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Appealing to consequences, or authority? The influence of explanations on children's moral judgments across two cultures

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ABSTRACT

Recent research shows that children's moral judgments can be influenced by testimony, but it remains unclear whether certain types of testimony are more influential than others. Here we examined two specific types of moral testimony - one that appealed to the authority of the speaker and one that appealed to the consequence of the action - and measured how each type of testimony moved children's judgments about harm. Chinese (N = 181; 45.3 % girls; all ethnically Chinese, middle-class) and U.S children (N = 198; 55.6 % girls; predominantly White, middle-class) were presented with countervailing testimony that justified novel, distress-inducing actions as acceptable, either by appealing to the speaker's authority or by reasoning about the positive consequences of the action. Both types of explanations significantly influenced children's moral judgments, leading children from both cultures to judge harm-related actions as more morally permissible. However, with age, children across both cultures became less receptive towards authority-based explanations. Neither type of explanation affected adults' (N = 180, recruited online from across China and the U.S.) moral judgments. Together, these findings provide developmental evidence on the types of explanations that influence children's moral judgments about actions that cause harm.

Consider the following scenario: Your child is on the playground and pushes another child who was in line for the slide, causing them to cry. How might you explain to your child why pushing others on the playground is wrong? Would you underscore the harm caused by explaining that pushing others can hurt them and make them feel sad? And if your child remains unremorseful, would you appeal to your own authority and say something like, "because I said so"?

This situation highlights two different modes of moral testimony that are commonly used by parents (e.g., Grusec & Goodnow, 1994; Leman, 2005), and have been of theoretical interest to psychologists: (1) appealing to the consequences or outcomes of an action (e.g., Smetana, 1985; Pellizzoni, Siegal, & Surian, 2010), and (2) appealing to authority-related considerations (e.g., parental, religious authorities, the law, e.g., Kohlberg, 1981; Graham et al., 2011). Here, we explored whether 3- to 5-year-old children and adults in the U.S. and China were influenced by these two types of explanations when an adult offered judgments that conflicted with their harm-related moral intuitions.

Limits of Testimony in Moral Development? Children acquire much of their knowledge from the testimony of other people. Much of the work on social learning has focused on testimony's ability to transmit non-social knowledge, such as the name of an object, geography of the world, historical events, or the existence of germs (Harris & Koenig, 2006; Lane, 2018, for reviews, see Harris, Koenig, Corriveau, & Jaswal, 2018; Mills, 2013). Despite the fact that morality reflects a central domain of cultural knowledge, we know little about the role played by testimony in children's *moral judgments*. Do children rely heavily on others' testimony for their moral beliefs? Are they willing to update their own moral judgments in favor of others' testimony?

While testimony has long been associated with the transmission of factual knowledge, questions have been raised about testimony's ability to transmit moral knowledge (Gelfert, 2006). In fact, work in Western philosophy (e.g. Jones, 1999; Nickel, 2000; McGrath, 2011) and evidence in psychology (Andow, 2019) points to the limits of learning from *moral testimony*, arguing that relying on someone else's testimony is in tension with exercising one's own moral agency, and is inferior to judging for oneself based on one's own moral understanding. Consistent with these skeptical views, seminal work in moral development has suggested that children's understanding of moral norms, particularly the expectation that agents should avoid harming others, might be innate or very early emerging (e.g., Bloom, 2010; Hamlin, Wynn, & Bloom, 2007;

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Mikhail, 2007), and is independent of prescription by local authorities (Smetana, 1981; Smetana et al., 2012).

Despite these long-standing views that take moral thinking to be "self-given" (Kant, 1959), children's moral learning is still deeply embedded in social, conversational and cultural contexts. Investigating the impact of testimony on children's moral development can provide insights into how cultural values and norms are transmitted and internalized as children navigate their social worlds. Recent developmental evidence suggests that testimony can influence children's moral judgments, even when that testimony contradicts harm-based intuitions in novel contexts (for a review, see Li and Koenig, 2023). For example, Rottman, Young, and Kelemen (2017) found that neutral behavior (e.g., aliens covering their heads with sticks, or painting their face white) could be perceived as morally impermissible by 7-year-olds after they heard counter-intuitive testimony invoking harm-related moral principles (e.g., "It really hurts others when Kulvaws paint their faces white."). Conversely, adult testimony can also lead children to judge harmful actions as permissible. Rhodes and Chalik (2013) found that 3- to 9-year-old children judged harming outgroup members to be less bad if a teacher gave permission (e.g., "Let's pretend that in the school they go to the teachers said that the kids could tease each other."). Li, Harris, and Koenig (2019) found that after 3- to 5-year-old Chinese and U.S. American children judged novel, distress-inducing actions (e.g., "mib-bing") to be morally wrong independently, many revised their original judgments in response to hearing counter-intuitive claims made by adults (e.g., "It is good to mib."). Why would U.S. and Chinese children revise their original harm-related moral judgments upon receiving a simple claim from adults?

Children's Appreciation of Outcome-based and Authority-based Arguments. When children gave up their own moral judgments to favor an adult's decision in the work discussed above (Li et al., 2019), two factors may have contributed to this result. One possibility is that children might have changed their minds due to the default moral authority they attribute to adult speakers. Notably, children were almost as likely to change their moral judgments when faced with a single speaker as when faced with a group of three speakers (Li et al., 2019), suggesting that children's changed view may be due to their deference to authority. If this is the case, then children's judgments might be particularly influenced when an adult speaker emphasizes their authority. Conversely, children may have suspected that adults had good reasons for their claims. Supporting this, many children justified their positive judgments for the harm-related action by appealing to the positive outcomes for the perpetrator (Li et al., 2019). If children think that adults have good reasons for their claims, they might be especially moved by an adult speaker who provides an explicit reason or explanation for their claim.

These possibilities, appealing to authority and to outcomes, connect to recent work in moral epistemology which distinguishes between two distinct modes of moral teaching: transmission and propagation (Hills, 2019). Transmission occurs when the listener comes to believe a moral claim based on the informant's word, or on her authority. Propagation, on the other hand, involves presenting reasons, arguments or analogies, guiding the listener to acquire first-hand knowledge. While transmission is considered problematic for adults because it often does not foster genuine moral understanding (e.g., McGrath, 2011; Nickel, 2001), propagation is viewed as legitimate because it encourages the learner to do some of their own epistemic work (Hills, 2019). Here, we are interested to examine whether children learn through both modes of moral teaching and whether, like philosophers predict, they increasingly require additional reasons before accepting someone's authority as a basis for counter-intuitive moral beliefs.

In the current study, we present children with an adult speaker who either made no moral judgments and cited no reasons (Control condition), one who emphasized their own authority (Authority-based condition) or one who cited consequences or outcomes as important reasons (Outcome-based condition). To identify developmental findings given that no prior research examined the effect of these explanations on adults' harm-related moral judgments, we extended the same paradigm to a sample of adult participants.

Our interest in these questions also has several theoretical bases in developmental and social psychology. First, Kohlberg (1981)'s classic work on children's moral reasoning revealed that the first stages of morality can be defined in terms of obedience to authority and avoiding punishment, with the former orienting towards dependence on authority, and the latter placing an emphasis on consequences for oneself. The roles of authority and consequences in children's moral decision making has invited considerable debate since Piaget (1965) and Kohlberg (1981). In particular, seminal work by Social Domain theorists challenged the classic view by emphasizing how children's judgments of familiar harm-related transgressions are not alterable by authority (e.g., a teacher saying that it is okay to hit others, Turiel, 1983; Smetana, 1981). Moreover, this work shows that preschoolers distinguish between moral principles and conventions, a distinction that lies in the appraisal of consequences: While the consequences of social conventional rules are extrinsic and constructed by people, moral rules have intrinsic consequences to the act itself (Turiel, 1983; Smetana, 1981, 1985). Thus, authority- and outcome-related considerations have been the center of attention in developmental theories of children's moral judgments.

Furthermore, observational studies that explore parental discipline techniques have shown that when it comes to moral socialization, it is common for parents to utilize both consequence-based explanations (e.g., discussion of the consequences of the transgression for the self) and power assertion (e.g., stipulations, threat of punishment, Grusec & Goodnow, 1994; Leman, 2005; Zahn-Waxler, Radke-Yarrow, & King, 1979; for reviews, see Grusec, 2006; Grusec & Davidov, 2010). Lastly, over the past two decades, social psychologists interested in moral reasoning have also expressed great interest in adults' consequence-focused reasoning in the face of moral dilemmas (e.g., Greene, Nystrom, Engell, Darley, & Cohen, 2004; Cushman, Young, & Hauser, 2006; Haidt, 2001). Using philosophical thought experiments, this line of research has found that when one harm is pitted against many, adults make moral judgments based on what results in the best outcome for the greatest number of people, and children make similar judgments as adults under certain circumstances (Bucciarelli, 2015; Marshall, Gollwitzer, & Bloom, 2022; Pellizzoni et al., 2010). On the other hand, authority-related concerns are also considered one of the most important but less studied "binding foundations" in morality, rooted in the necessity for cultural groups to establish and maintain order (Graham et al., 2011; Haidt & Graham, 2007) especially in more politically conservative groups and non-western communities (Graham et al., 2018). Thus, both authority-based and outcome-based explanations may play an indispensable role in changing children and adults' moral judgments.

Cross-cultural Differences in Testimonial and Moral Learning. Children's moral learning is situated in sociocultural contexts, making cross-cultural comparisons particularly relevant in exploring children's social learning. Specifically, there might be cultural variability in socialization practices that prioritize the relative weighting of adult authority versus the child's own independent judgment. Several studies have found that individuals from non-Western communities that are more collectivistic are more likely to emphasize conformity, interdependence, and deference than Western individualistic societies (Bond & Smith, 1996; Chang et al., 2011; Clegg, Wen, & Legare, 2017; Toelch, Bruce, Newson, Richerson, & Reader, 2014). For example, Clegg and colleagues (2017) found that Ni-Vanuatu adults were more likely to judge a high-conformity child who imitated at higher fidelity as intelligent, whereas U.S. adults were more likely to credit a low-conformity child for being innovative. Relatedly, research has also revealed that early socialization practices in East Asian countries like China are more likely to emphasize the importance of intellectual humility and learning from adult authorities (Li, 2005; Suizzo & Cheng, 2007; Wang, Elicker,

McMullen, & Mao, 2008; Wu et al., 2002). For example, when Chinese and U.S. mothers of preschoolers were asked to describe the most important parenting practices, Chinese mothers were more likely to emphasize the encouragement of modesty and cooperation compared to U.S. mothers (Wu et al., 2002). This cross-cultural variation is manifested in children's susceptibility to counter-intuitive claims, with Asian-American and Chinese children being more likely to defer to adult testimony than U.S. children when making perceptual judgments (Corriveau & Harris, 2010; Corriveau, Kim, Song, & Harris, 2013) and moral judgments (Li et al., 2019). However, little is known about how variability in parental and cultural expectations might result in differences in children's rates of acceptance of moral explanations, nor have any studies explored how children weigh outcome-based and authority-based explanations that challenge their initial beliefs. Here, we explored the role of cultural mechanisms underlying children's reliance on testimony by including samples of Chinese and U.S. American children as well as adult comparison groups. Based on previous research suggesting that children in China may place more emphasis on authority and intellectual modesty (e.g., Li et al., 2019), we predicted that Chinese children would be more deferential to adult explanations than their U.S. American counterparts, and that they might be especially sensitive to authority-based explanations. To see if different value systems might underlie any national differences, we also asked parents of the child participants and adult participants to complete an authoritarianism and social conformity questionnaire (Feldman & Stenner, 1997; Stenner, 2005).

In summary, most existing research on testimonial learning has been focused on children's selective trust in non-social domains (e.g., word learning, science and religion) instead of on the transmission of moral beliefs, attitudes and norms which determine how children conform to the culture around them. Despite the limited attention on the role of testimony on moral development, recent findings suggest that testimony can indeed influence children's moral beliefs. Our goal is to better understand when and why adult testimony influences children's harm-related moral judgments. Specifically, we aim to determine whether changes in children's moral beliefs are related to adults' authority, the reasons they are perceived to have, or both. We also aim to illuminate how the weighting of different considerations (e.g., authority of the speaker, consequences of actions) develop over time and across cultures. In three between-subjects conditions, 3- to 5-year-old Chinese and U.S. children and adults listened to stories with illustrations in which the protagonists engaged in actions that made others cry, referred to only by means of unfamiliar words such as "mibbing" (Li et al., 2019). Then, depending on condition, children were exposed to an adult speaker who provided *Authority-based* explanations (e.g., "Mibbing is good because I get to decide whether mibbing is good."), *Outcome-based* explanations (e.g., "Mibbing is good because [transgressor name] can play with the new toy after mibbing."), or *Control* statements (repeating basic information in the story). Afterwards, we ask participants to determine whether the novel harm-related actions were good or bad, and to evaluate the transgressor. While we acknowledge that there are multiple ways to operationalize and express any given explanation, we crafted an authority-based explanation that focused on testimony that appeals to the informant's practical authority (i.e., "Because I get to decide whether [action] is good or not.") based on the type of statements adults commonly express towards children (e.g., "because I said so.") and children's well-documented ability to infer authority from decisional power (e.g., Bernard et al., 2016; Charafeddine et al., 2015; Kajanus, Afshordi, & Warneken, 2020). For the outcome-based explanation, we focused on positive outcomes for the transgressor based on children's own open-ended justifications in previous research (e.g., "It's good because [transgressor] can eat the ice cream", Li et al., 2019). This type of reasoning also aligns with the "happy victimizer" effect, where young children sometimes attribute positive emotions to a transgressor who gets what they want (e.g., Arsenio & Lover, 1995; Keller, Lourenço, Malti, & Saalbach, 2003).

1. Method

Ethics Statement. This study was approved by the Institutional Review Board at University of Minnesota ("Moral Explanations", IRB ID: STUDY00007238). A parent or guardian provided written consent. The data in the U.S. was collected between September 2019 and August 2020; the data in China was collected between June 2021 to August 2021.

Participants. We recruited a total of 379 3- to 5-year-old children (198 U.S. children: 110 girls, 88 boys, M_{age} = 54.7 months; range = 40.2–71.3 months; 181 Chinese children: 88 girls, 99 boys, M_{age} = 55.7 months; range = 36.1–72 months). An additional 7 children were excluded due to failure to complete the study (n = 5) or experimenter error (n = 2). U.S. participants were recruited through a university-managed database of families from the greater Twin Cities areas, Minnesota. We recruited 3- to 5-year-old children because this appears to be the age range during which children undergo developmental changes in deciding whether to rely on counter-intuitive testimony from adults (Jaswal, Croft, Setia, & Cole, 2010; Lane, Harris, Gelman, & Wellman, 2014; Li et al., 2019; Ronfard, Chen, & Harris, 2018). An a priori G Power 3.1 analysis (Faul, Erdfelder, Lang, & Buchner, 2007) was conducted based on a medium effect size of η_p^2 = 0.06 (f = 0.25) with an alpha level of 0.05, which showed that a sample size of 324 was needed to achieve 95 % power for the main analyses.[1] Chinese participants were recruited from a private preschool in Beijing. All Chinese children and 57.07 % of the U.S. children were tested in in-person sessions. After in-person data collection was cut short due to COVID-19, we tested the rest of the U.S. participants via video-conferencing. The stimuli that children saw (i.e., a series of PowerPoint slides with pictures and videos) were identical across in-person and online sessions, and there were no significant differences between the settings in children's responses across all the tasks (all $ps > 0.4$).

All parents were invited to complete a voluntary questionnaire with demographic questions. In the U.S. sample, 89.9 % identified their child as White, 1.5 % Black, 1 % Asian, 1 % Native Hawaiian or other Pacific Islander, 0.5 % American Indian or Alaska Native, and 5.1 % identified their child with multiple races or ethnicities; 4 % were Hispanic (of any race). Self-reported education was fairly high: 94.95 % of the mothers and 83.33 % of the fathers had a Bachelor's degree or above. Parents reported income was primarily middle class, with 63.64 % reporting an annual income greater than $100,000 per year. In the Chinese sample, all children were identified as ethnically Chinese, with 90.06 % identified as the Han ethnicity. Bachelor's degrees or above were held by 77.9 % of mothers (169 out of 181, or 93.37 % of parents answered this question) and 83.53 % of fathers (170 out of 181, or 93.92 % of parents answered this question), which was higher than 41.98 % of Beijing's population in 2021 (Beijing Statistics Bureau, 2021). The sample in this study also had a higher average annual income than that of the Beijing population. Out of the 163 families that answered this question, approximately 79.75 % of the families earned an annual income of 252,000 RMB or more, which is higher than the average for Beijing urban families in 2021 (248,286 RMB based on a family of three; Beijing Statistics Bureau, 2021). Thus, the U.S and Chinese participants predominantly came from middle- to high-SES families.

In order to gauge the degree of change from childhood to adulthood, 90 U.S. participants (M_{age} = 29.13; range = 18–56; 69 women, 19 men and 2 non-binary; 78.9 % White, 12.2 % Asian, 2.2 % Black, 1.1 % American Indian or Alaska Native, 1.1 % more than one race, 4.4 % another race, 12.2 % Hispanic of any race) were recruited online through the online participant recruitment platform Prolific and resided

[1] More parents returned consent forms than initially anticipated. In such cases, we tested all children with parental consent and included them in the study. As a result, the actual sample size exceeded the number indicated by our a priori power analysis.

in the United States, and a comparable sample of 90 Chinese participants (M_{age} = 30.64; range = 18–59; 65 women and 25 men; all ethnically Chinese, 92.2 % of the Han ethnicity) were recruited online through social media and all resided in China.

Procedure. Participants were randomly assigned to one of three between-subject conditions: the *Outcome-based* condition, the *Authority-based* condition, or the *Control* condition. During the study, participants went through three trials in which they listened to stories about children who engaged in novel actions that made others cry. Then, depending on the condition, they were exposed to an adult speaker who either provided explanations on why the novel actions were permissible (in the *Outcome-based* and *Authority-based* conditions), or provided control statements (in the *Control* condition). Afterwards, children answered a series of questions about the novel action and the transgressor (i.e., *moral judgment questions, transgressor evaluation task)* from a live experimenter. In order to assess whether children were merely complying with the informant or had genuinely revised their beliefs, we also included a *belief strength* task, in which children judged the permissibility of the actions in a new context (*context transfer questions*) and decided whether to transmit their judgment to a puppet who wanted to learn about the novel actions (*Information transmissions)*. Adult participants completed the same procedure online using Qualtrics. Each task is described below in the order that it was presented to participants (please see Fig. 1 for a visual depiction of the procedure). Below, we provide a detailed description of each task for child participants.

Storytelling phase. The experimenter always began the study session by saying: "I am going to tell you some stories today. In each of the stories, we might hear a word that we have never heard before, and I might need your help figuring out what it means. Okay, ready?" Then, in each trial, the experimenter told children a story with the aid of three drawings (see Fig. 2). In each story, the protagonist engaged in an action that were referred to only by means of unfamiliar words (e.g., "mib"in English; *miè bó* in Chinese pinyin syllables), and it was made clear to children that the novel actions caused harm and distress to another child (e.g., "Devon *mibbed* Casey and made Casey very upset and she started crying.", see Fig. 2). The reason for using novel actions was to avoid any uncontrolled bias from adult testimony associated with familiar actions. Previous research has shown that children could make a moral evaluation of these unfamiliar actions because each story recounted their distress-inducing consequences (Li et al., 2019; Smetana, 1985). The characters in the stories were gender-matched to the participants.

Testimony phase. After narrating each story, the experimenter told the child that they were going to show them a video of a lady who heard the same story yesterday. Each video featured a confederate sitting at the table with an adult female informant. In the two testimony conditions (*Outcome-based* condition and *Authority-based* condition), the confederate in the video asked the informant, for example: "What do you think? Was it good or bad for [Devon to *mib*]?" The informant in both conditions replied by stating that it was good to "mib". Then, the experimenter in the video continued to ask: "Why was it good to *mib*?" and the informant either provided a *Outcome-based* explanation that focused on the positive consequences for the transgressor (e.g., "Because Devon could play with the new toy after *mibbing.*") or an *Authority-based* explanation that exerted power and authority over children (e.g., "Because I get to decide whether *mibbing* is good."). Here, we attempted to make the two conditions comparable by focusing on manipulating the testimony itself (e.g., either highlighting an aspect of the outcome or the informant's authority), rather than introducing new information about the moral situation or the characteristics of the informant. In the *Control* condition, the same confederate also asked the informant two questions, but the questions were about basic information in the story (e.g., 'What do you think? Did mibbing happen in the story?" "Who did the *mibbing*, Devon or Casey?"), and the informant did not give any judgments of the novel actions (see Supplemental Materials for full video scripts).

Moral judgment questions. After hearing each story and receiving adult testimony, the experimenter first asked comprehension check questions to make sure the child could remember that the novel actions caused distress to the victim, and what the informant had said in the video. If the child could not remember the story outcome, the experimenter showed them the last drawing with the victim in tears to remind them that the victim was upset after the protagonist engaged in the novel action. If the child could not remember what the informant said, the video was shown again to the child.

After the comprehension checks, the experimenter asked for children's own *moral judgment,* for example: "What do you think? Was it good or bad for [Devon to *mib* Casey] ?" If the child indicated that it was bad, the experimenter said: "Do you think it's a little bad or very bad?" If the child indicated that it was good, the experimenter followed up by asking if it was "a little good" or "very good". Children's responses were then converted to a 4-point scale moral judgment score (very bad =3, a little bad =2, a little good = 1, very good = 0). Higher moral judgment scores indicate children adhered to their moral intuitions and judged the harm-related action to be morally wrong.

Following each *moral judgment question,* the child was also asked a *justification* question: "Why do you think it was good/bad to [*mib*]?" Children's answers were later transcribed and coded via video recordings of the sessions. To develop the coding categories, one research assistant drew a random sample of 50 % of the justifications and developed a codebook with the first author. The research assistant then proceeded with coding all the responses. For reliability, a second coder in each country who was blind to condition and hypotheses coded a subset of the justifications (33 %). Reliability coding was then calculated on the basis of these justifications. Interrater reliability was high for both samples (Chinese sample = 97.7 %; U.S. sample = 96.6 %). Discrepancies were resolved through discussion.

Transgressor evaluation task. Afterwards, the experimenter asked the child a few questions about the transgressor in each trial. First, the experimenter asked a *deserved punishment question* (adapted from Smetana et al., 2012), for example: "What do you think should happen to [Devon]? Should [Devon] get in trouble?" and if yes, "Should s/he get in a little trouble or a lot or trouble?" Children's responses were coded into a 3-point scale (a lot of trouble =2, a little trouble = 1, no trouble = 0).

The experimenter then asked *play questions*: "If [Devon] is here, would you want to play with him/her? Are you very sure or only a bit

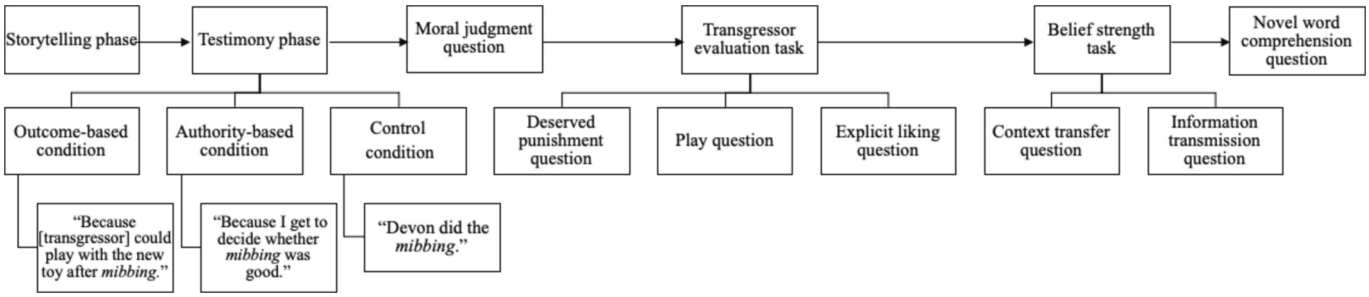


Fig. 1. Flow chart of the procedure.



Fig. 2. Example of story vignettes used for the girl version in the United States. In each story, the protagonist engages in a novel moral transgression that is the cause of distress.

sure?" (Scoring: very sure will play = 0, a little sure will play = 1, a little sure won't play = 2, very sure won't play = 3). These questions were followed by the *explicit liking questions*: "What do you think of [Devon]? Do you like him/her or not like him/her? Do you kind of (don't) like or really (don't) like [Devon]?" Responses were scored from 0 (really like) to 3 (really don't like, see Supplemental Materials for children and adults' responses in the *play* and *explicit liking* questions).

Belief strength task. To assess whether children who accepted adult testimony were merely complying with the informant or had genuinely revised their beliefs, a *belief strength* task was included to probe whether children judged the permissibility of the same actions in a new context, and whether to transmit their judgment to others.

In this task, the experimenter first asked children *context transfer questions* to examine whether children's moral judgments about the actions could be transferred to other contexts, for example: "Now let's think about a different situation. Let's say [Devon] was at [the playground] and wanted to [*mib* another classmate who was playing in the sandpit]. Would it be good or bad to [*mib* at the playground]? Would it be a little good/bad or very good/bad?" (Scoring: very bad =3, very good = 0).

Then, to assess whether children were willing to transmit their moral judgments, the experimenter introduced children to a child puppet who matched the child's gender named "Sam". In in-person sessions in the U.S., the puppet was operated by the experimenter. In all other sessions, children saw pictures of the same puppet talking in a puppet voice on the computer. In each trial, the experimenter told the child that neither Sam nor herself knew anything about the novel action and asked the child an *information transmission question*: "Sam would like to learn about *mibbing*. Can you tell him whether *mibbing* was good or bad?" and then "Was it a little good/bad or very good/bad?" (Scoring: very bad =3, very good = 0). Whatever the child said, the puppet then thanked the child for telling him/her about the novel action.

Novel word comprehension question. At the end of each trial, to assess how children conceptualized the novel actions, the experimenter also presented children with three pictures and asked, for example: "What do you think *mibbing* means in this story? What do you think happened in this story?" The experimenter then described the three pictures for children to choose from in turn, with one picture depicting a familiar moral transgression (e.g., Devon taking the toy away from Casey), one depicting a familiar prosocial action (e.g., Devon giving Casey a gift) and the other depicting a neutral action (e.g., Devon reading a book next to Casey). Children then chose the picture that they think looked most like the novel action. Children's likelihood of choosing the positive prosocial action did not differ by condition, and the majority of children's choices were focused on familiar moral transgressions (p = .11). This indicates that adult testimony did not significantly affect children's interpretation of the actions (see Supplemental Materials).

Parent questionnaires. To explore how parenting values might affect the extent to which children deferred to the counter-intuitive testimony, parents and adult participants filled out two questionnaires: authoritarianism (selecting the quality they think "is more important for a child to have." e.g., "obedience" versus "self-reliance", Feldman & Stenner, 1997) and social conformity (e.g., "Society should aim to protect citizens' right to live any way they choose" versus "It is important to enforce the community's standards of right and wrong", Stenner, 2005). For the Chinese parents, the questionnaires were translated from English to Chinese by a native Chinese speaker who was proficient in English, and then back-translated by a second bilingual research assistant.

2. Results

We analyzed participants' response data using Linear Mixed Models (LMMs). For LMM fitting, we used the *lmer* package (Bates, Maechler, Bolker, & Walker, 2014) in R (version 1.2.5019; R Core Team, 2019). Unless otherwise stated, for each task for the child participants, we included the fixed effects of Condition (Outcome-based vs. Authority-based vs. Control, Control was used as the reference group), children's Age (continuous), and Culture (Chinese vs. U.S., Chinese was used as the reference group). Since each participant received a total of three trials, participant ID was included as a random effect. To determine the significance of each predictor, we used likelihood ratio tests (LRT) to compute chi-square statistics. This involved comparing models that included the predictor of interest against a null model (which retained other predictors and random effects but excluded the predictor of interest). We also included interaction terms for the fixed effects sequentially and checked whether each interaction term significantly improved model fit by using LRTs. Separate models were also fitted for adults. Below, we first summarize adult responses and then report children's responses in each task.

Preliminary analyses revealed no effects of gender or trial number (first to third trial). Thus, reported analyses collapse across these factors.

Adult responses. For the main measure of interest — the moral judgment questions following counter-intuitive testimony — the

majority of adult participants persisted in judging the novel transgression to be "bad". Specifically, adults judged the actions to be "bad" in 98.9 % of their responses in the Outcome-based condition (China: 100 %; U.S.: 97.8 %), 94.4 % of their responses in the Authority-based condition (China: 92.2 %; U.S.: 96.7 %). and 99.4 % of their responses in the Control condition (China: 98.9 %; U.S.: 100 %). When examining participants' moral judgment scores (very bad = 3, very good = 0), the LMM analysis with the adult participants revealed a significant interaction between Condition and Culture ($x^2(2) = 10.3$, $p = .006$). Follow-up pairwise tests revealed that Chinese adults rated the novel actions less negatively then U.S. adults in the Authority-based ($M_{\text{Chinese}} = 2.23$, $M_{\text{U.S.}} = 2.6$, $p = .002$) and Control ($M_{\text{Chinese}} = 2.29$, $M_{\text{U.S.}} = 2.86$, $p < .01$) conditions, but not in the Outcome-based condition ($M_{\text{Chinese}} = 2.48$, $M_{\text{U.S.}} = 2.53$, *ns*, see Fig. 3).

Adults' responses in the *transgressor evaluation* task did not reveal any effects of Condition, a further indication that neither type of explanation influenced adults' judgments about the transgressor. However, we found a main effect of Culture in participants' responses to the deserved punishment and play questions. Compared to U.S. adults, Chinese adults were less likely to judge that the transgressor should get into trouble and more likely to indicate that they would play with the transgressor (please see the Supplemental Materials for detailed information on adults' responses in this task and the *true belief* task).

Children's moral judgment responses. In contrast to adults, we found that children's moral judgments were sensitive to the explanations provided. Only 48.2 % of children's responses in the Outcome-based condition (China: 3-year-olds 23.1 %; 4-year-olds 51.6 %; 5-year-olds 57.9 %; U.S.: 3-year-olds 28.1 %; 4-year-olds 53.3 %; 5-year-olds 61.9 %) and 57.4 % of children's responses in the Authority-based condition indicated that the action was bad (China: 3-year-olds 36.1 %; 4-year-olds 47.1 %; 5-year-olds 94.7 %; U.S.: 3-year-olds 35 %; 4-year-olds 58.8 %; 5-year-olds 70 %). In contrast, 88.4 % of children's moral judgment responses indicated that the action was bad in the Control Condition (China: 3-year-olds 81.8 %; 4-year-olds 94.9 %; 5-year-olds 96.8 %; U.S.: 3-year-olds 78.3 %; 4-year-olds 82.7 %; 5-year-olds 92.1 %).

For the main analysis of children's *moral judgment* score, we found significant effects of Age ($x^2(1) = 50.8$, $p < .001$) and Condition ($x^2(2) = 62.5$, $p < .001$). The interaction between Age and Condition also significantly improved model fit, $x^2(2) = 8.7$, $p = .01$. However, children's moral judgments were not affected by Culture, $x^2(1) = 0.36$, $p = .55$. There were no other significant interactions.

To follow up on the interaction between Age and Condition, we split the sample into three age groups, and ran LMM models with Condition as a fixed effect. Following this, we performed pairwise comparisons between Conditions within each age group with Benjamini-Hochberg (BH) adjustments. For 3-year-old children, we found a significant effect of Condition ($x^2(2) = 23.2$, $p < .001$). Follow-up pairwise tests with B—H adjustments revealed that 3-year-old children rated the novel transgressions as significantly more permissible both in the Outcome-based condition ($M_{\text{3-year-olds}} = 1.01$, $p < .001$) and the Authority-based condition ($M_{\text{3-year-olds}} = 1.16$, $p < .001$) compared to the Control condition ($M_{\text{3-year-olds}} = 1.95$), but their ratings in the two testimony conditions did not differ ($p = .47$). Similarly, Condition was a significant predictor for 4-year-old children's moral judgment responses, $x^2(2) = 26.3$, $p < .001$. Both types of explanations also affected 4-year-old children's moral judgments ($M_{\text{4-year-olds Outcome-based}} = 1.58$, $M_{\text{4-year-olds Authority-based}} = 1.55$, $M_{\text{4-year-olds Control}} = 2.26$, Outcome-based vs. Control, $p < .001$; Authority-based vs. Control, $p < .001$). Again, 4-year-old children's judgments in the two testimony conditions were not significantly different ($p = .88$).

By contrast, 5-year-old children distinguished between the Outcome-

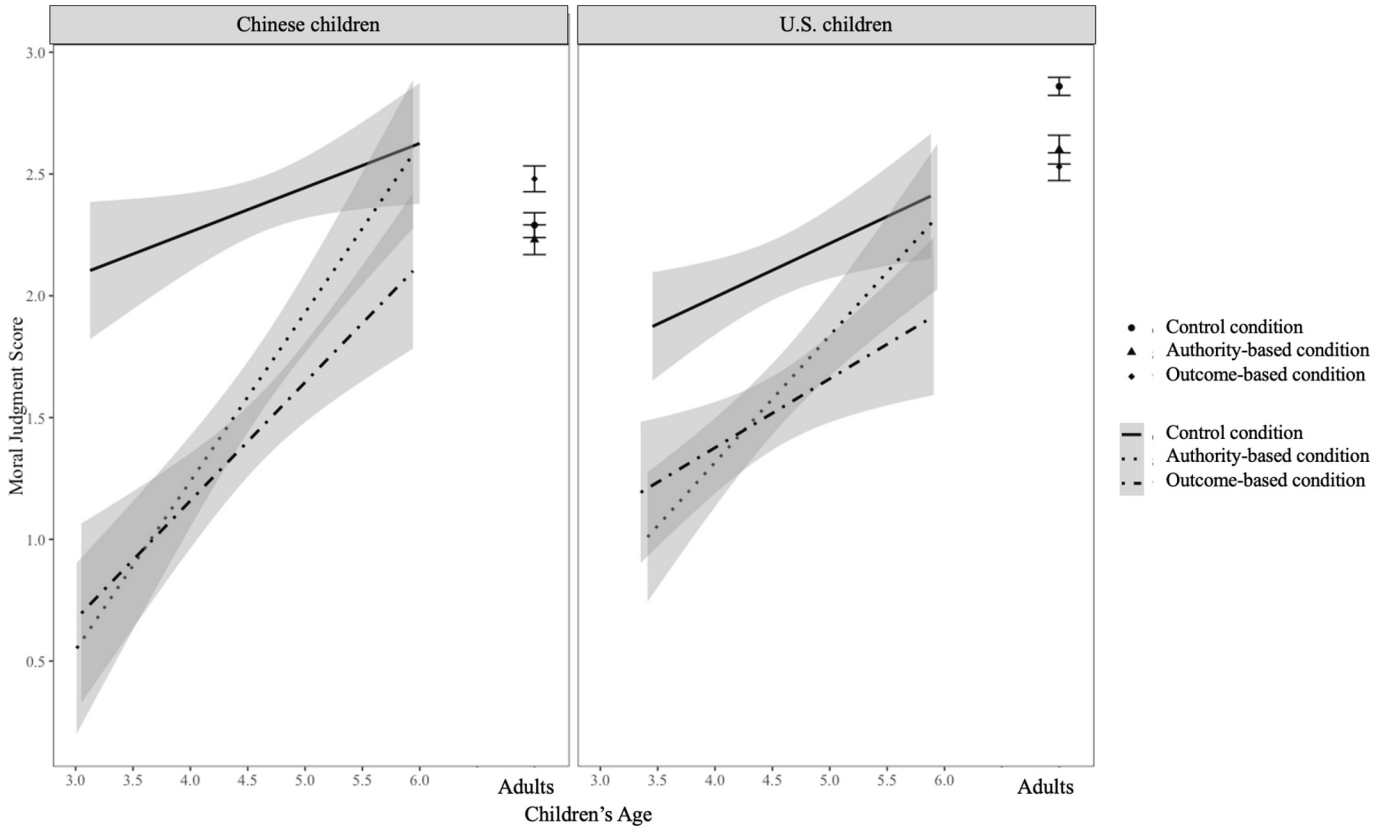


Fig. 3. Participants' moral judgment ratings (very bad = 3, very good = 0) in each country as a function of Age and Condition.
Notes. Separate line types indicate children's moral judgment ratings in each condition (Outcome-based, Authority-based, Control). Gray shading indicates standard errors. Data points represent adults' moral judgment ratings.

based and Authority-based conditions. Following the overall Condition effect ($x^2(2) = 17.9$, $p = .0001$), we found that children's moral judgment ratings in Outcome-based condition still significantly differed from the Control condition ($M_{5\text{-year-olds Outcome-based}} = 1.77$, $M_{5\text{-year-olds Control}} = 2.44$, Outcome-based vs. Control, $p = .001$), but the effect of the Authority-based condition became marginal ($M_{5\text{-year-olds Authority-based}} = 2.15$, Authority-based vs. Control, $p = .07$). When directly comparing the two testimony conditions, we confirmed that children's moral judgments in the Outcome-based condition were significantly more positive than their judgments in the Authority-based condition (Authority-based vs. Outcome-based, adjusted $p = .027$). By implication, while the Outcome-based explanations affected children's moral judgments across all age groups, there were age-related differences in children's receptivity to the Authority-based explanations (see Fig. 3).

Children's justifications of their moral judgments. When asked to explain their moral judgments, child participants gave an explanation in 72.14 % of the trials in the Outcome-based condition, 67.19 % of the trials in the Authority-based condition and 69.62 % of the trials in the Control condition. The children who did not give a justification either said "I don't know" or remained silent.

All children's justifications for their positive or negative judgments could be assigned to one of five categories: (1) *Positive or negative outcomes*; (2) *Familiar moral actions*; (3) *Authority*; (4) *Restatement*; and (5) *Irrelevant* (see definitions and examples of the categories in Table 1).

Importantly, we found that if children made a positive moral judgment (i.e., saying that the novel moral action was "good"), the patterns of their justifications were different across conditions: Children were more likely to mention *positive outcomes* in the the Outcome-based condition (46.5 % of the responses in the Outcome-based condition, see Table 2) compared to the two other conditions. Children in the Authority-based condition were also more likely to use *authority* explanations (16 % of the responses in the Authority-based condition) compared to children in the two other conditions. By contrast, if children made a negative judgment (i.e., judging the novel moral action to be "bad"), their open-ended justification patterns were consistent across conditions: The most common type of justification cited *familiar moral actions* (e.g., "Because it's kind of like hitting or hurting people.").

Table 1
Children' justification categories for negative moral judgments.

Category Name	Description	Example
Positive or negative outcomes	Emphasizing consequences for the transgressor or the victim, including how the action would hurt the victim, result in punishment for the transgressor, or how the transgressor would have positive feelings or good outcomes.	"Because it kind of hurts her (victim's) feelings."; "Because if you take other people's toys you might get in trouble and get a time out."; "Because then both children can play, they will be so happy!"
Familiar moral actions	Interpreting the story by citing familiar moral actions and considerations, including citing familiar moral transgressions, proposing alternative prosocial actions that the transgressor should have done, or appealing to fairness, harm-related, or intention-based concerns to justify the transgressor's behavior.	"Because it's kind of like hitting or hurting people."; "Because you should negotiate with him/her. If he/she agrees that you could play, then you can play"; "Because you need to share your food."; "Because he will return it soon after playing with it."; "Because he didn't mean it"
Authority	Referring to the testimony they heard, or that the informant has the authority to decide whether the action was good.	"Because she said it's good." "Because the lady in it gets to decide." 'Because I had to listen to that lady."
Restatement	Restating their positive or negative evaluation of the action, or commenting on the transgressor's good or bad moral characters	"Because it's mean."; "Because it's not nice."; "Because tamming is good for you."; "Because he is a good boy."
Irrelevant	Giving other justifications that are not listed above or not related to the vignette.	"Because my new dog mibbed"; "Because he didn't hit me."

Children's deserved punishment responses. For this task, we coded children' responses to the *deserved punishment questions* (e.g.,"Should [Devon] get in trouble?") into a three-point scale (a lot of trouble =2, a little trouble = 1, no trouble = 0) and analyzed them with LMMs.

Here, we found a significant Age × Condition interaction, $x^2(2) = 9$, $p = .01$. With age, children judged the transgressor to be more deserving of punishment in the Control and Authority-based Conditions, but they suggested milder punishment with age in the Outcome-based Condition (see Fig. 4). Post-hoc adjusted pairwise tests for each age group found that 3- and 4-year-old children's responses did not significantly differ across the conditions (3-year-olds: $M_{\text{Outcome-based}} = 1.03$, $M_{\text{Authority-based}} = 0.771$, $M_{\text{Control}} = 0.828$; 4-year-olds: $M_{\text{Outcome-based}} = 0.893$, $M_{\text{Authority-based}} = 1.18$, $M_{\text{Control}} = 1.24$, $ps > 0.4$). However, 5-year-old children were less likely to punish the transgressor in the Outcome-based condition than the Control condition ($M_{\text{Outcome-based}} = 0.85$, $M_{\text{Control}} = 1.24$), $p = .03$; But their responses in the Authority-based condition ($M_{\text{Authority-based}} = 1.18$) did not significantly differ from the Control condition, *ns*, or the Outcome-based condition, $p = .05$. These results indicate that the Outcome-based explanation (but not Authority-based explanation) affected older children's judgment about deserved punishment for the transgressor.

Children's belief strength responses. The *belief strength task* was included to explore whether children's initial moral judgments would transfer to a new context, and whether children would transmit their initial judgment to others.

Context transfer. In this task, children evaluated the permissibility of the novel actions in new contexts (very bad =3, very good = 0). Here, we found significant effects of Age ($x^2(1) = 61.2$, $p < .001$) and Condition ($x^2(2) = 15.8$, $p = .0004$), but no effect of Culture and no significant interactions. Post hoc B—H adjusted pairwise comparisons revealed that compared to the Control condition ($M = 2.12$), children rated the novel actions less negatively in both the Authority-based condition ($M = 1.77$, $p = .002$) and Outcome-based condition ($M = 1.72$, $p = .0009$). But the overall effect of the two testimony conditions are similar (Outcome-based vs. Authority-based, $p = .7$).

Info-transmission. In the *info-transmission* task, children were asked to transmit their moral judgments to others. The pattern of results in this task aligned with the *context transfer* task. There were significant effects of Age ($x^2(1) = 53.4$, $p < .001$) and Condition ($x^2(2) = 38.1$, $p < .001$), but there were no effects of Culture and no significant interactions. Specifically, children in both Authority-based ($M = 1.6$) and Outcome-based ($M = 1.65$) conditions judged the novel moral actions to be more permissible than children in the Control condition ($M = 2.22$, $ps < 0.001$). But children's responses did not differ across the two testimony conditions ($p = .6$).

Parent Characteristics. Parent surveys on authoritarianism and social conformity were collected as we were interested in whether it would predict children's level of acceptance in moral explanations. On average, Chinese adults ($M = 1.67$ out of 4, $SD = 0.98$) and parents ($M = 1.43$ out of 4, $SD = 0.88$) scored higher on authoritarianism compared to U.S. American adults ($M = 1.09$, $SD = 1.20$) and parents ($M = 0.86$, $SD = 1.06$). A linear regression using Participant Group (adult participants, parents of child participants) and Culture (China, U.S.) as predictors and authoritarianism score as the response found a significant main effect of Culture, $B = -0.57$, $SE(B) = 0.09$, $p < .0001$, indicating that Chinese parents and adult participants had higher authoritarian scores than U.S. participants. We also found an effect of Participant Group ($B = -0.23$, $SE(B) = 0.09$, $p = .01$), indicating that adult participants had higher authoritarianism scores than parents of the child participants.

We found similar patterns of results for the average social conformity scores, with Chinese participants (Chinese adults: $M = 0.38$ out of 1, $SD = 0.19$; Chinese parents: $M = 0.34$ out of 1, $SD = 0.17$) scoring higher in

Table 2
Children's justifications for their positive and negative moral judgments by condition.

	Positive moral judgments			Negative moral judgments		
Condition	Authority-based	Outcome-based	Control	Authority-based	Outcome-based	Control
Positive or negative outcomes	4.3 %	46.5 %	2.3 %	17.4 %	19.8 %	15.2 %
Familiar moral actions	11.1 %	14.4 %	11.6 %	46.8 %	44.0 %	39.8 %
Authority	16.0 %	1.0 %	0.0 %	0.5 %	0.0 %	0.0 %
Restatement	16.7 %	5.0 %	16.3 %	10.6 %	11.0 %	15.8 %
Irrelevant	6.8 %	1.0 %	14.0 %	0.9 %	2.2 %	2.1 %
No response	45.1 %	32.2 %	55.8 %	23.9 %	23.1 %	27.1 %

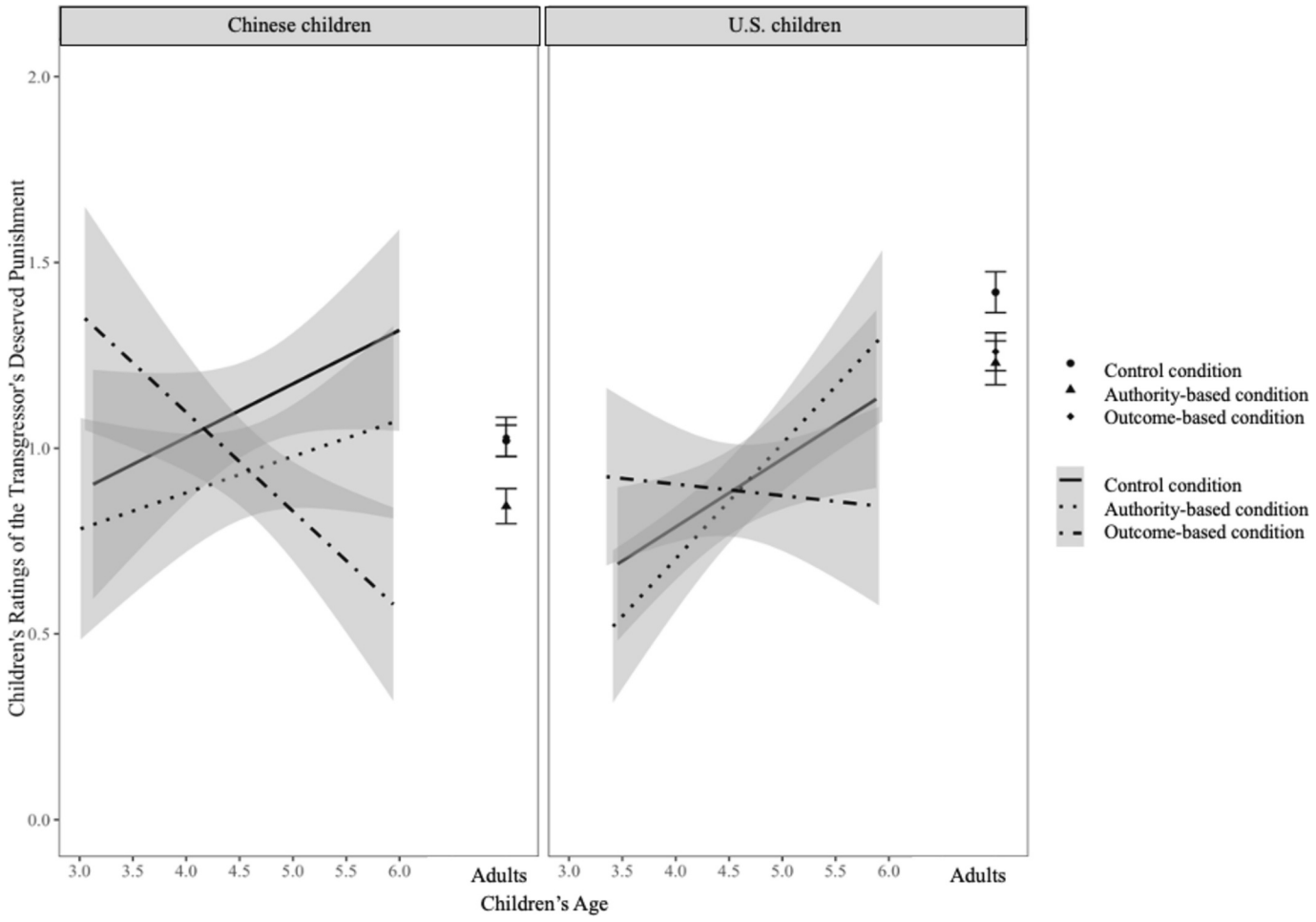


Fig. 4. Participants' ratings of the transgressors' deserved punishment in each country as a function of Age and Condition.
Notes. Separate line types indicate children's deserved punishment responses in each condition (Outcome-based, Authority-based, Control). Gray shading indicates standard errors. Data points represent adults' deserved punishment responses.

social conformity than U.S. participants (U.S. adults: $M = 0.25$, $SD = 0.19$; U.S. parents: $M = 0.27$, $SD = 0.19$), $B = -0.09$, $SE(B) = 0.02$, $p < .001$. As expected, social conformity was highly positively correlated with authoritarianism ($r = 0.54$, $p < .001$).

When examining the correlations between the parental measures and children's moral judgment responses, we found that parental social conformity score was negatively correlated with children's moral judgments in the context transfer task ($r = -0.07$, $p = .02$) and negatively correlated with the information transmission task ($r = -0.06$, $p = .06$). However, when authoritarianism and social conformity were added as predictors and compared with the main models, neither of them significantly improved the fit of the models (Moral Judgment Scores: *Authoritarianism:* $x^2(1) = 2.9$, $p = .09$, *Social Conformity*: $x^2(1) = 1.4$, $p = .23$; Context Transfer Scores: *Authoritarianism:* $x^2(1) = 2.1$, $p = .15$, *Social Conformity*: $x^2(1) = 3$, $p = .09$; Info Transmission Scores: *Authoritarianism:* $x^2(1) = 3.8$, $p = .05$, *Social Conformity*: $x^2(1) = 1.7$, $p = .2$). These results indicate that parental authoritarianism and social conformity values as measured here did not significantly predict children's acceptance of moral explanations.

3. Discussion

The current study assessed whether 3- to 5-year-old Chinese and U.S. American children and adults judge novel, distress-inducing actions to be more morally permissible after an adult informant had given two types of counter-intuitive explanations: *Outcome-based* explanations that focus on consequences and *Authority-based* explanations that emphasize the speaker's authority. We found that both types of explanations moved

children's (but not adults') moral judgments of the permissibility of harm-related transgressions, indicating that children's decisions to change their moral beliefs were supported by the reasons provided. Children's context-transfer judgments and transmission of the judgments in the *belief strength* task were also affected by the two types of explanations, indicating that children's responses did not merely signal compliance to the social demands of the task, but likely reflected genuine changes in their moral judgment. Furthermore, children *across both cultural groups* were more selective in their trust in adult explanations with age, such that they became more likely to defer to the counter-intuitive moral claims when provided with Outcome-based explanations compared to Authority-based explanations.

Our work shows that children from both cultures rated novel harm-related transgressions more positively in the presence of authority-based and outcome-based explanations. These findings clarify the role of adult testimony on children's moral judgments (Li et al., 2019; Rottman et al., 2017) by uncovering the influence that reasons have on children's decisions to update their prior harm-related moral judgments. Specifically, this work is the first to show that across two cultural contexts, children revised their moral judgments both in cases when adults provide an explicit reason related to the positive outcomes for the speaker, and in cases when the adult speaker emphasizes her authority. On the surface, this finding seems to stand in contrast with previous work suggesting that children condemn basic, harmful actions from an early age (Hamlin et al., 2007; Smetana, 2006). Thus, if children honor an anti-harm principle, an important question concerns why children judged harmful actions as more morally permissible upon hearing the adult's explanations. We think children's commitment to the anti-harm *principle* was not abandoned upon hearing unexpected adult testimony. Rather, it is possible that the two types of explanations guided children's moral judgments when applying the anti-harm moral principle to novel contexts. Specifically, children were more likely to judge the moral actions as permissible in the *Outcome-based* condition compared to the *Control* condition, likely because these explanations minimized the distress caused to the victim and prioritized the positive outcomes for the transgressor. This possibility is supported by children's explanations in this condition, which emphasized the *positive outcomes* for the transgressor (e.g., "Because he could eat the ice cream."). In addition, children in the *Authority-based* condition also rated the moral actions as more permissible, likely because they trusted her authority on the interpretations of ambiguous harm-related actions as a result.

Given that children might find different explanations compelling, another question we explored was whether the two types of adult explanations posed the same level of influence on children's moral judgments and evaluations of the transgressors. The results revealed an interesting developmental finding that 3- and 4-year-old Chinese and U. S. children were equally affected by the two types of explanations in their moral judgments, but 5-year-olds from both countries were more influenced by *Outcome-based* explanations (which emphasized the positive consequences for the transgressor), and they were less likely to be convinced by *Authority-based* explanations (in which they were asked to believe on an adult's authority). This pattern of results was evident in children's moral judgment responses, as well as their judgments about the deserved punishment of the transgressor.

It is possible that Outcome-based explanations by an adult informant appeal to children with age because they have started to appreciate that moral norms are obligatory and governed by social and cultural groups (Rhodes & Wellman, 2017; Tomasello, 2020), and are unalterable by individual beliefs and desires (Chernyak, Kang, & Kushnir, 2019; Heiphetz & Young, 2017). Thus, while taking an adult's words and trusting her authority (i.e., "transmission", Hills, 2019) might be compelling enough for younger children to revise their moral beliefs, older children may increasingly require additional reasons or explanations before accepting someone's authority as a basis for a revised belief. Specifically, older children across both cultural contexts may have doubted that a single individual with unspecified credentials had the authority to "decide" whether an action was good or bad. This possibility is supported by the broader literature on testimony in non-moral domains which suggests that around age 5, children no longer trust an adult's testimony unconditionally, and discredit the informant only when testimonial failures lack "reasonable" explanations (e.g., limitations in access, for a review, see Koenig, Tiberius, & Hamlin, 2019). This shift may relate to children moving away from a "default" trust in adults (Jaswal & Kondrad, 2016), or to an attenuation of their tendency to prioritize interpersonal considerations (Koenig, Li, & McMyler, 2022). Additionally, statements rooted in practical authority may appear "circular" to older children, and children's increasing skepticism towards the adult's authority-based explanations with age might reflect their attunement to argument circularity, or overall argument quality, compared to 3-year-olds (e.g., Castelain, Bernard, Van der Henst, & Mercier, 2016; Corriveau & Kurkul, 2014; Koenig, 2012; Ma, Cui, Wan, Chen, & Corriveau, 2024; Mercier, Bernard, & Clément, 2014). Thus, it is possible that children are increasingly discerning of testimony from adults when presented with explanations in the moral domain as well.

Another alternative, but not mutually exclusive possibility is that older children have started to appreciate that a certain level of personal autonomy or independent agency is needed in making moral judgments, so merely being presented with someone's authority may not be enough to move their moral judgments. This possibility is supported by children's differential treatment of the two explanations in their open-ended justifications: When asked to explain why the novel transgression was "good", the proportion of responses which focused on positive outcomes in the Outcome-based condition (46.5 %) was higher than the proportion of responses focused on authority explanations in the Authority-based condition (16 %). Thus, perhaps children did not feel that it was legitimate to cite someone else's testimony as justification for their own moral beliefs, and instead tried to come up with their own rationale (Hopkins, 2007).

While children gave greater weight to outcome-based explanations across both cultures, it's also true that they found both types of explanations less compelling with age —even within the relatively narrow range of 3 to 5 years. One possible explanation is that the harm-related moral principle strengthens with age due to socialization and the repeated application of the principle in everyday life. As children grow older, they internalize and practice moral norms that prohibit causing physical harm, leading to stronger initial beliefs that are more resistant to change. This developmental change is evident even in the Control condition, where older children and adults judged the novel harm-related actions as morally worse compared to younger children. In addition, the specific adult testimony provided in this study—focusing on positive outcomes for the transgressor or the informant's authority—may become less influential with age. Adults, in particular, might view explanations that highlight benefits to the transgressor or the speaker's authority as insufficient justification for endorsing harmful actions. However, recent research reveals that when provided with more complex moral scenarios that elicit more uncertainty (e.g., moral dilemmas), or more persuasive testimony (e.g., deontological reasoning, testimony coming from a group), even adults' judgments and behaviors can be significantly influenced in harm-related situations (e.g., Bostyn & Roets, 2017; Cornwell, Jago, & Higgins, 2019; Kelly, Ngo, Chituc, Huettel, & Sinnott-Armstrong, 2017; Chituc & Sinnott-Armstrong, 2020). This lends support to the possibility that harm-related moral judgments remain sensitive to certain forms of testimonial influence, with the extent of influence being determined by the form the harm takes (e.g., simple vs. complex) and the nature of message.

In the current study, our choice of outcome-based and authority-based explanations was guided by prior research (Charafeddine et al., 2015; Li et al., 2019) and theoretical interests in exploring the roles of authority and consequences (e.g., Kohlberg, 1981; Smetana, 1985; Hills, 2019). One important future direction is to broaden the space of reasons that speakers provide to include other types of compelling moral explanations. For example, future research could explore whether

compared to younger children, older children are more convinced by explanations that emphasize collective authority (e.g., "Because that's what we decided." Tomasello (2020) compared to explanations that exert individual authority. Future studies can also provide children with other types of outcome-focused arguments which stress that the transgression could be for the greater good, or the victim's own good (e.g., "It is good because it could save more people."). Moreover, since outcome-based explanations is only one example of reason-based moral arguments, it is important to assess the effect of other modes of moral reasoning that do not focus on consequences of the action, such as deontological reasoning (e.g., stressing that the action itself is the right thing to do, Alexander & Moore, 2021) and sentimentalist reasoning (e.g., appealing to emotions of the characters, Haidt & Bjorklund, 2008). Our project also opens new avenues for research by extending the novel moral situations to real-life moral situations. For example, future studies could explore how adult explanations —such as outcome-based or authority-based testimony—influence moral judgments when children face conflicts between competing moral obligations (e.g., weighing harm-related and fairness-related obligations). In such cases, outcome-based explanations might emphasize the positive outcomes for the victim (e.g., 'Because it helps her learn how to share'), while authority-based explanations could prioritize one obligation over the other from a position of power.

We also found interesting cross-cultural differences in parental values: Chinese parents in our sample scored higher on authoritarianism and social conformity compared to U.S. parents, indicating that they placed more value on authority and conformity-related considerations in early socialization practices. However, it is interesting that Chinese children's moral judgment responses did not differ from U.S. children. In particular, they were not more receptive to Authority-based explanations compared to their U.S. counterparts. Future studies could make the authority of the speaker more salient, which can be achieved either by changing the informants' identity visually (e.g., presenting children with a more senior person instead of an informant in her early twenties), giving more explicit verbal cues when introducing the informant (e.g., having the experimenter introduce the informant as someone who is putatively granted a superior status such as teachers), or by demonstrating the informant's relative social status (e.g., showing that others elected the informant to a position of decision-making power, Kajanus et al., 2020; Margoni, Baillargeon, & Surian, 2018; Heck, Bas, & Kinzler, 2022). It is possible that Chinese preschoolers might be more receptive to these more salient authority-related cues compared to their U.S. counterparts.

Because children depend greatly on others to learn about the moral world around them, it is important to understand the mechanisms by which they actively optimize their social learning in moral contexts. Our findings reveal that 3- to 5-year-old Chinese and U.S. children judged novel, distress-inducing actions to be morally wrong independently, but unlike adults, they shifted their judgments upon hearing explanations that challenged their initial beliefs —either by focusing on the outcomes for the transgressor or by emphasizing the informant's authority. With age, children's moral judgments were less influenced by Authority-based explanations, but Outcome-based explanations continued to affect children's moral decisions. This study offers new insights that guides future research on how age, cultural background, and the nature of testimonial influence affect children's harm-related moral judgments.

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CRediT authorship contribution statement

Pearl Han Li: Writing – review & editing, Writing – original draft, Visualization, Resources, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Melissa A. Koenig:** Writing – review & editing, Supervision, Resources, Methodology, Conceptualization.

Data availability

The data and study materials that support the findings of the study are openly available in Open Science Framework and can be accessed at the following link, http://osf.io/wjbn7/.

Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.cognition.2024.105994.

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