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Becoming Speciesist: How Children and Adults Differ in Valuing Animals by Species and Cognitive Capacity

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Abstract:	<p>Children morally prioritize humans over animals less than adults do. Is this because children are less speciesist—meaning they place less moral weight on mere species membership? Or is it because they give less weight to differences in cognitive capacity between humans and other animals? We investigated this in two experiments, presenting children and adult participants in the U.S. and Spain with moral trade-off dilemmas. These dilemmas involved individuals who varied in species membership (human vs. monkey) and cognitive capacity. Across both cultures, children were less likely than adults to prioritize humans over animals, regardless of cognitive capacity. Additionally, participants tended to prioritize individuals with higher cognitive capacities, regardless of species membership—though this effect was less robust in children. Our findings suggest that children in these Western contexts are indeed less speciesist than adults, though they do not rule out developmental changes in the moral weight assigned to cognitive capacity.</p>

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Running head: BECOMING SPECIESIST

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11 **Abstract**
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13 Children morally prioritize humans over animals less than adults do. Is this because
14 children are less speciesist—meaning they place less moral weight on mere species
15 membership? Or is it because they give less weight to differences in cognitive capacity between
16 humans and other animals? We investigated this in two experiments, presenting children and
17 adult participants in the U.S. and Spain with moral trade-off dilemmas. These dilemmas
18 involved individuals who varied in species membership (human vs. monkey) and cognitive
19 capacity. Across both cultures, children were less likely than adults to prioritize humans over
20 animals, regardless of cognitive capacity. Additionally, participants tended to prioritize
21 individuals with higher cognitive capacities, regardless of species membership—though this
22 effect was less robust in children. Our findings suggest that children in these Western contexts
23 are indeed less speciesist than adults, though they do not rule out developmental changes in the
24 moral weight assigned to cognitive capacity.
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40 *Keywords:* moral circle, moral judgment, speciesism, animals, cognitive capacity, children
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Becoming Speciesist: How Children and Adults Differ in Valuing Animals by Species and Cognitive Capacity

Most children have a fondness for non-human animals. They play with pets, cherish zoo visits, and adore animal characters like Peppa Pig or Clifford the Big Red Dog. Experimental research supports the notion that children place greater moral value on animals than adults do (e.g., Wilks et al., 2021). What explains children's greater concern for animals? Are they applying different criteria than adults when determining which beings deserve moral consideration? If so, what are those criteria?

The perceived moral significance of species membership and cognitive capacity

Seeing humans as morally more important than all other animals is a defining feature of most moral systems across time and cultures (Caviola et al., 2019). This prioritization is evident in many domains of life. For instance, legal frameworks around the world grant robust protections to human life while offering animals comparatively minimal safeguards. Religious traditions commonly emphasize the special moral status of humans. Even in societies with close relationships to animals, such as ancient pastoral communities, animals have long been used for food, labor, and ritual, with such practices widely accepted as morally permissible. Perhaps most strikingly, the widespread consumption of animals—despite the availability of alternatives—illustrates the deeply entrenched belief that human interests outweigh those of animals. However, the basis for this view remains unclear.

One possibility is that people prioritize humans over other animals purely on the basis of species membership—an attitude that has been called 'speciesism' by some authors (Horta, 2010; Singer, 1975). On this view, humans are more valuable than animals simply because they are humans. On an alternative view, humans matter more because they have unique features that animals lack. The most prominently cited features relate to greater, and

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3 distinctive, cognitive capacities, including the ability to reason or make rational decisions (cf.
4 Cohen, 1986; Kant, 1785; cf. Warren, 2003). According to this view, humans hold greater
5 moral significance not simply because they belong to the human species but because they
6 have much greater cognitive capacities than other animals.
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12 We focus on these two factors—species membership and cognitive capacity—because
13 they consistently emerge as central criteria in both philosophical and psychological accounts
14 of how people assign moral worth. Philosophers often distinguish between *who* a being is
15 (e.g., a member of the human species) and *what* a being can do (e.g., reason, communicate, or
16 exercise self-control; (DeGrazia, 1996; Kagan, 2022; Singer, 1975; Warren, 2003). Since
17 most humans also possess cognitive capacities that distinguish them from other animals,
18 these two factors typically go together. However, they in principle can, and in some cases do,
19 come apart. In particular, at least some humans—for example, those with severe cognitive
20 disability or advanced dementia—seem to lack many of the cognitive capacities distinctive of
21 humans yet still seem to enjoy a much higher moral status than non-human animals (Singer,
22 1975; Kagan, 2022). Questions about the respective role of species membership and cognitive
23 capacity in explaining, and perhaps justifying or undermining, the priority commonly
24 assigned to humans over animals remain a key focus of heated debate in moral philosophy.
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42 Research in moral psychology has echoed this focus, similarly finding that people rely
43 on both identity-based (e.g., species) and capacity-based (e.g., cognitive) reasoning when
44 making moral judgments (Caviola et al., 2019, 2020; Gray et al., 2007; Henseler Kozachenko
45 & Piazza, 2021; Piazza et al., 2014). Moreover, from an evolutionary perspective, prioritizing
46 members of one's own species may have conferred adaptive advantages by promoting
47 kinship bonds, group cohesion, and reciprocal cooperation (Boyd & Richerson, 2005;
48 Tomasello, 2014). At the same time, attending to cognitive traits like intelligence,
49 communicative ability, or goal-directed behavior in others may have helped early humans
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3 identify agents with the capacity for alliance—or for deception and threat (Cosmides &
4 Tooby, 1992). These two dimensions—species membership and cognitive capacity—thus
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6 likely reflect deep-rooted heuristics for identifying socially relevant beings.
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10 To test whether people prioritize humans over animals based on species membership
11 alone, one has to systematically disentangle species membership from other factors, such as
12 cognitive capacity, that typically correlate with belonging to a certain species. Experiments
13 with adults have done exactly that, revealing that adults prioritize humans over animals based
14 on mere species membership, even when cognitive capacity is controlled for (Caviola et al.,
15 2020, 2022). For example, when presented with a human and a chimpanzee of equal
16 cognitive capacity and sentience, most adults still prioritize the human. This tendency persists
17 even in extreme cases where the chimpanzee is presented as clearly having higher cognitive
18 capacity than (but the same sentience level as) the human. This suggests that judgments about
19 cognitive capacity cannot fully explain the different moral weights we grant to humans and
20 animals. Put another way, it suggests that adults are, at least partially, speciesist in the sense
21 explained above. It is plausible that other factors, such as appearance or perceived
22 vulnerability, could also play a role. However, in this study, we focus solely on species
23 membership and cognitive capacity—arguably the most prominent factors highlighted in
24 ethical and public debates about the treatment of non-human animals.
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45 While adults do appear to have speciesist tendencies, they also value higher cognitive
46 capacity. For example, adults tend to prioritize more cognitively capable animals over less
47 cognitively capable animals of the same species (Caviola et al., 2022). They also tend to
48 prioritize humans over animals more strongly when they see the humans as having much
49 higher cognitive abilities than the animals. Thus, it seems that adults exhibit both tendencies:
50 while they do often prioritize humans over animals based on species membership alone, they
51 nevertheless also attribute a degree of moral weight to cognitive capacity levels.
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The developmental shift in perceptions of human moral superiority over animals

Several empirical findings demonstrate children's greater concern for animals. When presented with hypothetical, direct trade-off scenarios, most children between the ages of five and nine choose to save ten dogs over one human, whereas most adults prioritize the human over even one hundred dogs (Wilks et al., 2021). This pattern of children valuing animals more than adults also extends to pigs (Wilks et al., 2021) and monkeys (Paruzel-Czachura et al., 2024) and manifests in both U.S. and Polish participants. Notably, these effects persist despite children and adults perceiving animals and humans as having the same absolute and relative levels of sentience and cognitive capacity (Wilks et al., 2021). Research also demonstrated that children are less likely to categorize farmed animals as food (McGuire, Palmer, et al., 2023) and show greater moral concern than adults when reasoning about eating animals (McGuire, Bagus, et al., 2025; McGuire, Fry, et al., 2023). When asked directly, a majority of children judged physical violence against animals as more morally wrong than hurting another child (Hussar & Harris, 2018). Children's moral concern for animals appears stronger in younger children than older ones. For example, when asked to report how much they care about a range of individuals, 5-year-old children typically placed a greater number of animals at the center of their moral circle, whereas 10-year-old children placed more humans at the center while placing animals towards the outskirts (Neldner et al., 2018, 2023), and during adolescence people even tend to particularly morally downgrade animals (McGuire, Fry, et al., 2025).

The present research

Why do children show greater moral concern for animals than adults do? Existing research has yet to answer this question. While some studies suggest that children consider

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3 perceived cognitive capacity when attributing moral concern to animals (Henseler
4 Kozachenko & Piazza, 2021; Kozachenko & Piazza, 2024; Neldner & Wilks, 2022), no
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6 developmental research has systematically examined how children assess moral concern
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8 when both species membership and cognitive capacity are manipulated simultaneously.
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12 In this article, we present two experiments that systematically vary species and
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14 cognitive capacity to isolate their influence on moral judgment. Specifically, children and
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16 adults made decisions in hypothetical prioritization dilemmas involving saving monkeys
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18 versus humans.
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22 This study design allows us to disentangle the following hypotheses. First, children
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24 may value cognitive capacities to the same extent as adults but exhibit a weaker speciesist
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26 tendency—meaning they have a weaker tendency to prioritize humans over animals based on
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28 mere species membership (*late speciesism hypothesis*). Alternatively, children may be just as
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30 speciesist as adults but place less emphasis on higher cognitive capacities when making
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32 moral judgments (*late higher cognitive capacity valuing hypothesis*). Lastly, children, unlike
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34 adults, might assign greater moral worth to beings that have lower cognitive capacities
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36 compared to other beings, perhaps because they perceive them as particularly vulnerable
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38 (*early lower cognitive capacity valuing hypothesis*).
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43 If children and adults prioritize equally cognitively capable animals and humans in the
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45 same way, this would rule out the late speciesism hypothesis and support the late higher
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47 cognitive capacity valuing hypothesis. Conversely, if children continue to show a weaker
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49 tendency to prioritize humans over animals, even when both individuals are equally
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51 cognitively capable, this would rule out the late higher cognitive capacity valuing hypothesis
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53 and support the late speciesism hypothesis. Finally, if children maintain or even increase their
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55 relative valuation of animals when an animal's cognitive capacities are raised (while the
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human's cognitive capacities remain constant), this would rule out the early lower capacity valuing hypothesis.

We conducted our experiments in both the U.S. and Spain to assess whether the findings generalize across different Western cultures or whether cultural differences—such as dietary norms (e.g., the greater prevalence of vegetarianism in the U.S. vs. the cultural significance of jamón in Spain) or relationships with animals (e.g., the popularity of bullfighting in Spain vs. pet ownership trends in the U.S.)—influence moral judgment. We worked with children aged 6–10, as past research suggests this age group exhibits lower speciesist tendencies than adults (Wilks et al., 2021) while also considering cognitive capacity when making moral judgments about animals (Kozachenko & Piazza, 2021).

Study 1: U.S. Samples

Method

Participants. Our total sample comprised 122 U.S. participants: 64 American adults recruited through Prolific (31 men, 32 women, $M_{age} = 37.08$, $SD_{age} = 14.46$, age range: 18-79) and 58 American children (30 boys, 28 girls, $M_{age} = 6.71$, $SD_{age} = 1.32$, age range: 6-10) recruited using convenience sampling (emailing participants from a university database). Children were tested online via Zoom between June and August 2021. The study was preregistered (https://aspredicted.org/YTP_XYL).

Procedure. Trained research assistants read aloud the instructions to each of the children in Study 1, while a slightly adjusted text version was presented to adults on Prolific (see Supplementary Materials for the exact script for each group).

First, participants were presented with a story. In the story, a magical snowfall from long ago randomly altered the cognitive capacity of both humans and monkeys, causing some to become much smarter and others to become significantly less cognitively capable. Over

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3 generations, the descendants of these humans and monkeys inherited these changes, resulting
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5 in a world where some individuals—both human and monkey—are exceptionally cognitively
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7 capable while others are not.
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10 For clarity, participants were shown an abstract image containing purple and green
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12 people and monkeys. They were informed that the green-colored person and monkey were
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14 both really smart, possessing the ability to think in a clever way, speak, solve difficult
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16 puzzles, and plan for the future; they were also told the green-colored person and monkey
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18 were exactly equally smart. Similarly, they were informed that the purple-colored person and
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20 monkey were both less smart—unable to speak, solve difficult puzzles, or plan for the future—
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22 and were told that they were equally less smart. The colors were counterbalanced across
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24 participants. Additionally, participants were informed that both the really smart and less
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26 smart people and monkeys all had an equal capacity for emotions and physical pain,
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28 regardless of their cognitive capacity or species, and that all of the people and monkeys in
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30 question could easily survive on their own. We ensured participants understood the details of
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32 this story with four comprehension checks; children or adults who failed any of these
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34 questions a second time (after being corrected once) were ultimately excluded from analyses
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36 (see Supplementary Materials for exact question text).
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42 After being presented with the story and survey instructions, participants responded to
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44 eight moral dilemmas. Six of these dilemmas involved a direct choice between two
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46 hypothetical individuals, where only one could be saved—a method successfully employed
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48 by Wilks et al. (2021). The individuals in these scenarios were either both humans, both
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50 monkeys, or a human and a monkey, with varying levels of cognitive capacity. Before each
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52 dilemma, participants were given the following prompt: *There are two boats here. Both of*
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54 *these boats are sinking. Unfortunately, no one on either of the boats is able to swim. But you*
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56 *can pick one boat to save.* Participants then made their decision by selecting one of three
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3 options, arranged from left to right: saving the former individual (coded as -1), choosing
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5 “cannot decide” (coded as 0), or saving the latter individual (coded as 1). Since these three
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7 choices reflect a logical continuum of preferences or tendencies, we will treat them as an
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9 interval scale consistent with previous research using similar dilemmas (Wilks et al., 2021).
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12 The dilemmas shown to participants were: 1) Really smart person vs. less smart
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14 monkey (i.e., the realistic case), 2) really smart person vs. really smart monkey, 3) really
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16 smart monkey vs. less smart person, 4) less smart person vs. less smart monkey, 5) really
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18 smart person vs. less smart person, and 6) really smart monkey vs. less smart monkey.
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21 Participants were also asked two additional questions. First, in an attention check
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23 question, participants chose whether to save one person or 10 plates; participants who chose
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25 the plates were excluded from the analyses. Second, participants were presented with an
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27 additional dilemma asking them to save either a really smart person or a super smart monkey
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29 with greater cognitive capacity than any person would have. The above dilemmas (including
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31 the attention check) were presented in randomized order, besides the additional super smart
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33 monkey dilemma, which was always presented last. The visual location of the options
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35 (left/right) was also counterbalanced.
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40 After completing all eight moral dilemmas, participants responded to the Speciesism
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42 Scale (Caviola et al., 2019; McGuire et al., 2023), which included statements like “Morally,
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44 animals always count for less than humans.” Results from this measure are reported in the
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46 Supplementary Materials. Participants also answered demographic questions—children
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48 provided their age and gender, while adults reported their age, gender, education level, and
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50 political orientation. Children received either a small toy (if tested in person on the university
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52 campus) or a \$5 Amazon gift card (if tested via video call), while adults were paid \$2 for
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54 completing the survey via Prolific.
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3 **Open Science.** Reports of all measures, manipulations, and exclusions, as well as all
4 data, analysis code, and experimental materials for all studies are available for download at
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6 https://osf.io/htu2d/?view_only=71b49831cb954c658823d0a4e0410ea5
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9 10 **Results**

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12 First, we examined the inter-species dilemmas. Consistent with previous research
13 (Wilks et al., 2021), children were less likely than adults to prioritize humans over animals
14 (see Table 1 for statistics and Figure 1 for choice percentages). This pattern persisted across
15 scenarios where the cognitive capacity levels of the person and monkey varied: whether the
16 monkey was much more cognitively capable than the person, equally cognitively capable, or
17 less cognitively capable. For example, children were less likely than adults to prioritize a
18 really smart person over either a less smart monkey (i.e., the “realistic” case) or an equally
19 smart monkey. Even in the scenario where the monkey was “super smart” (more cognitively
20 capable than any person), children prioritized the person less often than adults did. Further,
21 children were less likely than adults to prioritize a less smart person over a less smart
22 monkey, and while they were also less likely to prioritize a less smart person over a really
23 smart monkey, this effect was not statistically significant.
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40 Next, we examined the intra-species dilemmas. Here, children were less likely than
41 adults to prioritize a smarter individual over a less smart individual. This was true for both
42 the human and monkey intra-species comparisons (see Supplementary Materials for full
43 analyses). Adults significantly prioritized the really smart person over the less smart person
44 ($t(63) = -6.77, p < .001, d = 0.84$), as well as the really smart monkey over the less smart
45 monkey ($t(63) = -6.69, p < .001, d = 0.84$). In contrast, children did not show a significant
46 tendency to prioritize the really smart being over the less smart being in either the person
47 ($t(57) = 0, p = 1$) or monkey comparisons ($t(57) = -1.63, p = .11, d = 0.21$).
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All key results remained significant after applying Bonferroni corrections for multiple comparisons (see Supplementary Materials section 1.7). This includes the core findings that U.S. adults were more speciesist than U.S. children and that adults prioritized higher cognitive capacity more than children. No preregistered comparisons lost significance after correction.

Table 1

Mean choices of U.S. children and U.S. adults (Study 1)

	Adults	Children	<i>t</i> -value	<i>p</i> -value	<i>d</i>
Really Smart Person vs. Less Smart Monkey	-0.77 (0.50)	0.12 (0.92)	6.53	< .001	1.22
Really Smart Person vs. Really Smart Monkey	-0.62 (0.55)	-0.14 (0.76)	4.02	< .001	0.74
Really Smart Person vs. Super Smart Monkey	-0.20 (0.84)	0.41 (0.84)	4.06	< .001	0.74
Less Smart Person vs. Less Smart Monkey	-0.58 (0.61)	0.03 (0.84)	4.57	< .001	0.84
Less Smart Person vs. Really Smart Monkey	-0.16 (0.86)	0.05 (0.93)	1.28	.202	0.23
Really Smart Person vs. Less Smart Person	-0.50 (0.59)	0.00 (0.90)	3.95	< .001	0.66
Really Smart Monkey vs. Less Smart Monkey	-0.52 (0.62)	-0.19 (0.89)	2.33	.022	0.43

Note. Participants' responses were recoded so that -1 always indicates saving the former individual (the person or the more cognitively capable individual), 0 indicates "can't decide," and 1 indicates saving the latter individual (the monkey or the less cognitively capable individual). Negative scores reflect a stronger preference for saving the person over the monkey (or the more cognitively capable individual), while positive scores reflect a stronger preference for saving the monkey over the person (or the less cognitively capable individual). The values under the "Adults" and "Children" columns represent mean recoded choices, with standard deviations shown in parentheses. Inter-species comparisons (assessing speciesism) are highlighted in green, while intra-species comparisons

(assessing discrimination based on cognitive capacity) are highlighted in yellow. All *t*-values use 120 degrees of freedom.

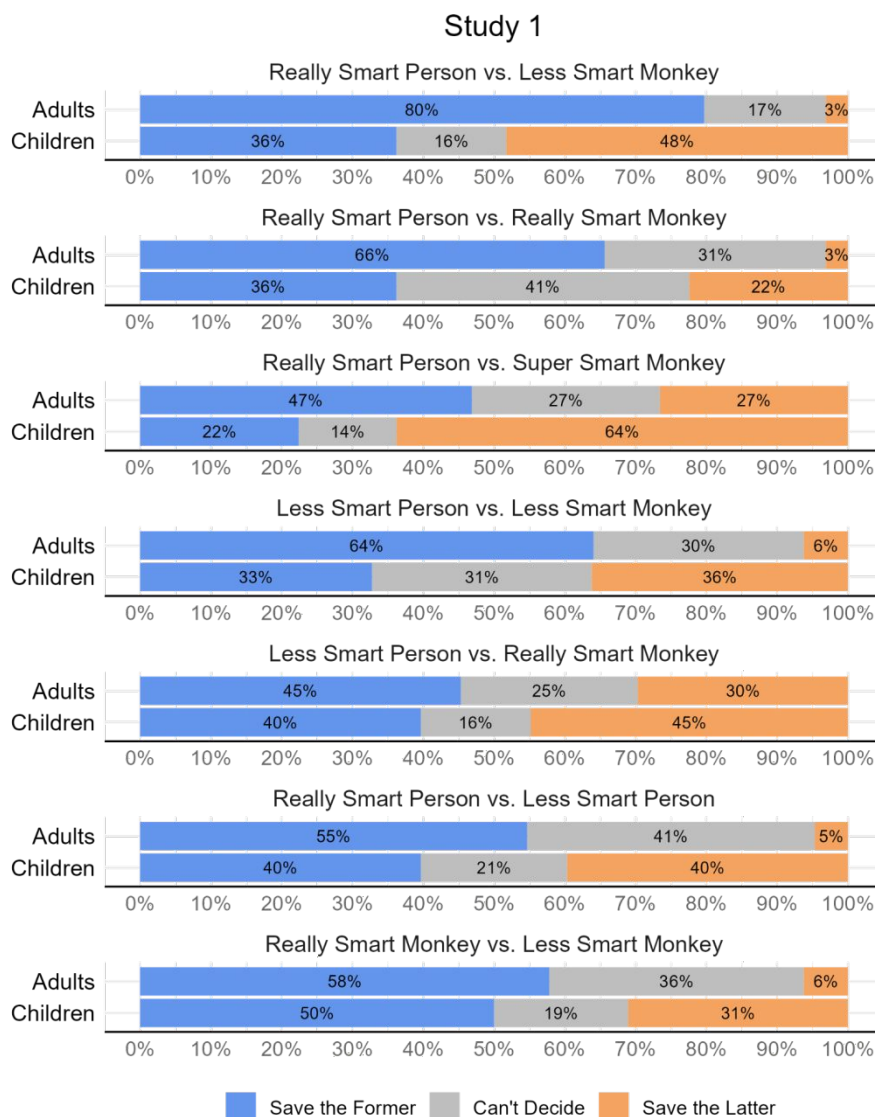


Figure 1. The percentage of children and adults in Study 1 choosing to save the former individual (a person or smarter individual; blue) over the latter individual (monkey or less smart individual; orange).

Study 2: Spanish Samples

In Study 2, we aimed to replicate our results in adult and children samples from Spain. Our aim was to investigate whether the patterns of results are robust across these two

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3 Western cultures. The design mirrored that of Study 1 but included six additional dilemmas
4 that involved comparing one being against five beings. The purpose of these additional
5 dilemmas was to introduce a third factor (small vs. large number of individuals) to amplify
6 the contrast between the cognitive capacity and species factors.
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11 **Method**

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14 **Participants.** Our total sample comprised 185 Spanish participants: 91 Spanish adults
15 (52 women, 38 men, $M_{age} = 34.09$, $SD_{age} = 12.65$, age range: 18-67) and 94 Spanish children
16 (52 girls, 42 boys, $M_{age} = 8.47$, $SD_{age} = 0.89$, age range: 6-10). Both samples were recruited
17 via convenience sampling and tested in person at local parks and a primary school. The study
18 was preregistered (https://aspredicted.org/THJ_HVB).
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26 **Procedure.** The procedure in Study 2 closely mirrored that of Study 1, with all
27 materials translated into Spanish using the standard back-translation method (Brislin, 1970),
28 in which materials are translated into the target language and then independently translated
29 back into the original language to check for consistency and accuracy. Participants were told
30 the same story about magical snow affecting the cognitive capacity of humans and monkeys
31 who lived long ago and were asked identical comprehension check questions as in Study 1.
32 As in Study 1, any participant who failed a comprehension check question twice (providing
33 an incorrect answer after failing once and being corrected) was excluded. After completing
34 all instructions and comprehension checks, participants were asked which being or group of
35 beings they would save in hypothetical moral dilemmas, either pitting humans against
36 monkeys or more cognitively capable beings against less cognitively capable beings of the
37 same species. The primary difference between Study 1 and Study 2 is that Study 2 added six
38 additional tasks for a total of thirteen dilemmas rather than seven. In these additional
39 dilemmas, participants chose whether to save one person (or smarter individual) or five
40 monkeys (or less smart individuals). We included these to explore whether the effects
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3 observed in the 1-vs-1 scenarios would also appear in dilemmas where the less popular type
4 of individual (e.g., animals or lower cognitive capacity) contains a larger number of such
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6 individuals.
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10 The dilemmas shown to participants are displayed in the column names of Table 2.
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12 The dilemmas included the same seven 1-vs-1 scenarios as in Study 1. Additionally, there
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14 were six 1-vs-5 scenarios: one really smart person vs. five less smart monkeys, one less smart
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16 person vs. five really smart monkeys, one really smart person vs. five really smart monkeys,
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18 one less smart person vs. five less smart monkeys, one really smart person vs. five less smart
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20 people, and one really smart monkey vs. five less smart monkeys. As in Study 1, participants
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22 were asked an additional attention check question in which they chose whether to save one
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24 person or 10 plates. All the dilemmas were presented in randomized order, with the visual
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26 location (left/right) of beings or groups of beings counterbalanced.
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31 After responding to all moral dilemmas, adult participants completed the Spanish
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33 adaptation of the Speciesism Scale (Caviola et al., 2019; Suárez-Yera et al., 2021) and
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35 responded to the same demographic questions as in Study 1. **Results from the Speciesism**
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37 **Scale are reported in the Supplementary Materials.** Children were given a small prize
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39 (dinosaur gel pen). No incentives were given to adults.
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42 **Results**

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44 First, we examined the inter-species dilemmas. Study 2 replicated the finding that
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46 children showed a significantly weaker tendency than adults to prioritize humans over
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48 monkeys in inter-species 1-vs-1 dilemmas (see Table 2 for statistics and Figure 2 for choice
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50 percentages). Children were less likely than adults to save a less smart person over both a
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52 really smart monkey and a less smart monkey. They were also less likely to save a really
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54 smart person over both a really smart monkey and a less smart monkey. Finally, children
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56 were much more likely than adults to save a super smart monkey—whose cognitive capacity
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3 exceeded any human's—over a really smart human. In the four inter-species 1-vs-5
4 dilemmas, there were no significant differences between adults and children. However,
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6 descriptively, children showed a weaker tendency than adults to save the one person over the
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8 five monkeys in all four dilemmas.
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12 Next, we examined the intra-species dilemmas. Both adults and children showed a
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14 significant tendency to prioritize the smarter individual over the less smart one in both the
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16 human-human and monkey-monkey dilemmas ($p < .001$ in all cases; see Supplementary
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18 Materials for full analyses). Although there was no significant difference between children's
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20 and adults' responses in these 1-vs-1 intra-species dilemmas (unlike in Study 1; see Table 2),
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22 children still exhibited a descriptively weaker tendency to prioritize the smarter individual.
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24 The pattern differed for the intra-species 1-vs-5 dilemmas. Adults showed a significant
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26 tendency to prioritize the larger number of less smart individuals over the one really smart
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28 individual in both the dilemmas featuring humans ($t(90) = 6.71, p < .001, d = 0.70$) and
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30 monkeys ($t(90) = 5.62, p < .001, d = 0.59$). In contrast, children did not exhibit this tendency,
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32 with non-significant results in both the dilemmas featuring humans ($t(93) = 1.72, p = .09, d =$
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34 0.18) and monkeys ($t(93) = 0.63, p = .53, d = 0.07$).
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40 All key results supporting our main conclusions remained significant after Bonferroni
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42 corrections (see Supplementary Materials section 2.7). However, a few comparisons—mostly
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44 involving children's responses to dilemmas featuring less cognitively capable or multiple
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46 individuals—lost significance after correction. These changes do not affect the main
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48 conclusions regarding developmental differences in speciesism or sensitivity to cognitive
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50 capacity.
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54 Table 2

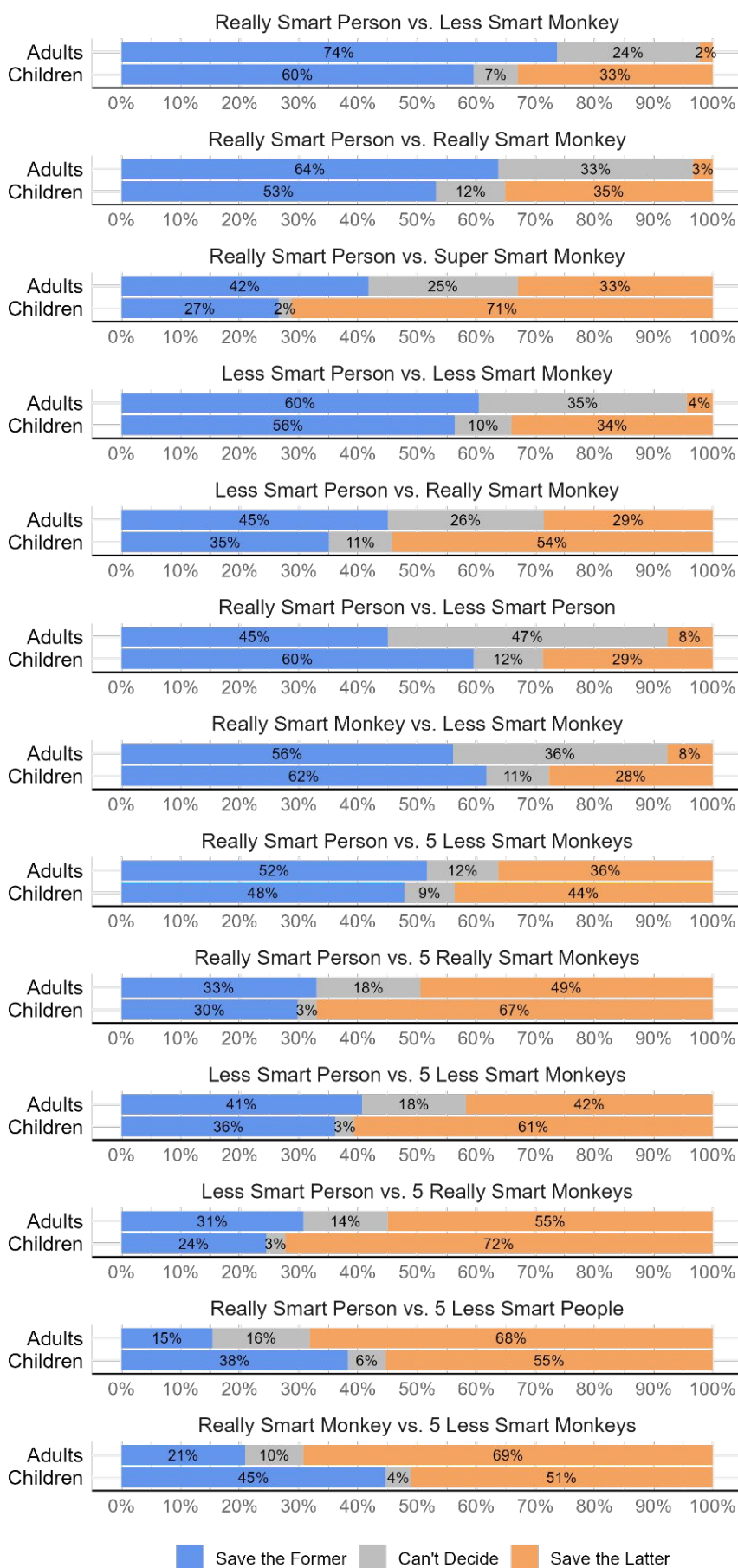
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57 *Mean choices of Spanish children and Spanish adults (Study 2)*
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	Adults	Children	<i>t</i> -value	<i>p</i> -value	<i>d</i>
Really Smart Person vs. Less Smart Monkey	-0.71 (0.50)	-0.27 (0.93)	4.10	< .001	0.60
Really Smart Person vs. Really Smart Monkey	-0.60 (0.56)	-0.18 (0.93)	3.78	< .001	0.55
Really Smart Person vs. Super Smart Monkey	-0.09 (0.86)	0.45 (0.89)	4.15	< .001	0.61
Less Smart Person vs. Less Smart Monkey	-0.56 (0.58)	-0.22 (0.93)	2.97	.003	0.43
Less Smart Person vs. Really Smart Monkey	-0.16 (0.85)	0.19 (0.93)	2.73	.007	0.40
Really Smart Person vs. Less Smart Person	-0.37 (0.63)	-0.31 (0.89)	0.58	.565	0.08
Really Smart Monkey vs. Less Smart Monkey	-0.48 (0.64)	-0.34 (0.89)	1.26	.209	0.18
Really Smart Person vs. 5 Less Smart Monkeys	-0.15 (0.93)	-0.04 (0.96)	0.80	.424	0.12
Really Smart Person vs. 5 Really Smart Monkeys	0.16 (0.90)	0.37 (0.92)	1.56	.121	0.23
Less Smart Person vs. 5 Less Smart Monkeys	0.01 (0.91)	0.24 (0.96)	1.70	.091	0.25
Less Smart Person vs. 5 Really Smart Monkeys	0.24 (0.90)	0.48 (0.86)	1.83	.069	0.27
Really Smart Person vs. 5 Less Smart People	0.53 (0.75)	0.17 (0.96)	2.83	.005	0.41
Really Smart Monkey vs. 5 Less Smart Monkeys	0.48 (0.82)	0.06 (0.98)	3.16	.002	0.46

Note. Participants' responses were recoded as follows: -1 indicates saving the former individual (a person or the smarter individual), 0 indicates "can't decide," and 1 indicates saving the latter individual(s) (monkey(s) or the less smart individual(s)). Negative scores reflect a greater preference for saving the person over the monkey(s) (or the more cognitively capable individual), while positive scores reflect a greater preference for saving the monkey(s) over the person (or the less cognitively capable individual). The values in the "Adults" and "Children" columns represent mean recoded choices, with standard deviations shown in parentheses. Inter-species comparisons (assessing

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3 speciesism) are highlighted in green, while intra-species comparisons (assessing discrimination based
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5 on cognitive capacity) are highlighted in yellow. All t -values use 183 degrees of freedom.
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Study 2



Save the Former Can't Decide Save the Latter

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3 **Figure 2.** The percentage of Spanish children and adults in Study 2 choosing to save the
4 former individual (person or smarter individual; blue) over the latter individual(s) (monkey(s))
5 or less smart individual(s); orange).
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10 11 12 **General Discussion**

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15 In this article, we investigated whether children's greater concern for animals stems
16 from a weaker speciesist bias or a lower emphasis on cognitive capacity. By examining
17 scenarios where species and cognitive capacity diverged, we found that while both children
18 and adults generally prioritize humans, children do so to a lesser extent. Notably, even when
19 animals possessed cognitive capacities equal to or greater than humans, both U.S. and
20 Spanish children were still less likely than adults to prioritize humans. This suggests that
21 children place less moral weight on species membership alone. In other words, our findings
22 indicate that children are less speciesist than adults.
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35 **Children value mere species membership less than adults do**

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38 Connecting our findings to the hypotheses outlined in the introduction, our results
39 support the *late speciesism hypothesis*. The strongest evidence comes from the 1-vs-1 inter-
40 species dilemmas, where adults in both the U.S. and Spain prioritized humans over monkeys
41 more than children did, regardless of cognitive capacity. At the same time, these findings
42 contradict the *late higher cognitive capacity valuing hypothesis* in its strict form, as it would
43 predict no age-related differences in how equally capable humans and animals are valued.
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52 Two direct tests of speciesism come from the comparisons of “really smart person vs.
53 really smart monkey” and “less smart person vs. less smart monkey.” The beings in both of
54 these dilemmas were described as equally cognitively capable, equally capable of pain and
55 pleasure, and equally able to survive on their own. But despite this, both U.S. and Spanish
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3 adults strongly prioritized saving the person over the monkey in both instances. By contrast,
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5 U.S. and Spanish children either did not prioritize saving the person over the monkey or had a
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7 weaker tendency to do so.
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10 11 12 **Both children and adults value higher cognitive capacity** 13

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15 We also found that both children and adults tended to prioritize more cognitively
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17 capable individuals over those with lower cognitive capacity. This directly contradicts the
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19 *early lower capacity valuing hypothesis*, which would predict that children should assign less
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21 value to animals as their cognitive capacities increase.
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25 To explore this, we can compare children's and adults' responses in the 1-vs-1 intra-
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27 species dilemmas (i.e., trade-offs where the only difference between beings is their cognitive
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29 capacity level, such as "really smart monkey vs. less smart monkey"). For both U.S. and
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31 Spanish participants, we found that adults clearly prefer to prioritize the more cognitively
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33 capable over the less cognitively capable individual of the same species. While children also
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35 showed this preference, it was significantly weaker than those of U.S. adults, though not of
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37 the Spanish adults.
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41 We can also compare responses across inter-species dilemmas to infer how children
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43 and adults weigh cognitive capacity. This is in particular useful if two dilemmas pit the same
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45 type of individuals against each other with the only difference being that one individual has a
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47 different cognitive capacity level. For instance, we can compare participants' responses in the
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49 "really smart person vs. less smart monkey" dilemma to their responses in the "really smart
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51 person vs. really smart monkey" dilemma to see whether participants have a weaker tendency
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53 to save the person when the monkey is more cognitively capable. We describe these analyses
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55 in more detail in the Supplementary Materials sections 1.3 and 2.3. We generally find that
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57 participants' tendency to prioritize one individual over one (or five) others changes if the
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3 cognitive capacity level of one type of individual changes (but all other factors are held
4 constant). Specifically, we find that Spanish children and adults both prioritize more
5 cognitively capable individuals over less cognitively capable individuals and that they do so
6 to similar degrees. We also find that while U.S. adults similarly prioritize more cognitively
7 capable individuals, U.S. children had a weaker tendency (compared to U.S. adults) to
8 prioritize more cognitively capable individuals (cf. Kozachenko & Piazza, 2024).
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11 Overall, both types of analyses described above support the view that adults and
12 children tend to value higher cognitive capacity. This tendency seems roughly equally strong
13 in adults and children, although there is weak evidence that U.S. children are more egalitarian
14 with regard to cognitive capacity. It is possible, therefore, that children may be less inclined
15 than adults to associate higher cognitive capacity with higher moral status. We consider this
16 an area for future investigation.
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19 Moreover, we did not find any clear difference in how strongly participants (both
20 children and adults) valued cognitive capacity as a function of species category—i.e.,
21 whether they prioritized cognitive capacity more or less in humans or monkeys (See
22 Supplementary Materials sections 1.4 and 2.4). This is noteworthy given that previous studies
23 found weak, albeit non-robust, evidence suggesting adults have a stronger tendency to
24 prioritize cognitive capacity in animals compared to humans (Caviola et al., 2022). Other
25 work suggests that children, but not adults, differentially prioritize cognitive capacity
26 information when making moral judgments about different categories of animals
27 (Kozachenko & Piazza, 2024). Future research is needed to tease apart the nuances of how
28 perceived cognitive capacity may interact with species membership.
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Developmental trends across U.S. and Spanish cultures

The key findings were relatively stable across the two countries (Supplementary Materials section 3.2). That is, U.S. adults provided roughly the same responses as Spanish adults, and U.S. children provided roughly the same responses as Spanish children. Furthermore, the differences between adults and children showed similar patterns in the U.S. and Spain. This is in line with a previous study that showed that Polish children also have a weaker tendency to prioritize humans over animals than Polish adults do (Paruzel-Czachura et al., 2024). Given that these cultures are all relatively similar (e.g., Western), these findings don't rule out that moral attitudes towards animals could differ widely in different (e.g., non-Western) cultures. We consider understanding the effect of culture on the development of our speciesist tendencies an important direction for future research.

Limitations and future research

While we manipulated two key factors that are widely taken to be important in shaping moral judgments—species and cognitive capacity—we did not account for other factors that could also plausibly impact such judgments. These include perceived goodness (Neldner & Wilks, 2022), harmfulness (Piazza et al., 2014), disgustingness (Henseler Kozachenko & Piazza, 2021), vulnerability (Hussar & Harris, 2018), similarity to humans (Miralles et al., 2019), lifespan, and wellbeing. We encourage future research to systematically investigate the relative impact of these additional factors on children's and adults' moral attributions.

One open question is whether lower cognitive capacities lead children or adults to view beings as more vulnerable, and whether this, in turn, affects their moral judgments. In our study, we attempted to control for perceived vulnerability by explicitly stating that all

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3 individuals—regardless of cognitive capacity—were equally incapable of helping
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5 themselves. Overall, our findings do not support the hypothesis that children assign greater
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7 moral weight to animals because they view them as more vulnerable due to lower cognitive
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9 capacities. In particular, we generally found that both children and adults prioritized beings
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11 with higher cognitive capacities. However, one finding raises the possibility that perceived
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13 vulnerability may still play a role in children in particular. In Study 1, U.S. children were
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15 slightly more likely (although not statistically significantly) to prioritize a less cognitively
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17 capable monkey over a highly cognitively capable human than they were to prioritize a
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19 highly cognitively capable monkey over that same human. This might suggest that they
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21 perceived the less cognitively capable monkey as especially vulnerable. That said, this pattern
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23 was not replicated in Study 2 with Spanish children, nor was it observed in the analogous
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25 comparison involving a super smart monkey. Thus, while our study was not designed to test
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27 vulnerability directly, and our results overall do not support a simple vulnerability-based
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29 explanation, we cannot rule out that perceived vulnerability may have influenced some
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31 decisions. More broadly, it is likely to be a relevant factor in real-world moral judgments.
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33 Supporting this, prior research suggests that children judge moral transgressions against
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35 animals as more severe than those against humans, potentially because they see animals as
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37 especially vulnerable (Hussar & Harris, 2018). We hope future research will more directly
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39 examine how perceived vulnerability interacts with cognitive capacity, species membership,
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41 and cultural context in shaping moral concern—for example, by experimentally manipulating
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43 perceptions of vulnerability across different cultural settings.
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51 Another direction for future work is to examine the role of emotional proximity and
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53 early exposure to animals. Children frequently form close bonds with pets, visit zoos, and
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55 watch media that portrays animals as lovable, emotionally rich beings. Such experiences may
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57 contribute to stronger emotional connections with animals, potentially shaping their moral
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3 preferences in favor of animals over humans. This may partly explain developmental
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5 differences in moral prioritization. Future studies could investigate whether the frequency or
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7 emotional intensity of child–animal interactions predicts moral concern for animals.
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10 A limitation of our studies is the reliance on hypothetical dilemmas, which may not
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12 fully reflect real-world attitudes or behaviors. The artificial dilemmas used in our studies
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14 might have confounding factors or fail to accurately reflect people's attitudes. It's also
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16 possible that children might generally be more inclined to take an egalitarian approach
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18 toward both options presented in such dilemmas, regardless of the specific features of the
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20 options. Additionally, variation in sampling and procedures (e.g., online surveys for adults vs.
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22 face-to-face or Zoom testing for children) may have influenced responses due to factors like
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24 social desirability or context, impacting comparability. Future research could address this by
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26 standardizing methods across groups.
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30 The lack of significant differences between children and adults in the 1-vs-5 inter-
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32 species dilemmas is difficult to interpret. These dilemmas involve trade-offs between three
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34 factors: cognitive capacity, species category, and the number of individuals. These factors
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36 may interact in non-linear ways, and these interaction effects could differ between adults and
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38 children. While it is beyond the scope of the current study to provide insight here, we think it
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40 would be valuable to explore in future research.
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47 **Conclusion**

48 Children in our U.S. and Spanish samples were less likely than adults to prioritize
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50 humans over animals, even when both had the same cognitive capacity. This suggests that
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52 speciesism—the tendency to favor individuals solely based on species membership—
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54 strengthens as children grow older and transition into adulthood.
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Supplementary Materials for Becoming Speciesist: How Children and Adults Differ in Valuing Animals by Species and Cognitive Capacity

Study 1

1.1 Participants

We preregistered (https://aspredicted.org/YTP_XYL) that we would recruit participants until we obtained usable data from 64 children. However, since we recruited participants in batches we ended up recruiting 75 children. Yet, 17 were excluded: nine for parental interference, seven for failing comprehension checks, and one for experimenter error. As such, our final sample comprised 58 children. All results remained robust when we analyze data with no exclusions (see Supplementary Materials section 1.6).

1.2 Results of one-sample t -tests

To separately test whether U.S. children and adults significantly prioritized people over monkeys and/or more cognitively capable beings over less cognitively capable beings, we conducted one-sample t -tests against the scale midpoint for each item, reported in Table S1. Cohen's d was used to measure the size of the effects. All analyses in Table S1 were preregistered.

Table S1

One-sample t -tests against the scale midpoint (0) using U.S. samples

	Sample	M (SD)	<i>t</i> -value	<i>p</i> -value	<i>d</i>
Really Smart Person vs. Less Smart Monkey	Children	0.12 (0.92)	1.00	.322	0.13
	Adults	-0.77 (0.50)	-12.36	< .001	1.54
Really Smart Person vs. Really Smart Monkey	Children	-0.14 (0.76)	-1.38	.172	0.18
	Adults	-0.62 (0.55)	-9.10	< .001	1.14
Really Smart Person vs. Super Smart Monkey	Children	0.41 (0.84)	3.76	< .001	0.49
	Adults	-0.20 (0.84)	-1.94	.057	0.24
Less Smart Person vs. Less Smart Monkey	Children	0.03 (0.84)	0.31	.755	0.04
	Adults	-0.58 (0.61)	-7.56	< .001	0.94
Less Smart Person vs. Really Smart Monkey	Children	0.05 (0.93)	0.42	.672	0.06
	Adults	-0.16 (0.86)	-1.46	.150	0.18
Really Smart Person vs. Less Smart Person	Children	0.00 (0.90)	0	1	NA
	Adults	-0.50 (0.59)	-6.77	< .001	0.84
Really Smart Monkey vs. Less Smart Monkey	Children	-0.19 (0.89)	-1.63	.109	0.21
	Adults	-0.52 (0.62)	-6.69	< .001	0.84

Note. Participants' responses are recoded as -1 = saving the former individual (person or smarter individual), 0 = can't decide, 1 = saving the latter individual (monkey or less smart individual). Thus, negative scores indicate a greater preference for saving the person over the monkey (or the more cognitively capable of the two individuals in question), while positive scores indicate a greater preference for saving the monkey over the person (or the less smart of the individuals in question). Values in the "M (SD)" column are mean recoded choices, with standard deviations in parentheses. All *t*-values for children use 57 degrees of freedom, and all *t*-values for adults use 63 degrees of freedom.

1.3 Comparing responses across inter-species dilemmas

We were also interested in how strongly children and adults prioritized cognitive capacity as measured by the differences in their responses across dilemmas. For instance, if a participant responded that they would save a really smart person over a less smart monkey but couldn't decide whether to save a really smart person over a really smart monkey, this could indicate they have a preference for saving more cognitively capable beings over less cognitively capable beings. In an exploratory analysis, we first created scores for 1) the difference between participants' responses to the "really smart person vs. really smart monkey" and "really smart person vs. less smart monkey" and 2) the difference between participants' responses to the "less smart person vs. really smart monkey" and "less smart person vs. less smart monkey" dilemmas. We then added these difference scores together to get a total measure of how much participants prioritized more cognitively capable beings over less cognitively capable beings. On this measure, a score of -4 would indicate a participant prioritized the person over the really smart monkey but prioritized the less smart monkey over the person in both cases, while a score of 4 would indicate the opposite. Thus, higher scores indicate a stronger prioritization of more cognitively capable beings, while lower scores indicate a stronger prioritization of less cognitively capable beings.

Using one-sample t-tests against the midpoint of the scale for this combined measure, we found that U.S. adults prioritized more cognitively capable beings significantly more than they prioritized less cognitively capable beings ($M = 0.56$, $t(63) = 3.95$; $p < .001$, $d = 0.49$). In contrast, U.S. children did not prioritize more cognitively capable beings significantly more than they prioritized less cognitively capable beings ($M = -0.24$, $t(63) = -1.04$; $p = .303$, $d = 0.14$). The largest difference between two individual scores was the difference between children's responses

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3 to the “really smart person vs. really smart monkey” ($M = -0.14$) and “really smart person vs. less
4 smart monkey” ($M = 0.12$) items; however, a paired t-test revealed that this difference was not
5 statistically significant ($t(57) = 1.63, p = .108$). Moreover, changes in cognitive capacity affected
6 adults’ judgments significantly more than they affected children’s judgments ($t(120) = 2.95, p =$
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1.4 Comparing responses across intra-species dilemmas

To test whether participants’ tendency to prioritize based on cognitive capacity depends on the species of the individuals in question, we conducted an exploratory analysis using the intra-species items. We first created a score for the difference between the two intra-species items (“really smart person vs. less smart person” and “really smart monkey vs. less smart monkey”). Scores on this measure ranged from -2 (indicating a participant prioritized the really smart person, but the less smart monkey, i.e. they valued cognitive capacity more in humans) to 2 (indicating a participant prioritized the less smart person, but the really smart monkey, i.e. they valued cognitive capacity more in monkeys).

Based on this measure, neither U.S. adults ($M = 0.02, t(63) = 0.33; p = .742, d = 0.04$) nor U.S. children ($M = 0.19, t(57) = 1.90; p = .062, d = 0.25$) weighed cognitive capacity more in the dilemma involving monkeys than in the dilemma involving people. There also was not a significant difference in this score between children and adults ($t(120) = 1.58, p = .119, d = 0.29$).

1.5 Results of the Speciesism Scale

As mentioned in the main text, participants completed the Speciesism Scale (Caviola et al., 2019; McGuire et al., 2023) after answering all moral dilemma items in Study 1. To test

whether participants' scores on the scale predicted their responses to the main items, we constructed a measure of total speciesism by averaging the 5 inter-species comparisons (the first 5 rows of Table S1), yielding a score between -1 (always chose to save the person) and 1 (always chose to save the monkey). In an exploratory analysis, we found that U.S. children's standardized scores on the Speciesism Scale (ranging from 0 to 42, with 42 indicating the highest degree of speciesism; $M = 16.59$, $SD = 5.51$) did not predict their tendency to prioritize people over monkeys ($b < 0.01$, $SE = 0.13$, $t(56) = 0.04$, $p = .972$). Repeating the analysis for adults, we found that U.S. adults' responses to the inter-species moral dilemmas in Study 1 were significantly predicted by their total score on the Speciesism Scale ($M = 15.95$, $SD = 7.17$), with participants who scored higher exhibiting a stronger prioritization of people over monkeys across dilemmas ($b = -0.37$, $SE = 0.12$, $t(62) = -3.16$, $p = .002$).

1.6 Results without exclusions

We repeated the analyses in Study 1 without performing any of the exclusions for failed comprehension checks, parental interference, or experimenter error mentioned in the main text. This yielded a final sample of 151 participants containing 75 children (34 boys, 41 girls, $M_{age} = 6.52$, $SD_{age} = 1.34$) and 76 adults (36 men, 39 women, $M_{age} = 38.45$, $SD_{age} = 14.48$). Table S2 visualizes the results of the independent-samples t-tests in Study 1 absent these exclusions. All of the results are consistent with those reported in the main text.

Table S2

Mean choices of U.S. children and U.S. adults (Study 1) without exclusions

	Adults	Children	t-value	p-value	d
Really Smart Person vs. Less Smart Monkey	-0.80 (0.46)	0.03 (0.94)	6.85	< .001	1.13

Really Smart Person vs. Really Smart Monkey	-0.61 (0.61)	-0.12 (0.78)	4.23	< .001	0.69
Really Smart Person vs. Super Smart Monkey	-0.25 (0.85)	0.42 (0.84)	4.83	< .001	0.79
Less Smart Person vs. Less Smart Monkey	-0.61 (0.61)	0.01 (0.84)	5.16	< .001	0.85
Less Smart Person vs. Really Smart Monkey	-0.21 (0.87)	0.03 (0.93)	1.62	.108	0.26
Really Smart Person vs. Less Smart Person	-0.53 (0.58)	-0.03 (0.91)	4.01	< .001	0.66
Really Smart Monkey vs. Less Smart Monkey	-0.49 (0.64)	-0.17 (0.89)	2.48	.014	0.40

Note. Participants' responses are recoded as -1 = saving the former individual (person or smarter individual), 0 = can't decide, -1 = saving the latter individual (monkey or less smart individual). Thus, negative scores indicate a greater preference for saving the person over the monkey (or the more cognitively capable of the two individuals in question), while positive scores indicate a greater preference for saving the monkey over the person (or the less smart of the individuals in question). Values in "Adults" and "Children" columns are mean recoded choices, with standard deviations in parentheses. All *t*-values use 149 degrees of freedom.

1.7 Results with Bonferroni corrections

Although we did not preregister any corrections for multiple comparisons in our analyses for Study 1, for robustness, we repeated the analyses in Study 1 using Bonferroni corrections. Seven one-sample *t*-tests against the midpoint of the scale (0; *I cannot decide*) were conducted for the samples of children and adults, separately, five testing participants' levels of speciesism and two testing participants' prioritization of more cognitively capable beings over less cognitively capable beings. Similarly, seven independent samples *t*-tests were conducted to compare the difference between the children and adult samples: five testing participants' levels of speciesism and two testing participants' prioritization of more cognitively capable beings over

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3 less cognitively capable beings. Thus, after applying Bonferroni corrections to correct the
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5 experiment-wise error rate, all analyses using the inter-species dilemmas were considered
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7 significant when $p < .01$ (i.e., $.05/5$) and all analyses using the intra-species dilemmas were
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9 considered significant when $p < .025$ (i.e., $0.05/2$).
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12 For the results of the independent samples t-tests after performing Bonferroni corrections,
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14 compare the p -values in the first five rows of Table 1 in the main text to the adjusted significance
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16 level of $p < .01$, and compare the last two rows to the adjusted significance level of $p < .025$.
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18 Note that the results of these analyses are all unaltered by Bonferroni corrections.
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21 Similarly, for the results of the one-sample t-tests after performing Bonferroni
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23 corrections, compare the p -values in the first five rows of Table S1 in section 1.2 of the
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25 Supplementary Materials to the adjusted significance level of $p < .01$, and compare the last two
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27 rows to the adjusted significance level of $p < .025$. These analyses are likewise all unaltered by
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29 Bonferroni corrections.
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Study 2

2.1 Participants

We collected data from 121 children aged 6 to 10 years but excluded 15 for failing an attention check question, 10 for failing comprehension check questions, and two for being outside of the age range, resulting in a final sample of 94 children. We collected data from 103 adults but excluded five for failing an attention check question, five for failing comprehension check questions, and two for being born later than 2006 (making them younger than 18), yielding a final sample of 91 adults (52 women, 38 men, $M_{age} = 34.09$, $SD_{age} = 12.65$). Note that since we collected participants in batches, we recruited more than the 70 adults and 70 children we preregistered (https://aspredicted.org/THJ_HVB). All results remained robust when we analyzed data with no exclusions (see Supplementary Materials section 2.6).

2.2 Results of one-sample t-tests

To separately test whether Spanish children and adults significantly prioritized people over monkeys and/or more cognitively capable beings over less cognitively capable beings, we conducted one-sample *t*-tests against the scale midpoint for each item, reported in Table S3. Cohen's *d* was used to measure the size of the effects. All analyses in Table S3 were preregistered.

Table S3

One-sample t-tests against the scale midpoint (0) using Spanish samples

	Sample	M (SD)	<i>t</i> -value	<i>p</i> -value	<i>d</i>
Really Smart Person vs.	Children	-0.27 (0.93)	-2.77	.007	0.29

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4	Less Smart Monkey	Adults	-0.71 (0.50)	-13.61	< .001	1.43
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7	Really Smart Person vs.	Children	-0.18 (0.93)	-1.89	.062	0.20
8						
9	Really Smart Monkey	Adults	-0.60 (0.56)	-10.38	< .001	1.09
10						
11						
12	Really Smart Person vs.	Children	0.45 (0.89)	4.88	< .001	0.88
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14	Super Smart Monkey	Adults	-0.09 (0.86)	-0.97	.335	0.10
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18	Less Smart Person vs.	Children	-0.22 (0.93)	2.33	.022	1.78
19						
20	Less Smart Monkey	Adults	-0.56 (0.58)	-2.97	.003	0.43
21						
22						
23						
24	Less Smart Person vs.	Children	0.19 (0.93)	1.99	.049	0.21
25						
26	Really Smart Monkey	Adults	-0.16 (0.85)	-1.86	.067	0.19
27						
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29	Really Smart Person vs.	Children	-0.31 (0.89)	-3.35	.001	0.35
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31	Less Smart Person	Adults	-0.37 (0.63)	-5.69	< .001	0.60
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35	Really Smart Monkey vs.	Children	-0.34 (0.89)	-3.72	< .001	0.38
36						
37	Less Smart Monkey	Adults	-0.48 (0.64)	-7.22	< .001	0.76
38						
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41	Really Smart Person vs.	Children	-0.04 (0.96)	-0.43	.669	0.04
42						
43	5 Less Smart Monkeys	Adults	-0.15 (0.93)	-1.58	.118	0.17
44						
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46	Really Smart Person vs.	Children	0.37 (0.92)	3.94	< .001	0.41
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48	5 Really Smart Monkeys	Adults	0.16 (0.90)	1.75	.083	0.18
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52	Less Smart Person vs.	Children	0.24 (0.96)	2.48	.015	0.26
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54	5 Less Smart Monkeys	Adults	0.01 (0.91)	0.11	.909	0.01
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4	Less Smart Person vs.	Children	0.48 (0.86)	5.37	< .001	0.55
5						
6	5 Really Smart Monkeys	Adults	0.24 (0.90)	2.57	.012	0.27
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10	Really Smart Person vs.	Children	0.17 (0.96)	1.72	.088	0.18
11						
12	5 Less Smart People	Adults	0.53 (0.75)	6.71	< .001	0.70
13						
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16	Really Smart Monkey vs.	Children	0.06 (0.98)	0.63	.530	0.07
17						
18	5 Less Smart Monkeys	Adults	0.48 (0.82)	5.62	< .001	0.59
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21 *Note.* Participants' responses are recoded as -1 = saving the former individual (person or smarter
 22 individual), 0 = can't decide, 1 = saving the latter individual (monkey or less smart individual). Thus,
 23 negative scores indicate a greater preference for saving the person over the monkey (or the more
 24 cognitively capable of the two individuals in question), while positive scores indicate a greater preference
 25 for saving the monkey over the person (or the less smart of the individuals in question). Values in the "M
 26 (SD)" column are mean recoded choices, with standard deviations in parentheses. All *t*-values for children
 27 use 93 degrees of freedom, and all *t*-values for adults use 90 degrees of freedom.

2.3 Comparing responses across inter-species dilemmas

36 We repeated the analysis from section 1.2 of the Supplementary Materials using the data
 37 from Study 2 (constructing the combined measure of speciesism using only the same four items).
 38 Assessing this score in exploratory one-sample *t*-tests, we found that Spanish adults prioritized
 39 more cognitively capable beings significantly more than they prioritized less cognitively capable
 40 beings ($M = 0.51$, $t(90) = 4.47$; $p < .001$, $d = 0.47$). Similarly (and unlike in Study 1), Spanish
 41 children prioritized more cognitively capable beings significantly more than they prioritized less
 42 cognitively capable beings ($M = 0.50$, $t(93) = 2.62$; $p = .010$, $d = 0.27$). Moreover, in Study 2,
 43 changes in cognitive capacity did not affect adults' judgments significantly more than they
 44 affected children's judgments ($t(183) = 0.02$, $p = .980$, $d < .01$).

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3 In summary, the cross-dilemma analyses of inter-species dilemmas in Supplementary
4 Materials sections 1.2 and 2.2 further support the results reported in the main text of the paper.
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6 Both sets of analyses provide converging evidence that U.S. children do not weigh cognitive
7 capacity highly in their prioritization judgments in moral dilemmas, and that they weigh
8 cognitive capacity significantly less than U.S. adults. But in contrast, both Spanish children and
9 adults significantly weigh cognitive capacity in their prioritization judgments, and there is not a
10 significant difference in the extent to which they do so. However, these cross-cultural results are
11 limited by several factors (see Supplementary Materials section 3.1) and so, while we urge more
12 research to interrogate a possible interaction between culture and age in individuals' degrees of
13 speciesism, we also caution against drawing strong conclusions from the differences between the
14 U.S. and Spain in our studies.
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30 2.4 Comparing responses across intra-species dilemmas

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32 To test whether participants' tendency to prioritize based on cognitive capacity depends
33 on the species of the individuals in question, we repeated the exploratory analysis in section 1.3
34 using two of the intra-species items. As in our analysis for Study 1, we calculated the difference
35 between the two intra-species items ("really smart person vs. less smart person" and "really
36 smart monkey vs. less smart monkey") in Study 2. Based on this measure, Spanish adults
37 weighed cognitive capacity significantly more in the 1-vs-1 dilemma involving monkeys than in
38 the dilemma involving humans ($M = 0.11$, $t(90) = 2.08$; $p = .041$, $d = 0.22$), while Spanish
39 children did not appear to value cognitive capacity differently by species ($M = 0.03$, $t(93) = 0.36$;
40 $p = .720$, $d = 0.04$). Despite this distinction, Spanish children's and adults' difference scores were
41 not significantly different from each other ($t(183) = 0.75$, $p = .472$, $d = 0.11$).
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2.5 Results of the Speciesism Scale

In Study 2, participants completed a Spanish-adapted version of the Speciesism Scale (Caviola et al., 2019; Suárez-Yera et al., 2021). To test whether participants' scores on the scale predicted their responses to the main items, we constructed a measure of total speciesism by averaging the 5 1-vs-1 inter-species comparisons (the first 5 rows of Table S3), yielding a score between 1 (always chose to save the person) and 3 (always chose to save the monkey). In an exploratory analysis, we found that Spanish children's scores on the Speciesism Scale (ranging from 0 to 42, with 42 indicating the highest degree of speciesism; $M = 15.64$, $SD = 6.06$) did not predict their prioritization of people over monkeys ($b = -0.17$, $SE = 0.10$, $t(92) = -1.61$, $p = .111$). Repeating the analysis for adults, we found that Spanish adults' responses to the inter-species moral dilemmas in Study 2 were significantly predicted by their total score on the Speciesism Scale ($M = 12.98$, $SD = 6.15$), with participants who scored higher exhibiting a stronger prioritization of people over monkeys across dilemmas ($b = -0.34$, $SE = 0.10$, $t(89) = -3.39$, $p = .001$). Notably, both of these results mirrored those in the U.S. sample (see Supplementary Materials section 1.4).

2.6 Results without exclusions

We repeated the analyses in Study 2 without performing exclusions for failed comprehension checks mentioned in the main text (including exclusions for the plates dilemma). However, we still excluded participants who failed an attention check, were outside of the age range, or had incomplete data. This yielded a final sample of 220 participants containing 119 children (54 boys, 65 girls, $M_{age} = 8.44$, $SD_{age} = 0.96$) and 101 adults (45 men, 54 women, $M_{age} = 34.14$, $SD_{age} = 12.72$). Table S4 visualizes the results of the independent-samples t-tests in Study

2 absent these exclusions. The overall pattern of results is consistent with those reported in the main text.

Table S4

Mean choices of Spanish children and Spanish adults (Study 2) without exclusions

	Adults	Children	<i>t</i> -value	<i>p</i> -value	<i>d</i>
Really Smart Person vs. Less Smart Monkey	-0.71 (0.50)	-0.25 (0.93)	4.67	< .001	0.60
Really Smart Person vs. Really Smart Monkey	-0.60 (0.57)	-0.11 (0.94)	4.81	< .001	0.63
Really Smart Person vs. Super Smart Monkey	-0.06 (0.82)	0.43 (0.90)	4.09	< .001	0.55
Less Smart Person vs. Less Smart Monkey	-0.56 (0.57)	-0.14 (0.95)	4.05	< .001	0.53
Less Smart Person vs. Really Smart Monkey	-0.17 (0.85)	0.23 (0.93)	3.29	.001	0.44
Really Smart Person vs. Less Smart Person	-0.38 (0.63)	-0.29 (0.91)	0.87	.379	0.11
Really Smart Monkey vs. Less Smart Monkey	-0.50 (0.64)	-0.30 (0.90)	1.85	.066	0.24
Really Smart Person vs. 5 Less Smart Monkeys	-0.20 (0.92)	-0.03 (0.96)	1.36	.174	0.18
Really Smart Person vs. 5 Really Smart Monkeys	0.15 (0.90)	0.35 (0.93)	1.67	.099	0.22
Less Smart Person vs. 5 Less Smart Monkeys	0.01 (0.91)	0.24 (0.96)	1.85	.065	0.25
Less Smart Person vs. 5 Really Smart Monkeys	0.22 (0.90)	0.43 (0.89)	1.74	.083	0.24
Really Smart Person vs. 5 Less Smart People	0.53 (0.74)	0.14 (0.96)	3.41	< .001	0.45
Really Smart Monkey vs. 5 Less Smart Monkeys	0.44 (0.84)	0.04 (0.99)	3.19	.002	0.43

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3 *Note.* Participants' responses are recoded as -1 = saving the former individual (a person or smarter
4 individual), 0 = can't decide, 1 = saving the latter individual(s) (monkey(s) or less smart individual(s)).
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6 Thus, negative indicate a greater preference for saving the person over the monkey(s) (or the more
7 cognitively capable of the individuals in question), while positive indicate a greater preference for saving
8 the monkey(s) over the person (or the less smart of the individuals in question). Values in "Adults" and
9 "Children" columns are mean recoded choices, with standard deviations in parentheses. All *t*-values use
10 218 degrees of freedom.
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19 2.7 Results with Bonferroni corrections

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21 We repeated the analyses in Study 2 using Bonferroni corrections for robustness (we did
22 not preregister Bonferroni corrections in our analysis plan). Thirteen one-sample *t*-tests against
23 the midpoint of the scale (0; *I cannot decide*) were conducted for the samples of children and
24 adults, separately, nine testing participants' levels of speciesism and four testing participants'
25 prioritization of more cognitively capable beings over less cognitively capable beings. Similarly,
26 13 independent samples *t*-tests were conducted to compare the difference between the children
27 and adult samples: nine testing participants' levels of speciesism and four testing participants'
28 prioritization of more cognitively capable beings over less cognitively capable beings. Thus,
29 after applying Bonferroni corrections to correct the experiment-wise error rate, all analyses using
30 the inter-species dilemmas were considered significant when $p < .006$ ($0.05/9$) and all analyses
31 using the intra-species dilemmas were considered significant when $p < .013$ ($0.05/4$).
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47 For the results of the independent samples *t*-tests after performing Bonferroni corrections,
48 compare the *p*-values in rows 1-5 and 8-11 of Table 2 in the main text to the adjusted
49 significance level of $p < .006$, and compare all other rows to the adjusted significance level of p
50 $< .013$. All analyses were unaltered by Bonferroni corrections except for the "less smart person
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3 vs. really smart monkey” comparison, which is no longer significant at $p = .007$ when using the
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5 adjusted alpha level.
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8 Similarly, for the results of the one-sample t-tests after performing Bonferroni
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10 corrections, compare the p-values in rows 1-5 and 8-11 of Table S3 in section 2.1 of the
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12 Supplementary Materials to the adjusted significance level of $p < .006$, and compare all other
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14 rows to the adjusted significance level of $p < .013$. Five otherwise significant results were made
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16 insignificant by performing Bonferroni corrections, while all other results were unaltered. The
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18 five no longer significant results are: (1) children significantly prioritized a really smart person
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20 over a less smart monkey; (2) children prioritized a less smart person over a less smart monkey;
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22 (3) children prioritized a really smart monkey over a less smart person; (4) children prioritized 5
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24 less smart monkeys over one less smart person; and (5) adults prioritized 5 really smart monkeys
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26 over one less smart person. Note that adjustments (1), (2), and (5) ultimately bolster the claim
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28 that speciesism increases with age, and that adjustments (3) and (4) are similarly consistent with
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30 the claims made in the results section of Study 2.
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37 Cross-cultural comparison

38 3.1 Cross-cultural comparison between U.S. and Spanish children and adults

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41 We also conducted exploratory analyses comparing U.S. participants’ responses to
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43 Spanish participants’ responses. Table S5 visualizes the results of each of these comparisons. In
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45 summary, we did not detect significant cross-cultural differences in group means for any items
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47 except in two cases. First, in the really smart person vs. less smart monkey comparison, Spanish
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49 children had a significantly weaker preference than U.S. children for saving the monkey. Second,
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51 in the really smart person vs. less smart person comparison, Spanish children were significantly
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more likely than U.S. children to save the smarter of the two people. Note, however, that the p -values for both comparisons are greater than .01. Thus, given the large quantity of analyses performed, we believe it would be inappropriate to draw conclusions about the relative levels of speciesism in the U.S. and Spain based on these few comparisons.

In an additional exploratory analysis, we constructed an overall measure of speciesism by averaging participants' responses to the five inter-species items and compared this measure across groups. Based on this measure, U.S. children were not significantly less speciesist than Spanish children ($M_{U.S.} = 0.10$, $SD_{U.S.} = 0.41$, $M_{Spain} = -0.01$, $SD_{Spain} = 0.41$, $t(150) = 1.52$, $p = .132$, $d = 0.25$). Similarly, U.S. adults were not significantly more speciesist than Spanish adults ($M_{U.S.} = -0.47$, $SD_{U.S.} = 0.49$, $M_{Spain} = -0.43$, $SD_{Spain} = 0.45$, $t(153) = 0.51$, $p = .612$, $d = 0.08$).

Table S5

Mean choices of U.S. and Spanish children and adults (Study 1 vs. Study 2)

		U.S.	Spain	t -value	p -value	d
Adults	Really Smart Person vs. Less Smart Monkey	-0.77 (0.50)	-0.71 (0.50)	0.63	.528	0.10
	Really Smart Person vs. Really Smart Monkey	-0.62 (0.55)	-0.60 (0.56)	0.23	.819	0.04
	Really Smart Person vs. Super Smart Monkey	-0.20 (0.84)	-0.09 (0.86)	0.83	.407	0.13
	Less Smart Person vs. Less Smart Monkey	-0.58 (0.61)	-0.56 (0.58)	0.18	.857	0.03
	Less Smart Person vs. Really Smart Monkey	-0.16 (0.86)	-0.16 (0.85)	0.06	.951	0.01
	Really Smart Person vs. Less Smart Person	-0.50 (0.59)	-0.37 (0.63)	1.28	.203	0.21
	Really Smart Monkey vs. Less Smart Monkey	-0.52 (0.62)	-0.48 (0.64)	0.31	.754	0.05

Children	Really Smart Person vs. Less Smart Monkey	0.12 (0.92)	-0.27 (0.93)	2.51	.013	0.42
	Really Smart Person vs. Really Smart Monkey	-0.14 (0.76)	-0.18 (0.93)	0.31	.757	0.05
	Really Smart Person vs. Super Smart Monkey	0.41 (0.84)	0.45 (0.89)	0.23	.818	0.04
	Less Smart Person vs. Less Smart Monkey	0.03 (0.84)	-0.22 (0.93)	1.77	.079	0.29
	Less Smart Person vs. Really Smart Monkey	0.05 (0.93)	0.19 (0.93)	0.90	.369	0.15
	Really Smart Person vs. Less Smart Person	0.00 (0.90)	-0.31 (0.89)	2.06	.041	0.34
	Really Smart Monkey vs. Less Smart Monkey	-0.19 (0.89)	-0.34 (0.89)	1.02	.311	0.17

Note. Participants' responses are recoded as -1 = saving the former individual (person or smarter individual), 0 = can't decide, 1 = saving the latter individual (monkey or less smart individual). Thus, negative scores indicate a greater preference for saving the person over the monkey (or the more cognitively capable of the two individuals in question), while positive scores indicate a greater preference for saving the monkey over the person (or the less smart of the individuals in question). Values in the "U.S." and "Spain" columns are mean recoded choices, with standard deviations in parentheses. All *t*-values for adults use 153 degrees of freedom, and all *t*-values for children use 150 degrees of freedom.

3.2 Indecisiveness differences

One additional cross-cultural difference stands out: Descriptively, Spanish children appear less likely than U.S. children to respond with "can't decide". We believe it is unlikely this trend reflects true cross-cultural differences (e.g., in indecisiveness). Instead, it is most likely due to small differences in language connotation or instructions (e.g. perhaps the "can't decide" option was made more salient by experimenters in the U.S. sample). However, it is worth noting that in a recent study with Polish and U.S. participants, a similar pattern was found, with U.S.

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3 children answering “can’t decide” in response to moral dilemmas more often than Polish
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5 children (Paruzel-Czachura et al., 2024). More research is needed to test whether there are
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7 genuine cross-cultural differences underlying children’s and adults’ tendencies to respond with
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9 neutral or uncertain options in moral dilemmas, and to inspect whether this systematically biases
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11 the conclusions drawn from such work.
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16 Limited interpretability of the 1-vs-5 dilemmas

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19 We did not find significant differences between children and adult’s responses in any of
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21 the four inter-species 1-vs-5 dilemmas. This may be explained by adult’s stronger tendency to
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23 prioritize the larger number of entities in the 1-vs-5 intra-species dilemmas. That is, the increased
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25 speciesist tendency in adults may have been counteracted by a stronger preference to save five
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27 individuals over one.
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31 However, it is important to note that this interpretation is speculative. Notably, it
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33 contrasts past work which finds that children show a much stronger tendency to prioritize a large
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35 number of animals over a smaller number of people (while adults almost always prioritize people
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37 (Wilks et al., 2021). However, trade-offs in the current study differ in that they feature three
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39 factors: cognitive capacity, species, and number of individuals. It’s possible that these three
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41 factors interact with each other in non-linear ways, or even that these interaction effects differ for
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43 adults and children. And crucially, we only included a small subset of 1-vs-5 dilemmas featuring
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45 these three factors. For example, we didn’t include dilemmas featuring five humans vs. one
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47 animal. As such, our interpretation of this data is limited and our studies cannot, with certainty,
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49 reveal how children and adults apply these three factors in their moral judgements.
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