & Lombrozo, 2017; Rottman et al., 2014; Rottman & Kelemen, 2012). In the present study, participants learned about creatures such as Nactans, a species that does (or does not) exist to care for others, or for whom it is (or is not) immoral to not care for others.

To investigate the causal influence of teleology on moral judgment, the Teleo → Moral condition stipulated that a given species does or does not exist for some purpose, and participants were asked to judge whether it is immoral for aliens of that species to refrain from the associated behaviors. To test for a causal influence in the reverse direction, the Moral → Teleo condition stipulated that failing to perform an action is or is not immoral, and participants were asked to judge whether it is the species’ purpose to perform that action.

A second aim of Study 2 was to explore whether inferences about social norms might play a role in explaining the relationship between teleology and moral judgment. To do so, we asked participants to identify the source of stipulated species purpose, and tested whether such inferences moderated the link between teleology and moral condemnation.

Method

Participants

Participants were 199 adults recruited via MTurk (87 women, 111 men, one nonbinary person, $M_{\text{age}} = 38$ years, age range = 19–73

years). One additional respondent was excluded who did not pass an attention check. Sensitivity analyses indicated that we had sufficient power to detect our main effect (sensitive to $\eta_p^2 = 0.10$; actual $\eta_p^2 = 0.15$). Most participants reported their religious beliefs as Catholic (28%), followed by atheist (25%), non-Catholic Christian (19%), agnostic (15%), and others (13%). Racial demographic information was provided by all participants: 1% identified as American Indian or Alaska Native, 2% as Asian, 12% as Black, 83% as White, and 3% as multiracial. Participants were paid at a rate of \$7.50 per hour, prorated to our 25-min task, and participation was restricted to workers in the United States who had completed at least 100 prior tasks.

Materials and Procedure

Participants were randomly assigned to either a Teleo → Moral condition ($n = 103$) or a Moral → Teleo condition ($n = 96$) in which they completed one task (see Figure 4 for overview of design). All participants were first told the following: “Scientists have recently discovered 10 new planets. Each planet has a unique group of beings living on it. I’m going to tell you about each group of beings and then ask you to answer some questions about them.”

In the Teleo → Moral condition, participants were introduced to 10 alien species presented serially in a random order. The 10 items were designed to reflect the test and control anthropic items from Study 1. Five of the 10 descriptions stipulated that an alien species exists for some particular purpose (e.g., “Kulvaws exist on this planet for a reason. They exist to procreate and perpetuate their species”). Each of the five statements corresponded to one of the anthropic teleological subcategories, using the same language as in Study 1. Five different descriptions denied that an alien species exists for some particular purpose (e.g., “Yolnars do not exist on this planet for any reason. They copulate which sometimes brings about children, but they do not exist to do so”). Each of the five denial statements corresponded to one of the anthropic teleological subcategories, once again using language that was used in Study 1, but distinct from the descriptions that stipulated purpose (so that participants would not confuse the two species). The language was counterbalanced across groups of participants. Participants were then asked whether it is immoral for the species not to perform the action described (e.g., “To what extent are Kulvaws who do not reproduce immoral?”) on a scale from “1—not immoral” to “5—immoral.”

After participants completed the moral inference task, they made a purpose attribution judgment. This question was included in part to ensure that participants were reasoning about the aliens as human-like agents, and in part to test whether teleological claims tended to support inferences concerning social norms imposed by group consensus, which could in turn ground judgments of immorality. We asked participants, “for the beings who were described as existing for a purpose, why do you think it is the case that the beings existed for that purpose?” Participants were told that they could select more than one answer and chose from the following: “a supernatural being, like a God or gods, caused it to be that way”; “a natural being, like humans or another species, caused it to be that way”; “it happened that way because of evolution by natural selection”; “individual beings chose these as their personal goals”; “large groups or communities of the beings assign these purposes as goals for the entire group”; “nothing caused it, it just is that way”; and “don’t know/not sure.”

Figure 4
Design of Study 2

Teleo → Moral

Reproductive purpose stipulated

Far away on the planet Glinhondo, there is a group of beings called Kulvaws. Kulvaws exist on this planet for a reason. They exist in order to procreate and perpetuate their species. They are alive in order to ensure that there will be future generations.

OR

Reproductive purpose denied

Far away on the planet Thenala, there is a group of beings called Yolnars. Yolnars do not exist on this planet for any reason. They copulate which sometimes brings about children, but they do not exist in order to do so. As a species they continue to exist and preserve the species, but they are not alive in order to do so.

To what extent are Kulvaws [Yolnars] who do not reproduce immoral?

1	2	3	4	5
0	0	0	0	0

Not immoral

Immoral

Moral → Teleo

Reproductive purpose stipulated

Far away on the planet Glinhondo, there is a group of beings called Kulvaws. Kulvaws sometimes do actions that are immoral. Kulvaws who do not procreate and perpetuate their species are immoral. It is immoral if they do not ensure that there will be future generations.

OR

Reproductive purpose denied

Far away on the planet Thenala, there is a group of beings called Yolnars. Yolnars do or don't do various actions. Some Yolnars do not copulate and do not create children, but there is nothing wrong or immoral about this. Some do not continue and preserve the species, but there is nothing wrong or immoral about this.

To what extent do Kulvaws [Yolnars] exist in order to reproduce?

1	2	3	4	5
0	0	0	0	0

Not immoral

Immoral

Note. The study consisted of one main task, in which participants were assigned to either a Teleo → Moral condition or a Moral → Teleo condition. This figure shows two examples out of 10 items that a participant in the Teleo → Moral condition (top) or Moral → Teleo condition (bottom) might see, presented in a random order (one from each within-subject condition: stipulated or denied). Instructions were provided before the task, and all participants completed secondary measures and demographics after these tasks.

In the Moral → Teleo condition, participants were introduced to five alien species and told that they sometimes perform actions that are immoral (e.g., “Kulvaws sometimes do actions that are immoral. Kulvaws who do not procreate and perpetuate their species are immoral.”). They were also introduced to five different alien species and told that they sometimes perform actions that are neither moral nor immoral (e.g., “Yolnars do or do not do various actions. Some Yolnars do not copulate and do not create children, but there is nothing wrong or immoral about this”). Then, participants were asked whether it was the species’ purpose to

perform the action described (e.g., “To what extent do Kulvaws exist to reproduce?”) on a scale from “1—they do not exist for this purpose” to “5—they exist for this purpose.” The 10 species were presented serially in a random order. These were designed to reflect the moral items from Study 1. As for the Teleo → Moral condition, the wording of the immoral action was counter-balanced across groups (see Table 4).

After this task, participants made an immorality attribution judgment: We asked participants, “for the beings who were described as sometimes doing actions that are immoral, why do you think it is immoral for them to do the actions described?” Participants were told that they could select more than one answer and they chose from the same list of options described in the Teleo → Moral condition.

Finally, participants completed all of the additional measures used in Study 1 (including the perceived frequency of each action), with the exception that the essentialism measure was shortened to reduce the length of the task. We instead used the essentialism measure from Levy et al. (1998), which is a subscale of that in Bastian and Haslam (2006).

Results

The primary dependent variables were ratings for teleological endorsement and moral judgment. These were calculated by assigning participants a score from 0 (*they do not exist for this purpose/not immoral*) to 4 (*they exist for this purpose/immoral*) based on their scale ratings.

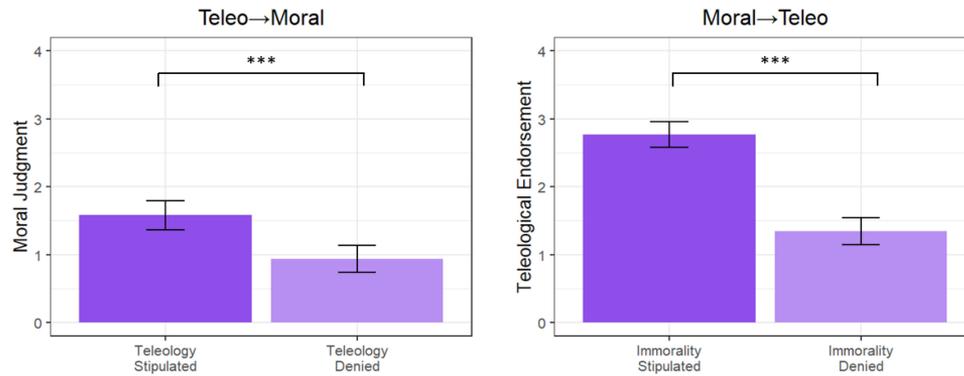
Our first aim was to test two predictions: (a) that assigning purpose to a species causes participants to morally condemn species members who do not fulfill those purposes, and (b) that designating an action as immoral prompts an inference that the species exists to perform that action. Participant ratings were analyzed as the dependent variable in a repeated-measures ANOVA with inference type (Teleo → Moral, Moral → Teleo), stipulation type (stipulated, denied), and purpose type (biological, care for others, environmental, societal, personal fulfillment) as independent variables. This analysis revealed a main effect of inference type, $F(1, 1,968) = 156.70, p < .001, \eta_p^2 = 0.07$, such that teleological endorsement ratings (Moral → Teleo condition) were higher overall than moral judgment ratings (Teleo → Moral condition). In line with our two predictions, there was also a main effect of stipulation type, $F(1, 1,968) = 345.53, p < .001, \eta_p^2 = 0.15$, such that participants gave higher ratings when teleology or morality was stipulated than when either was denied. That is, participants were more likely to judge species members as morally wrong when they failed to perform an action that was stipulated as their species’ purpose than when the action was denied as their purpose (and similarly with respect to the Moral → Teleo condition). Additionally, there was a significant interaction between stipulation type and inference type, $F(1, 1,968) = 51.93, p < .001, \eta_p^2 = 0.03$, such that stipulating immorality increased teleological endorsement ratings more so than stipulating teleology increased moral judgment ratings (see Figure 5). Finally, the analysis revealed a main effect of purpose type, $F(4, 1,968) = 7.35, p < .001, \eta_p^2 = 0.01$, and significant interactions between purpose type and stipulation type, $F(4, 1,968) = 2.59, p = .04, \eta_p^2 < .01$, and purpose type and inference type, $F(4, 1,968) = 9.15, p < .001, \eta_p^2 = 0.02$ (see the online supplemental materials).

In response to the question asking participants why a species had certain purposes or why certain actions were immoral, the most

Table 4
Sample Items in the “Environmental” Subcategory of Study 2

Condition	Item type	Item
Teleo → Moral	Purpose stipulated	Far away on the planet Gumala, there is a group of beings called Sarbops. Sarbops exist on this planet for a reason. They exist so that they can care for their planet. They are alive to preserve Gumala and its inhabitants.
	Purpose denied	Far away on the planet Quarita, there is a group of beings called Shonzers. Shonzers do not exist on this planet for any reason. They care for their planet, but they do not exist to do so. They preserve Quarita and its inhabitants, but they are not alive to do so.
Moral → Teleo	Immortality stipulated	Far away on the planet Gumala, there is a group of beings called Sarbops. Sarbops sometimes do actions that are immoral. Sarbops who do not care for their planet are immoral. It is immoral if they do not preserve Gumala and its inhabitants.
	Immortality denied	Far away on the planet Quarita, there is a group of beings called Shonzers. Shonzers do or do not do various actions. Some Shonzers do not care for their planet, but there is nothing wrong or immoral about this. Some do not preserve Quarita and its inhabitants, but there is nothing wrong or immoral about this.

Figure 5
Effect of Stipulating Function or Immorality on Inferences of Immorality or Function, Respectively, in Study 2



Note. Mean moral judgment ratings (judging the failure to fulfill a species function as immoral) when teleology is stipulated or denied (left), and levels of teleological endorsement when immorality is stipulated or denied (right). Error bars indicate 95% confidence interval. Asterisks (***) correspond to $p < .005$ for post hoc t -tests comparing the corresponding endorsement levels—Teleo → Moral: $t(103) = 6.76, p < .001$; Moral → Teleo: $t(96) = 10.90, p < .001$. These percentages are not exclusive since participants could select more than one option. See the online article for the color version of the figure.

highly endorsed reasons were that “large groups or communities of the beings assign these purposes as goals for the entire group” (45%) or that “it happened that way because of evolution by natural selection” (38%), not that a supernatural or natural being had created it that way (see Table 5). This suggests that participants were treating the alien species not as artifacts, but more similarly to human-like beings, potentially capable of making decisions.

To see whether inferences from purpose to group consensus (which could impose social norms) drove effects in the Teleo → Moral direction, we performed an additional analysis as follows. For participants in the Teleo → Moral condition, we compared the moral judgments of those who did and did not indicate that “large groups or communities of the beings assign these purposes as goals for the entire group” with a 2 (teleology stipulated vs. denied) by 2 (indicated group consensus vs. not) mixed ANOVA. Crucially, we did not find an interaction, $F(1, 1,016) = 1.84, p = .18$, and so failed to find evidence that the effect of teleology on morality is larger for those participants who

inferred group consensus. This analysis also revealed main effects of stipulation type, $F(1, 1,016) = 57.86, p < .001$, and of indication of group consensus, $F(1, 1,016) = 15.90, p < .001$.

To determine whether individual differences predicted participants’ moral judgments, we fit a regression model predicting moral judgment difference scores with Gaia beliefs, religious beliefs, purity ratings, perceived frequency, and essentialism. None of these variables significantly predicted moral judgments. We fit an additional regression model predicting anthropic teleological endorsement difference scores including the same factors, and the only significant predictor was perceived frequency ($\beta = -.78, p < .05$).

Discussion

Study 2 was designed to test our second question: whether beliefs about species’ purpose play a causal role in moral condemnation of individuals who fail to achieve that purpose. For our sample, we

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Table 5

Percentage of Participants Who Chose Each Option as an Explanation for Why a Species Had a Certain Purpose (Teleology) or Why Certain Actions Were Immoral for a Species (Moral) in Study 2

Response type	Why does the species have this purpose? (%)	Why is this action immoral for the species? (%)
Evolution	46	29
Individual choice	39	25
Group consensus	36	52
Natural being	31	30
Supernatural being	19	16
Nothing	16	5
Unsure	10	2

found evidence that this may be true: When we experimentally manipulated teleological beliefs about an alien species, we found a corresponding shift in moral judgments.

Interestingly, we also found evidence of a relationship in the reverse direction, such that beliefs about the (im)morality of actions influence beliefs about species purpose. There are a few ways to make sense of this bidirectional relationship. First, it could be that teleological and moral beliefs stem from a common cause, such that each effect is taken as evidence for the presence of that cause, resulting in elevated judgments for the other effect. Second, it could be that there are in fact two distinct causal relationships, but each is driven by its own mechanism. For example, it could be that beliefs about purpose predict moral judgments because purposes are assumed to be natural and therefore good, but that moral judgments predict purpose attributions because participants assume groups and individuals intentionally aspire to moral ends. These are interesting possibilities for further investigation in future work, but they go beyond the scope of the present aim to investigate the effects of belief in species-level purpose.

The design of Study 2 also allowed us to evaluate one hypothesis about what drives the Teleo → Moral link: Claims of species purpose lead participants to infer some form of group consensus or social norm, which could plausibly introduce the kind of moral obligation that would render purpose violations immoral (Tomasello, 2020). While we found that many participants in fact drew an inference from purpose to group consensus, we did not find evidence that doing so moderated the effect of teleology on moral claims. In Studies 3 and 4, we offer a more direct test of what explains the Teleo → Moral link.

Study 3

In Study 3, we addressed our third question: why is there a relationship between belief in species purpose and moral condemnation of those who do not fulfill that purpose? As mentioned in the Introduction, prior work has documented related inferences from existence or “naturalness” to “goodness,” but it remains unclear what drives such inferences in most cases. For the case of species function, we hypothesized that our participants might draw the following inference: If a species has a particular function, then it is beneficial for the species for individuals to fulfill that function, and correspondingly detrimental to the species for individuals to fail to fulfill that function. If participants are already committed to the idea that one has a moral obligation to benefit

the species (or more weakly an obligation not to harm the species), then the inference from “function” to “beneficial for species” could be sufficient to generate the judgment that it is morally wrong to choose not to fulfill a species function. For example, some might reason that if humans exist to reproduce, then reproduction must be good for the species; if it is morally wrong not to do what is good for the species, then it is morally wrong not to reproduce.

One aim of Study 3 was to directly test the hypothesis that teleology indeed supports the inference that an action is beneficial for the species. To do so, we again introduced participants to novel alien species and we stipulated or denied that some action was a species’ purpose. We then asked whether that action was likely to be beneficial to the whole species. We also asked whether that action was likely to be beneficial to individual species members to determine whether an inference from function to benefit extends to individuals as well.

A second aim of Study 3 was to determine whether belief that an action is beneficial or not beneficial for the species is indeed sufficient to generate the judgment that an individual who chooses not to perform that action is immoral. To test this, participants learned about novel alien species where we manipulated (a) whether or not performing some action was harmful or beneficial and (b) whether this affected the whole species or only individual species members. We then asked the extent to which individuals who refrained from performing the action were immoral. This allowed us to determine whether our participants judge as immoral those who do not perform actions that benefit their species and whether a failure to benefit the species is viewed as more morally wrong than a failure to benefit individual species members. To manipulate whether an action was harmful or beneficial, we used novel actions, such as “daxing.” This has the additional benefit of extending our results from human actions (Study 1) and familiar actions in other species (Study 2) to unspecified actions about which participants had no specific prior commitments.

The design and analyses for Study 3 were preregistered (<https://osf.io/pckhx/>).

Method

Participants

The participants in Study 3 were 52 adults (29 women, 22 men, one nonbinary person) recruited via Prolific.² Three additional respondents were excluded for failing an attention check. Sensitivity analyses indicated that we had sufficient power to detect our main effect (sensitive to $\eta_g^2 = 0.33$; found $\eta_g^2 = 0.38$). Most participants reported their religious beliefs as agnostic (31%), followed by atheist (25%), non-Catholic Christian (18%), Catholic (10%), and others (16%). Racial demographic information was provided by 84% of participants. Of those, 23% identified as Asian, 4% as Black, 59% as White, and 14% as multiracial. Participants were paid at a rate of \$7.50 per hour, prorated to our 8-min task, and participation was restricted to workers in the United States who had completed at least 100 prior tasks with a 95% approval rating, consistent with recommendations for obtaining high-quality data on online platforms (Eyal et al., 2021).

² We switched to Prolific in mid-2020 when data quality on MTurk became a recurring issue across our lab. Studies 1 and 2 were run prior to these issues.

Materials and Procedure

Study 3 comprised two tasks: a “moral judgment task” and a “teleology inference task” (see Figure 6 for an overview of design). All participants completed both tasks, with the “moral judgment task” always shown first. Participants were randomly assigned to one of four versions of the survey that counterbalanced the specific novel species and actions (e.g., Kulvaws who dax) used for each item.

Moral Judgment Task. All participants first received an introduction to the novel alien species, as described in Experiment 2. This task used a 2 (species consequence: harm, benefit) \times 2 (individual

consequence: harm, benefit) within-subject design. For each item, we told participants about a novel action performed by members of a species, along with information about whether or not performing the action harmed or benefited the species or the individual. For example, in the Species Harm/Individual Benefit condition, participants read that “Far away on the planet Glinhondo, there is a group of beings called Kulvaws. Kulvaws do many things, including something called daxing. If Kulvaws do not dax, it is harmful to the species, but it is beneficial to individual Kulvaws.” Participants were then told that although some of the species members choose to perform the action, some of them choose not to. After each item, participants gave a moral judgment: “To what extent is a Kulvaw who chooses not to dax immoral?” They responded on a scale from “1—neutral” to “5—very immoral” with a midpoint at “3—somewhat immoral.” All four items in the Moral Judgment task were presented serially and in a random order.

Teleology Inference Task. Participants were informed that they would learn about two additional alien species, but that they would be asked different questions about these last two species. This task used a 2 (teleology type: stipulated, denied) \times 2 (benefit target: species, individuals) within-subject design. Serially and in a random order, participants read about two novel species that performed some action and existed to perform that action (teleology stipulated), or that did not exist to perform that action (teleology denied). After each item, participants rated the extent to which this action is beneficial to the species (e.g., “To what extent is lorping good for the Nactan species?”) and the extent to which this action is beneficial to individual members of the species (“To what extent is lorping good for individual Nactans?”). The rating scale ranged from “1—very bad for (individual Nactans/the Nactan species)” to “5—very good for (individual Nactans/the Nactan species)” with a midpoint at “3—neither good nor bad for (individual Nactans/the Nactan species).”

Lastly, participants indicated their age, gender identification, and religious affiliation.

Results

Teleology Inference Task

Although participants completed the teleology inference task after the moral judgment task, we report it first to verify a presupposition of what follows: that participants indeed draw an inference from species function to species-level benefit. The dependent variable was participants’ benefit ratings, where higher ratings indicated inferences that an action is more beneficial. To determine whether stipulating teleology (i.e., that a species exists to perform some action) results in an inference that performing that action is good for the species and/or individuals, we conducted a two-way repeated measures ANOVA with teleology (stipulated, denied) and benefit target (species, individuals) as independent variables and benefit rating as a dependent variable (see Figure 7). We found a significant main effect of teleology, $F(1, 51) = 96.31, p < .001, \eta_g^2 = 0.38$, such that benefit ratings were significantly higher when teleology was stipulated than when teleology was denied. We did not find a significant main effect of benefit target, $F(1, 51) = 0.92, p = .34, \eta_g^2 = 0.002$, or a significant interaction, $F(1, 51) = 3.97, p = .05, \eta_g^2 = 0.01$.

Moral Judgment Task

In the moral judgment task, the dependent variable was participants’ moral judgment scores, where lower scores corresponded to

Figure 6
Design of Study 3

Moral Judgment Task

Far away on the planet Glinhondo, there is a group of beings called Kulvaws. Kulvaws do many things, including something called daxing. If Kulvaws do not dax, it is harmful [beneficial] to individual Kulvaws, and it is harmful [but it is beneficial] to Kulvaws as a whole species.

Although some of the Kulvaws choose to dax, some of them choose not to.

To what extent are Kulvaws who choose not to dax immoral?

Not immoral		Somewhat immoral		Very immoral
1	2	3	4	5
<input type="radio"/>				

Teleology Inference Task

Far away on the planet Gumala, there is a group of beings called Sarbops. Sarbops do many things, including something called stribing. In fact, Sarbops exist on this planet in order to scribe [Sarbops do not exist on this planet in order to scribe, it's just something that they do].

To what extent do you think stribing is good for individual Sarbops?

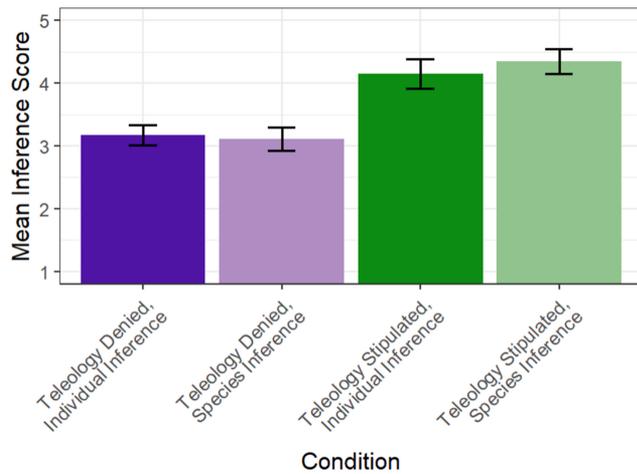
Very bad		Neither good nor bad		Very good
1	2	3	4	5
<input type="radio"/>				

To what extent do you think stribing is good for Sarbops as a whole species?

Very bad		Neither good nor bad		Very good
1	2	3	4	5
<input type="radio"/>				

Note. The study consisted of two main tasks, with names for novel actions and species counterbalanced across participants. This figure shows an example of one item each participant saw in each task (with text from the other items in brackets), presented in a random order. Participants always completed the moral judgment task first. Instructions were provided before the tasks, and participants completed demographics after these tasks.

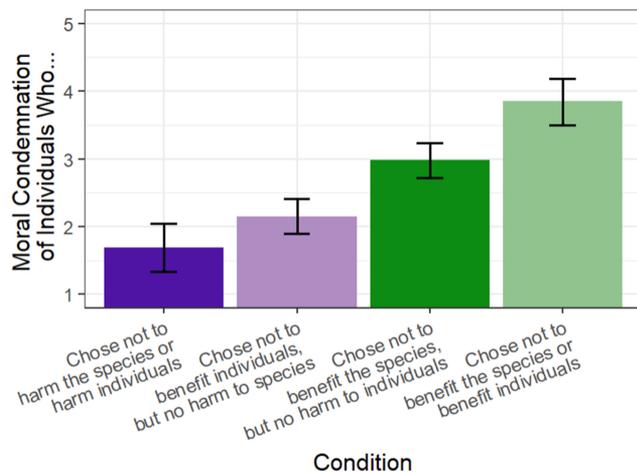
Figure 7
Inferences From Species Function to Species and Individual Benefit in Study 3



Note. Inferences that an action is beneficial to species or individuals when teleology is stipulated or denied, where a score of 3 indicates that the action is neither good nor bad, and higher scores indicate that the action is good. Error bars correspond to 95% confidence interval. See the online article for the color version of the figure.

judgment of an action as more neutral and higher scores corresponded to judgment of an action as more immoral. To determine how moral judgments against individuals who do not perform an action are affected by the species-level and individual-level consequences of not performing that action, we conducted a two-way repeated measures ANOVA with species consequence (harm, benefit) and individual consequence (harm, benefit) as independent variables and moral judgment score as a dependent variable (see

Figure 8
Moral Condemnation of Individuals Who Choose Not to Perform Various Actions in Study 3



Note. Mean moral condemnation of species members who do not perform an action in each condition. Error bars indicate 95% confidence interval. See the online article for the color version of the figure.

Figure 8). We found significant main effects of species consequence, $F(1,51) = 91.69, p < .001, \eta_g^2 = 0.32$, as well as individual consequence, $F(1,51) = 23.41, p < .001, \eta_g^2 = 0.08$, but no significant interaction, $F(1,51) = 1.94, p = .17, \eta_g^2 = 0.01$. Moral judgments were significantly harsher when the species was harmed than when the species benefited, $t(51) = 9.58, p < .001$, and significantly harsher when individuals were harmed than when individuals benefited, $t(51) = 4.83, p < .001$.

Next, to determine whether the effect of species harm on moral judgments was larger than the effect of individual harm, we calculated difference scores for the effect of species harm and for the effect of individual harm (e.g., species harm effect = average species harm moral judgment score – average species benefit moral judgment score). Harm done to the species affected moral judgments to a significantly greater degree than did harm done to individuals (species harm effect: $M = 1.49, SD = 1.12$; individual harm effect: $M = 0.66, SD = 0.99$; $t(51) = -5.35, p < .001$).

Discussion

Our primary aim in Study 3 was to address our third question: what explains the causal relationship between teleological beliefs about species purpose and moral condemnation of those who fail to fulfill it? To our knowledge, no prior work has offered a mechanism underlying is–ought reasoning that could plausibly explain why species-level teleological beliefs lead some to morally blame individuals. Study 3 offers a possible mechanism: Our results provide evidence that teleology supports the inference that an action is beneficial for the species, and that participants judge others as immoral who do not perform actions that benefit their species.³ In this study, stipulating teleology led participants to infer that performing an action is good for the species and good for individual species members. Additionally, participants believed that harsh moral judgment was warranted when an individual did not perform some species-beneficial action, where the effect of species benefit versus harm on such moral judgments was greater than the effect of individual benefit versus harm. As a next step, since Studies 2 and 3 employed novel anthropoid alien species as stimuli, we circled back to the focus of Study 1 and tested whether the findings in Study 3 hold true with respect to our participants' beliefs about the human species specifically.

Study 4

Study 3 found that species purpose supports the inference that an action is beneficial for the species, and that our participants judged that it is morally wrong not to do what is beneficial for the species. This suggests a mechanism by which belief in purpose (“is”) leads to moral condemnation of species members who fail to fulfill their purpose (“ought”): Namely, those species members are blameworthy because they fail to act in ways that benefit their species.

In Study 4, we aimed to bridge Studies 2 and 3 (which show causal effects but in an alien species) with Study 1 (which shows correlational effects in the domain of *human* purpose) by testing for the operation of the mechanism from Study 3 in the human domain. Specifically, we hypothesized that the relationship between belief in

³ In the online supplemental materials, we report additional data and results, which fail to support an alternative to the species-beneficial hypothesis.

human purpose and moral condemnation of those who fail to fulfill that purpose can be at least partially explained by an inference that fulfilling the specified purpose is beneficial to the human species.

Given participants' rich prior beliefs concerning humans and human purpose, we did not think it would be effective to simply stipulate that a real human action (such as environmental care) is or is not a species function (as in Study 2) or that it is or is not beneficial (as in Study 3). Instead, Study 4 capitalized on existing variation in these beliefs to test the hypothesis that an inference to species benefit mediates the effect of belief in species function on moral condemnation. Specifically, we asked participants to rate the extent to which they agree that caring for the environment is a human purpose, that caring for the environment is beneficial to the human species, and that it is morally wrong for someone to choose not to care for the environment. This allowed us to conduct mediation analyses to evaluate whether believing that an action is beneficial for the species mediates the relationship between believing that an action is a human purpose and judging someone immoral for not performing that action. Additionally, by using a new method and including a scale that differed from that used in previous studies, we hoped to ascertain whether the relationship between human purpose beliefs and moral condemnation is robust across measurement.

Study 4 focused on environmental care for two reasons. First, based on Study 1, we expected variation in participants' beliefs about both the extent to which humans exist to care for the environment and the extent to which failing to care for the environment is immoral. Second, environmental care is one of the most pressing issues of our time (see Nielsen et al., 2021) so identifying even a partial explanation for variation in participants' judgments about the morality of environmental care is potentially highly consequential. That said, we also conducted a conceptual replication of Study 4 involving both reproduction and environmental care; that study is reported in the online supplemental materials (Study 4B).

The design and analyses for Study 4 were preregistered (<https://osf.io/pckhx/>).

Method

Participants

Participants in Study 4 were 121 adults (59 women, 61 men, one nonbinary person, $M_{\text{age}} = 33$ years, age range = 18–77 years) recruited via Prolific. Four additional respondents were excluded for failing an attention check. Sensitivity analyses indicated that we had sufficient power to detect our main effect (sensitive to $R^2 = .004$; found $R^2 = .12$). Most participants reported their religious beliefs as agnostic (25%), followed by non-Catholic Christian (22%), other (19%), atheist (18%), and Catholic (16%). Racial demographic information was provided by all participants: 12% identified as Asian, 10% as Black, 74% as White, 2% as multiracial, and 2% as other. In addition, 10% identified as Hispanic or Latino, and 90% did not. Of the 97% of participants who reported their household income, 25% reported over \$100,000, 34% reported between \$50,000 and \$100,000, and 41% reported below \$50,000. Participants were paid at a rate of \$12.50 per hour, prorated to our 5-min task, and participation was restricted to workers in the United States who had completed at least 100 prior tasks with a 95% approval rating. All participants passed a captcha verification at the start of the survey.

Materials and Procedure

All participants first read the following instructions: "In this survey, we will ask you some questions about your personal beliefs. There are no right or wrong answers and your responses are completely anonymous, so please answer honestly." Then, all participants saw three statement blocks presented in a random order (see Figure 9 for overview of design). All blocks related to the environment. One block contained four statements about human purpose (e.g., "the human species exists to ensure that all natural things can thrive"), one block contained four statements about benefit to the human species ("ensuring that all natural things can thrive is beneficial for the human species"), and one block contained four statements about the immorality of someone's choice ("it is morally wrong for someone to choose not to ensure that all natural things can thrive").

Within each block, each of the four statements was presented serially and in a random order. Participants were asked to rate their agreement with each statement on a scale from "1—strongly disagree" to "7—strongly agree" with a midpoint at "4—neither agree nor disagree." Lastly, participants indicated their age, gender identification, race, ethnicity, household income, and religious affiliation.

Results

First, using new items, we replicated Study 1's finding that some participants believe humans exist to care for the environment: 57% of participants responded at or above "slightly agree" to at least one of the four human purpose items, and the mean agreement across all items was 4.04 out of 7 (95% CI [3.72, 4.36]).

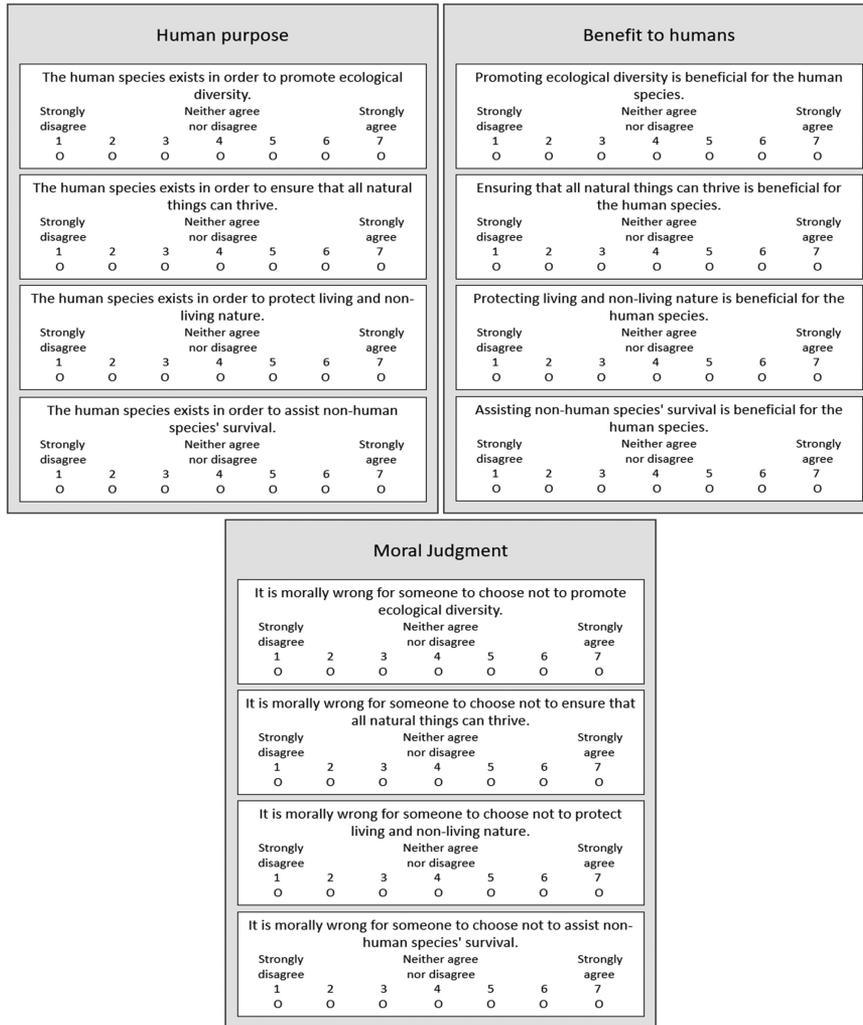
Recall that our primary prediction is that effects of purpose endorsement (e.g., "The human species exists to assist nonhuman species' survival") on moral claims ("It is morally wrong for someone to choose not to assist nonhuman species' survival") are mediated by an inference from purpose to species benefit ("assisting nonhuman species' survival is beneficial for the human species"). We fit a mediation model using the R package lavaan (Rosseel, 2012) to test whether endorsement that an action benefits the human species mediated the association between endorsement of human purpose and moral judgment. We fit a multilevel structural equation model accounting for item-level variation. All parameters are reported as standardized estimates.

Benefit to species endorsement significantly mediated the relationship between human purpose endorsement and moral judgment, $\beta = 0.18$, $p = .002$ (see Figure 10). The direct effect of human purpose endorsement on moral judgment was also significant, $\beta = 0.36$, $p < .001$. In other words, benefit to species endorsement partially mediated the effect of human purpose endorsement on moral judgment.

Discussion

By bringing our findings from Studies 2–3 back into the human domain, Study 4 provides evidence that the mechanism identified in Study 3 potentially operates in the human case: the belief in human purpose may predict moral condemnation of individuals who fail to fulfill their purpose in part because belief in human purpose is associated with belief that the purpose

Figure 9
Design of Study 4



Note. Study 4 consisted of one task with three blocks, the order of which was randomized. This figure shows all items that each participant saw, presented in a random order within blocks. Instructions were provided before the task, and participants completed demographics after these tasks.

serves a species-level good. One source of evidence for this interpretation is our mediation analysis, which finds that the effect of human purpose beliefs on moral judgments is mediated by beliefs about special benefit. It is therefore important to acknowledge that mediation analyses rest on a variety of assumptions (MacKinnon, 2008) and should be interpreted with caution (see Bullock et al., 2010; Green et al., 2010). We thus put greater weight on the converging evidence across Studies 1–4: Considered as a set, these studies support the hypothesis that species level purpose (whether human or nonhuman) is used to infer a species level benefit with implications for the morality of individuals' choices.

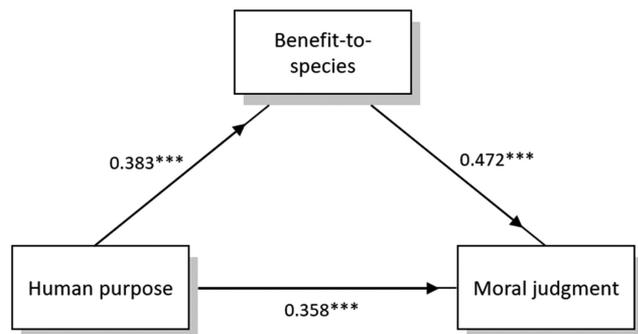
Additionally, Study 4 used new measures of purpose beliefs and moral judgments, such that participants rated the extent to which they agreed or disagreed with teleological claims (vs. rating true/false as in Study 1) and with statements of immorality (vs. selecting

neutral/immoral as in Study 1). This suggests that the finding that there is a relationship between belief in human purpose and moral condemnation of individuals is robust across the specific type of measurement.

General Discussion

Across four studies, we investigated beliefs about human purpose and their implications for moral judgment. We first investigated whether participants in our samples think that the human species exists for a purpose. In Study 1, we found that our participants did sometimes explicitly agree with statements that humans exist for purposes: many agreed that humans exist to reproduce, while others agreed that humans exist to care for others, care for the environment, contribute to society, or achieve personal fulfillment.

Figure 10
Mediation Analysis in Study 4



Note. Path diagram displaying the mediation relationship (fit using structural equation modeling) between human purpose judgments, benefit-to-species judgments, and moral judgments for participants' in Study 4.

*** $p < .001$.

These findings go beyond prior work by offering evidence of adults' teleological thinking in a previously unstudied domain. Since prior work has found that adults are less likely than young children to explicitly accept teleological claims about species (Kelemen, 1999), and because humans are considered by many to be a unique, elevated category compared to other living species (Coley, 2007), it does not necessarily follow that teleological thinking about the natural world extends to humans. People could be resistant to the idea that humans serve a purpose, especially since many believe that the purpose of nature is to benefit humans (Kahn, 1999; Pizza & Posada, 2020; Preston & Shin, 2021). Instead, we found that many participants were in fact inclined to think of the human species in teleological terms. Interestingly, however, since many people think that human purposes are themselves beneficial for the human species, our findings are also consistent with this prior work: Our participants thought that one purpose of humans is to benefit humans.

While we found evidence that our participants' beliefs about species-level human purpose are similar to beliefs about individual-level purpose (i.e., achieving a sense of purpose in one's own life) documented in prior work, the correspondence is not perfect. Commonly studied individual-level purposes include caring for others (Emmons, 2003; Hill, Burrow, Brandenberger, et al., 2010; Quinn, 2017), care for the environment (Pritchard et al., 2020), contributing to society (Bronk et al., 2010; Quinn, 2017; Yeager & Bundick, 2009), and achieving personal fulfillment (Hill, Burrow, O'Dell, et al., 2010; Ryan & Deci, 2001). Many of our participants did consider these to be species-level human purposes to some extent. However, participants most often endorsed reproduction as a species purpose, which is not commonly thought of as an individual-level purpose. While individuals' sense of purpose in their own lives could stem from or inform their views of species-level purpose, we suspect that both kinds of purpose beliefs instead share partially overlapping determinants, including perceived personal and social value. Future work should clarify the origins of and causal relationship between individual- and species-level purpose beliefs.

Given that people do sometimes think about human existence teleologically, we turned to the potential consequences of this belief. Specifically, given the link between beliefs about what exists ("is")

and moral judgments about what should be ("ought") in other domains, we asked whether believing that the human species exists for a purpose (this is the "is") might drive moral condemnation of individuals who fail to fulfill their species-level purpose (this is the "ought"). Study 1 provided correlational support for this hypothesis: endorsement of anthropic teleological beliefs (but not matching nonteleological beliefs) was significantly correlated with moral condemnation of purpose violations. Study 2 provided additional evidence, showing that species-level teleological endorsement has a causal impact on moral condemnation of purpose violations. Specifically, experimentally manipulating teleological beliefs about novel species resulted in a corresponding shift in moral judgments. This may be surprising given the prior result that adults do not reliably evaluate individuals negatively merely based on their failure to conform to group regularities (e.g., a Glerk who eats a different kind of berry than Glerks typically eat; Roberts, Gelman, & Ho, 2017). This suggests that whether an action is a species' purpose, over and above whether it is regularly performed, may uniquely lead to moral judgments against individuals who do not perform the action.

Finally, we asked what explains the link between teleological beliefs on the one hand, and moral condemnation on the other. While little prior work has offered a compelling mechanism to explain why people reason from "is" to "ought," Studies 3 and 4 provide a plausible answer, at least for the case of species-level teleological beliefs. We found that species-level purpose supports the inference that the corresponding actions are beneficial for the species as a whole (proposed mechanism). If participants already believe that it is morally wrong not to perform species-beneficial actions, then this inference will lead them to judge purpose violations morally wrong. In Study 3, stipulating teleology increased participants' judgments that performing an action is beneficial for the species, and participants judged individuals as more immoral when they failed to perform actions that benefited the species. Inferences regarding benefits for individuals (vs. the species as a whole) were qualitatively similar, but less pronounced. In Study 4, we found evidence that the mechanism identified with artificial stimuli in Studies 2–3 can potentially explain judgments about humans, as well. In Study 4, the relationship between participants' judgments about whether an action is a human purpose and whether it is morally wrong to choose not to perform the action was partially mediated by endorsement of the claim that the action is beneficial for the human species. While a variety of causal interpretations are consistent with this mediation result, it aligns with the causal results from Studies 2–3, as well as the correlational results from Study 1. Moreover, while we do not have direct causal evidence for cases involving the human species (and we hope that future work can address this), we believe these studies together point to a cohesive account of the moral consequences of species-level teleological beliefs. In sum, our studies jointly suggest that when people believe that a species exists for some purpose, they tend to infer that the purpose serves a species-level good, such that failing to pursue the purpose is immoral.

Notably, these studies identify an is–ought mechanism specific to the domain of species purpose. The "is" in this case refers to *species-level* teleological beliefs, whereas the "ought" refers to *individual-level* moral judgments, and the mechanism connecting them is a belief about species benefit and individuals' responsibility to the species. This structure is unlike other is–ought domains (e.g., why roses ought to be Valentine's gifts, Tworek & Cimpian, 2016;

why there ought to be particular degree requirements, Eidelman et al., 2009), even those which on the surface seem similar. For example, Foster-Hanson and Lombrozo (2022) investigated teleological claims about biological features (vs. the entire species), and found that these teleological claims supported normative claims about what features individuals ought to have, but not claims about immorality (in particular, participants did not endorse the claim that it is immoral for a biological organism not to have a functional feature). Roberts, Gelman, and Ho (2017) speculate that descriptive generalizations about social groups lead participants to posit social norms, but we did not find evidence that such inferences moderated effects of species-level teleology (Study 2). Thus the findings reported here seem to reflect the operation of an is–ought mechanism that has not been documented in prior research.

Although our is–ought mechanism is specific to the domain of human purpose, identifying it has important theoretical and practical implications. At a theoretical level, our findings suggest that even if is–ought fallacies are all fallacious in similar ways, they are not the result of a single mechanism or background belief that manifests across contexts (biological, social, institutional, etc.). Instead, different documented fallacies may have unique etiologies, with the consequence that it may be difficult to identify common interventions to “debias” reasoning in those cases where is–ought fallacies are problematic. Practically, our findings have implications for what such interventions might look like in the case of anthropic teleology. If the goal is (for example) to reduce moral condemnation against someone who chooses not to reproduce or who cannot reproduce, one option is to try to change the beliefs that drive this moral judgment. As we show, this moral condemnation is the result (at least in some cases) of believing that humans exist to reproduce. However, teleological beliefs may be difficult to change or overcome (e.g., Kelemen, 1999; Kelemen et al., 2013). Identifying the mechanism through which teleology influences morality offers another point of intervention: If it is possible to change beliefs about whether an action is beneficial to the species (e.g., changing beliefs about whether an action like reproduction will actually benefit the species), we may succeed in preventing unwanted moral condemnation against individuals.

While these studies address important questions about the scope and effects of teleological beliefs in a novel domain, we acknowledge that there are limitations, several of which provide directions for future work. First, our sample was limited to adults participating online across the United States. By no means is this sample representative of the whole population of the United States and its subcultures, let alone representative of beliefs across the world. Teleological beliefs about human existence and their moral implications are likely highly culturally dependent, so it would be beneficial for future work to explore differences across cultures and development. For example, there is wide cross-cultural variation in the extent to which societies view women in terms of their capacity to reproduce, and people in those societies that do are more likely to view women’s infertility as morally bad (McLeod & Ponesse, 2008). Therefore, we expect the findings in our study regarding reproduction to apply in any culture which places strong importance on reproduction (Behboodi-Moghadam et al., 2013; Dattijo et al., 2016; Fido & Zahid, 2004; Sandelowski, 1990; Tahiri et al., 2015) and possibly not apply in those that place less value on reproduction (Kim et al., 2005; Li et al., 2011; Tal & Kerret, 2020). That said, our results in Study 1 suggest that the relationship between anthropic teleological beliefs and moral judgments holds even controlling for religious, Gaia, and purity beliefs.

A second limitation is that there is a degree of artificiality in using alien species and novel actions. For that reason, our studies provide the most compelling picture when considered all together, including both correlational data from judgments about humans engaged in known behaviors, and experimentally manipulated judgments about novel organisms (aliens). Despite this variation, we find a consistent pattern of results across all four studies. Using human-related stimuli in Studies 1 and 4, we found a relationship between endorsement of anthropic teleology and moral judgments. As teleological and moral beliefs about the human species may be less susceptible to experimental manipulation (given their familiarity), shifting to novel organisms and actions allowed us to test our causal claims more directly, with the additional value of suggesting that the mechanisms posited to underlie the anthropic case are quite general. When considered as a whole, our four studies provide promising evidence of a causal relationship between teleological beliefs about a species and moral condemnation of species members who do not fulfill their species purpose, in the human case and beyond.

An additional point to note is that we did not systematically vary why individuals failed to fulfill their purpose. In Study 2, we asked, “To what extent are Kulvaws who do not reproduce immoral?” In Study 3, we asked, “To what extent are Kulvaws who choose not to dax immoral?” The role of choice is potentially important. Do adults take choice into consideration when morally judging individuals who fail to fulfill their human purpose? Would they make similar moral judgments if individuals are simply unable to fulfill their purpose? The role of choice is not addressed by the present studies and provides a fascinating direction for future research.

Addressing these questions in future research would contribute to our psychological and philosophical understanding of the relationship between teleology and morality. However, other future work could, separately but consequentially, illuminate the real-world effects of these findings. For example, how do pervasive misconceptions about evolution as a goal-directed process influence our dialogue and beliefs that humans must exist for a purpose? How often do we consume news or other media that contains anthropic teleological language? What effects does belief in reproductive or environmental purpose have on people’s willingness to support certain policies, and how does belief in societal purpose affect how we treat those who are not contributing to the workforce? More work needs to be done to address these open questions.

Our explanations for the world around us—including our teleological explanations of species and their behaviors—shape our basic understanding of the world. Our findings shed light on how our descriptive understanding, the “is,” can sometimes shape our prescriptive understanding, the “ought.” Right or wrong, people seem inclined to infer moral value from species function. It is easy to see how this might lead to harm (e.g., in judging a couple’s infertility), but it might also be a psychological feature that can be harnessed for good (e.g., in mobilizing care for others or the environment). Our studies are first steps in the larger project of mapping the links between explanation and understanding on the one hand, and prescription and action on the other.

Constraints on Generality

Our sample was limited to adults participating online across the United States from 2019 to 2023. By no means is this sample

representative of the whole population of the United States and its subcultures, let alone representative of beliefs across the world. Teleological beliefs about human existence and their moral implications are likely highly culturally dependent, so it would be beneficial for future work to explore differences across cultures and development.

Research Context

All of the authors are motivated by understanding the psychology of explanations. A large portion of Deborah Kelemen's research program focuses on how teleological explanations shape our thinking about species and vice versa (e.g., Kelemen, 1999; Kelemen & Rosset, 2009), while Tania Lombrozo has investigated teleological explanations in relation to causal beliefs and category structures (e.g., Lombrozo, 2009; Lombrozo & Gwynne, 2014; Lombrozo & Wilkenfeld, 2019). While working in Deborah Kelemen's lab, Casey Lewry became interested in whether people also think about the human species teleologically, and what implications this might have. The project continued in Tania Lombrozo's lab, where Casey Lewry's research with Tania Lombrozo investigates the connection between explanations and morality, with a focus on how this has real-world social implications. Casey Lewry and Tania Lombrozo's ongoing work focuses on explanations of social change: How do people use their beliefs about the nature of morality to explain the end of slavery or the legalization of gay marriage (Lewry & Lombrozo, 2022), and how do intuitive theories of moral progress determine whether one tries to make the world morally better (Lewry et al., 2023)?

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