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Empirical Article

Children across diverse societies exchange reasons to resolve disagreements

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Abstract

The exchange of reasons in rational discourse is crucial for resolving disagreements. In a preregistered cross-cultural study, 360 5- to 9-year-old children from China, Kenya, and the U.S. (51.6% female) participated in a dyadic decision-making task (data collection: June 2022 to April 2023). Across cultural contexts, children consistently exchanged reasons. Reason-giving was spontaneous—it appeared without prior training—and selective: children provided reasons more often in contexts of disagreement compared to agreement. Chinese children gave reasons at an earlier age than U.S. and Kenyan children. Overall, our findings challenge claims that the exchange of reasons is a Western-unique mechanism for collective decision-making and suggest that, from a young age, children across diverse societies possess key capacities for engaging in rational public discourse.

Keywords social reasoning, argumentation, communication, cross-cultural development

Lay summary

Giving reasons for their views and discussing them is a key part of how people make effective decisions together. But when does this ability develop? In this study, we observed 360 5- to 9-year-old children from three diverse backgrounds—China, Kenya, and the U.S.—as they worked in pairs to make decisions about where to retrieve a reward. Children from all cultures tried to convince their partner by giving reasons, especially when they disagreed, even though they had not been taught to do so. We also found some cultural differences: children in China began doing this earlier than those in Kenya and the U.S. Overall, the findings suggest that exchanging reasons is a widespread tool that children use to coordinate and negotiate decisions from a young age.

From citizens in Oakland, California, debating how to improve their city's public transportation network, to small groups of San hunter-gatherers in the Kalahari Desert deciding where to set up camp, to villagers at Gram Sabhas (the world's largest deliberative institution in Central India) discussing how to respond to a changing climate—people around the world exchange reasons to make collective decisions and resolve disagreements (e.g., Habermas, 1996; Sen, 2003). This exercise of "public reason" (Rawls, 1996) is key in any historical moment, but it is of particular relevance at a time when public discourse is distorted by fake news, echo chambers, and filter bubbles.

Despite these widespread examples, early theoretical perspectives suggested that argumentation and debate may reflect specifically Western cultural practices (Gambetta, 1998; Gunaratne,

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2006; Peng & Nisbett, 1999). Proponents of this view argued, for instance, that many East Asian cultures place high value on social harmony, and thus may see overt argumentation as too socially disruptive (Kitayama et al., 2009). They also noted that many East Asian cultures tend to endorse a more "holistic" style of thinking (characterized by greater tolerance for contradiction), which may make individuals in these contexts more comfortable with leaving disagreements unresolved (Nakamura, 1964; Nisbett et al., 2001). Finally, in cultural contexts marked by strict social hierarchies—which includes the Chinese and Kenyan cultural contexts in focus here—reason-based collective decision-making procedures may be less common because conflicts may more often be settled through unilateral decisions by authority figures (see Gunkel et al., 2016; Hofstede, 2011).

In contrast, more recent theoretical perspectives have challenged the view that the exchange of reasons is primarily a WEIRD (Western, Educated, Industrialized, Rich, Democratic; see Henrich et al., 2010) phenomenon. Instead, they propose that joint reasoning is a universal, early-developing feature of human nature (Dryzek et al., 2019; Mercier, 2011; Mercier & Sperber, 2011; Pinker, 2021; Sen, 2003; Tomasello, 2019). In line with this view, initial empirical evidence with adults suggests that individuals from Japan and from an indigenous Mayan community engage in and benefit from the exchange of reasons in ways comparable to Western adults (i.e., reason-giving facilitates their collaborative decision-making; Boku et al., 2018; Castelain et al., 2016a, 2016b; Mercier et al., 2016; see also Bahrami et al., 2010). Yet, whether the capacity to exchange reasons with others develops similarly or differently across cultural contexts is currently unknown. To address this gap, the present study investigates whether children from three culturally diverse contexts—China, Kenya, and the U.S.—spontaneously and selectively exchange reasons to resolve disagreements and make joint decisions.

While the broader development of children's reasoning abilities has long been of interest to researchers, this work has been conducted predominantly with children from WEIRD cultural contexts, and has largely focused on children's understanding of *explanatory reasons*—reasons that clarify why a particular action is wrong or why a certain event occurred. For example, in one major line of work in this area, researchers investigate how children reason about different kinds of norm violations (see Dahl & Killen, 2018; Killen & Smetana, 2022). These studies find that, from around preschool age, children commonly reason about violations of moral norms (e.g., norms related to not harming others) based on concerns with others' welfare, fairness, or rights, while they reason about violations of conventional norms (e.g., norms related to table manners or dressing codes) based on concerns with authority, rules, consensus, or tradition (Langenhoff et al., 2022; Nucci & Turiel, 1978; Smetana, 1985; for a recent meta-analysis, see Yoo & Smetana, 2022; see Yazdi et al., 2026 for a recent study including non-WEIRD populations). In another major line of work on explanatory reasons, researchers investigate children's reasoning about causal events, and how it influences their learning (see Lombrozo, 2012). For example, in one study, researchers prompted children to explain the functioning of a novel causal toy, and found that doing so (as opposed to merely observing the toy) promoted children's causal learning and generalization (Legare & Lombrozo, 2014; see also Legare, 2012; Walker et al., 2014; for an overview, see Lombrozo, 2006).

In contrast, the current study focuses on children's developing ability to rationally exchange *reasons for beliefs* (Scanlon, 1998). For public discourse and effective joint decision-making, this ability is particularly important, as it allows individuals to align their beliefs with the best available evidence and successfully coordinate collective action (e.g., "I think we should set up camp near the hills because there's more water there"; see Habermas, 1996; Tomasello, 2019). The limited research that exists with regard to children's emerging understanding of reasons for beliefs (henceforth "reasons") has largely focused on how children *respond* to reasons given to them by others. For example, from around age four, children from Europe, the U.S., and Canada (Domberg et al., 2019; Koenig, 2012; Mercier et al., 2014; Ronfard & Lane, 2018), as well as children from Japan (Mercier et al., 2018), China (Schleihauf et al., 2023), and indigenous Mayan communities in Guatemala (Castelain et al., 2016a, 2016b), are more likely to believe others who supported their views with stronger reasons compared to those who provided weaker ones, suggesting that this particular aspect of children's reason-understanding develops similarly across cultural contexts. Moreover, when exposed to disagreement regarding their own beliefs, preschoolers in the U.S. and Europe tend to revise these beliefs selectively depending on whether their own or the disagreeing other's belief is better supported by evidence (Langenhoff et al., 2023; Rakoczy et al., 2022; Schleihauf et al., 2022; see also Ronfard et al., 2018; Ronfard et al., 2021; no comparable evidence exists from non-WEIRD populations).

Yet, to become rational contributors to public discourse, children must not only learn to *respond* to others' reasons; they must also develop the second main skill of rational discourse, *reason-giving* (see Kuhn et al., 2013). That is, children must recognize when and how to provide justifications for their own views. Prior work with children from the U.S. and Europe shows that even 2- and 3-year-olds point to evidence when trying to get a decision-making partner to accept their position (Hartwell et al., 2022; Mascaro et al., 2019). By around age 5, children begin to verbally articulate reasons for their beliefs, particularly when joint decision-making requires negotiating different beliefs, insights, or perspectives (Köymen et al., 2014, 2016, 2020; Köymen & Tomasello, 2020). Over the early school years, WEIRD children's reason-giving abilities become increasingly nuanced, such that by age seven they explicitly compare the quality of opposing reasons (e.g., "you only heard it but I saw it with my own eyes"; Köymen & Engelmann, 2022; Köymen & Tomasello, 2018).

To our knowledge, the current study is the first to examine the development of children's reason-giving from a cross-cultural perspective. On the one hand, it seems plausible that children's reason-giving might differ across cultural contexts—despite initial work showing cross-cultural similarities in reason-giving among adults (e.g., Boku et al., 2018)—because adults in WEIRD societies have been shown to communicate with their children in distinctive ways. For instance, caregivers in the U.S. and Europe tend to provide their children with more one-on-one verbal input than caregivers in many other cultural contexts (Cristia et al., 2019; Heath, 1983; Lieven, 1994). Moreover, and most relevant here, they frequently provide children with reasons for their actions and beliefs, and encourage children's participation in discussion and negotiation (Baumrind, 1971; Keller, 2022). By contrast, adult–child relationships in many other cultural contexts, including

Kenya (Bornstein et al., 2011) and China (Stewart et al., 1998; Wang et al., 2024), tend to be more hierarchical, and caregivers are often more likely to establish firm rules and expectations without providing explicit justifications or opportunities for negotiation (Bornstein, 2013; Regalado et al., 2004). If—as a consequence of these different socialization practices—children in Kenya and China are less frequently exposed to reasons than children in the U.S., they may also be less likely to use reasons as a cognitive tool for their own decision-making.

On the other hand, recent research questions whether parenting practices can be meaningfully divided along rigid cultural lines. Instead, it suggests that contextual and situational factors more accurately explain when and why adults offer reasons to children (Prevoo & Tamis-LeMonda, 2017; Sadiq Sangawi et al., 2015; Smetana, 2017). Moreover, parent–child interactions may not be the primary context in which children's ability to give reasons naturally emerges. When interacting with a seemingly all-knowing adult, children may simply defer to the adult's authority or greater social status, especially when a disagreement arises. But in interactions with peers, children may be more likely to view one another as equals, and, in light of disagreement, consider both conflicting perspectives as equally valid. This, in turn, may naturally prompt children to attend to the reasons behind their own beliefs, which they can then offer as justifications to their interlocutors (Köymen & Tomasello, 2020; Langenhoff et al., 2025; Perret-Clermont, 2022; Piaget, 1952). Indeed, many of the above-mentioned studies showing children's reason-giving during joint decision-making with peers were designed to create disagreements between children and their reasoning partners, even if disagreement was not always explicitly manipulated (e.g., Hartwell et al., 2022; Köymen et al., 2020, 2016). In light of this, we focus here on contexts of peer disagreement, as we believe they offer the most natural setting for revealing early reason-giving capacities in children from various cultural backgrounds.

The present study

The goal of the current research was to investigate whether children from three diverse cultural backgrounds—China, Kenya, and the U.S.—exchange reasons to resolve disagreements and make joint decisions. The literature reviewed so far points to conflicting predictions. One possibility is that children in the U.S.—a context where parents tend to expose children to reasons from an early age—might engage in peer reason-giving earlier or more frequently than children in our Chinese or Kenyan samples—where parent–child relationships tend to be more hierarchical, and reasoning and argumentation may be less culturally encouraged (e.g., Bornstein et al., 2011; Keller, 2022). Another possibility, in line with recent theoretical accounts (e.g., Mercier & Sperber, 2011; Tomasello, 2019), is that children's reason-giving might develop in similar patterns across cultures—particularly when it is observed in the context of peer disagreements, where children might be most likely to consciously reflect on the grounds for their belief (e.g., Langenhoff et al., 2025; Piaget, 1952).

We aimed to assess reason-giving in a context as naturalistic as possible, resembling a decision-making situation that children in all three cultural contexts may naturally encounter in their everyday lives with peers. To this end, we created a scenario in which dyads of same-aged peers (60 dyads per cultural context) had to collaboratively decide which of two boxes they wanted to open to obtain a reward (see Figure 1). Thus, both children shared a common goal (finding a reward) but, in the disagreement condition (see below), held different beliefs about how to achieve this goal. Importantly, this setup also mirrors many of the real-world public reasoning contexts discussed in the introduction—such as town hall meetings—where people often share the same desired outcome but disagree on the best way to get there.

The procedure consisted of two phases. In Phase 1—the evidence-gathering phase—children were separately exposed to evidence regarding the reward's location. One child received perceptual evidence (they saw where the reward was hidden) whereas the other child received testimony-based evidence (they were told by an experimenter where the reward was hidden). Importantly, we manipulated whether the evidence that children gathered individually supported the same or different conclusions. In the *agreement condition*, children received evidence supporting the same conclusion (e.g., one child watched how the rewards were hidden in a blue box, while the other child was told that the rewards were in the blue box). In the *disagreement condition*, children were presented with conflicting evidence (e.g., one child watched how the rewards were hidden in a blue box, while the other child was told that the rewards were in a red box). In Phase 2—the joint deliberation phase—children came together to jointly decide which box to open.

We were interested in whether children's reason-giving would show similar or different patterns across cultural contexts. Following our pre-registered plan, we tested whether, across cultural contexts, children would (1) give more reasons in contexts of disagreement compared to agreement, (2) give more reasons with increasing with age (Köymen et al., 2020), and (3) give fewer reasons after establishing common ground, i.e., after the second compared to the first test trial (Köymen et al., 2016).

Figure 1 Example of study set-up in the three cultural contexts.

Additionally, we examined whether children from different cultures and age groups differed regarding which box they decided to open (i.e., the box supported by perceptual vs. testimonial evidence). Finally, in an exploratory analysis, we tested whether children's decision-making was influenced by dominance (to evaluate whether children—in addition to using a cooperative strategy to resolve disagreements, namely reason-giving—also used a competitive strategy, namely dominance).

Method

Data accessibility

The preregistration, information on power analysis, data, analytic code to reproduce analyses and figures, anonymized transcripts of the dialogues between dyads for each cultural context, photos of study materials, and the study scripts in each language are publicly accessible on OSF and can be accessed at https://doi.org/10.17605/OSF.IO/BMY7S.

Participants

In total, data from 360 (186 females) 5- to-9-year-old children from China, Kenya, and the U.S.—who were paired into $N = 180$ dyads (60 dyads per culture)—were included in the final sample of the study. All data were collected between June 2022 and April 2023. The required sample size was determined with a power simulation, expecting a significant effect of the factor condition. A sample size of 180 dyads led to an average power of $1 - \beta = 0.73$. We tested 7 additional dyads in China and 2 in the U.S. These additional dyads were excluded due to experimental errors (1 in China, 2 in the U.S.), because children misremembered which box was supported by evidence (3 in China), or because children peeked into the boxes before making their decision (3 in China).

Chinese children came from peripheral areas of Beijing. They belonged predominantly to the Han ethnic group, with a significant number coming from migrant families. Children in this area typically grow up with their parents and no more than one sibling (Binah-Pollak, 2014). The majority of the parents of children in our sample had attained a high school education as their highest level of formal schooling. Most children came from low socio-economic backgrounds with many parents engaged in informal employment, such as selling groceries or washing dishes. In China, Confucian principles advocate for enduring parent–child bonds and stress the significance of familial harmony and obedience (Binah-Pollak, 2014; Sun & Ryder, 2016; Xu & Hamamura, 2014). Within the communities studied, parenting approaches are deeply rooted in these traditional values, characterized by a tendency toward punitive measures and strictness, coupled with a lesser degree of warmth and understanding, especially when compared to urban parenting norms (Wang et al., 2024).

Kenyan children in our sample came from rural, low socioeconomic status households near Nanyuki, Laikipia County, and were mainly of Kikuyu ethnicity, which is Kenya's largest ethnic group. Traditionally, the Kikuyu have been small-scale farmers and practicing animal husbandry for their subsistence, but trade and wage work have become increasingly important (Whiting, 1996). Although children are highly valued, many families nowadays restrict their number for economic reasons (Price, 1996). Despite the trend toward smaller families, children typically grow up surrounded by siblings, cousins, and friends of various ages (Kinoti, 2010). Children typically have few or no possessions of their own. Children typically attend preschool from about 4 years of age, and then transition to primary school once they are 5–6 years old. Outside school, children often help with various tasks around the house, attend to younger siblings, or look after animals (Whiting, 1996). Relationships between adults and children tend to be more hierarchical, and teaching is mostly top-down and authoritarian (Kinoti, 2010).

U.S. children were from the California Bay Area and had mixed racial and socioeconomic backgrounds. Children's racial and ethnic make-up was representative of urban areas in Northern California, which is approximately 36% White, 28% Asian, 24% Hispanic or LatinX, 6% African or African American, and 6% who have two or more races (U.S. Census Bureau, 2021). Children in the U.S. typically grow up with their parents and one or two siblings. Other family members often live in other parts of the country and are not part of the children's daily lives. Like in many places in the U.S., parents often encourage psychological autonomy from an early age, and children receive high levels of direct, child-centered pedagogy (Keller, 2022). Schooling often involves more student-centered approaches, including a lot of problem-based and discussion-centered learning. Adults frequently use explanation and reasoning in everyday interactions. Children commonly grow up with many toys and possessions. From an early age, the majority of children are cared for in nurseries and kindergartens and by 6 years of age, children attend primary school (National Center for Education Statistics, 2017).

The study was conducted in accordance with the Declaration of Helsinki and the ethical guidelines of the Chinese Academy of Sciences and the University of California, Berkeley. In China and the U.S., children's caregivers gave informed consent prior to their child taking part in the study. In Kenya, we obtained permission to conduct the research from the National Commission for Science, Technology, and Innovation and the local school boards. Informed consent for children's study participation was given by the responsible head-teachers, who act as guardians while children are in school.

Design and procedure

Children were randomly paired into dyads matched by gender and age, with a maximum age difference of one year between them. In the Kenyan and Chinese samples, dyad members were typically drawn from the same classroom. In the U.S. sample, most dyads were tested at a summer camp, where children had already spent several days or weeks together. Thus, although we did not explicitly control for the relationship between children, children were generally familiar with one another. The study followed a between-subject design, with half of the dyads participating in the disagreement condition, the other half in the agreement condition.

Dominance test

In both conditions, children first participated in a dominance test. Our assessment of dominance was defined in terms of the capacity to exert control over resources (Hawley, 1999). To measure which child in a dyad was the more dominant one, we placed an attractive toy between the two children and left them alone to play with it for 1 min. In line with prior work (Grueneisen &

Tomasello, 2022), the child who took the toy first was identified as the more dominant child of the dyad.

Collaborative decision-making task

Following the dominance test, children participated in two practice trials, which were identical across conditions, and two test trials, which differed according to condition. In both practice trials and test trials, dyads were presented with a pair of boxes and informed that one of the boxes held two rewards (small toys, like marbles or stickers), while the other box was empty. They were instructed that they could, as a team, only choose one of the boxes; if they opened the correct box, both children would get a reward, but if they opened the wrong box, none of them would get a reward. We presented a different pair of boxes in each trial. The boxes belonging to one pair always had different colors, so that it was easy for children to refer to the individual boxes.

The study was run by two experimenters; one experimenter led the study (and provided testimonial evidence in test trials), the other experimenter took care of preparing the boxes (and provided perceptual evidence in test trials; see below). Children were given a maximum of 2 min for their collaborative decisions about which box to open, but they could also call the experimenters back sooner if they were ready. While children discussed, both experimenters stood far enough away from the children (or if possible, left the room), so that children did not feel like they were being overheard. When the experimenters returned, children were given a small rock to place on top of and indicate their chosen box. This method ensured that only one box was chosen, even in the absence of a prior mutual agreement between the children.

Training trials

In training trials, children were familiarized with the general procedure of jointly selecting the box that they thought contained the reward. However, in these trials, children received no evidence regarding which box held the rewards, requiring them to guess. The box selected in the first training trial was set aside. Only after the second test trial, both boxes were opened. For all children, the choice of the first training trial led to a successful outcome (i.e., both boxes had been endowed with rewards), while the choice of the second trial led to failure (neither box had been endowed with rewards). Thus, all children were left with the impression that they made the right choice in the first training trial and the wrong choice in the second training trial.

Test trials

In the test trials, each experimenter asked one child to follow them to opposite corners of the room, where the children individually received evidence about which box contained the rewards. In the agreement condition, children received consistent evidence: one child witnessed an experimenter placing the rewards in one box (perceptual evidence), while the other child was told by the second experimenter that the reward was in the same box (testimonial evidence). In the critical disagreement condition, children received conflicting evidence: one child witnessed an experimenter placing the rewards in one box (perceptual evidence), while the other child was told by the second experimenter that the reward was in a different box (testimonial evidence; to ensure that children were not confusing color words, the testimonial experimenter additionally pointed at photographs of the respective box). Thus, the study was set up such that children in the agreement condition were likely to develop consistent beliefs about the reward's location and encounter little difficulty in their joint decision-making. In contrast, children in the disagreement condition were likely to develop conflicting beliefs, leading to disagreement over which box to open—a conflict they would need to resolve in order to make a rational joint decision and achieve their common goal. Importantly, at the start of the joint deliberation phase, children in the disagreement condition were unaware that they had received opposing evidence. Across cultural contexts, most children initiated the joint deliberation phase by suggesting one of the boxes (e.g., by pointing to a box or naming its color), which made the disagreement apparent.

As in training trials, both boxes were opened after the end of the second test trial. In the test trials, all boxes held rewards. As a result, children were left with the impression that they had correctly chosen in both instances. At the end of the study, children were debriefed and the testimonial experimenter apologized to children for "accidentally" telling them that the rewards were in the wrong box.

Data recording and coding

The full study procedure was video-recorded. Children's conversations during the test trials were then transcribed, and Kenyan (from Swahili) and Chinese (from Mandarin) transcripts were translated into English by native speakers. From the transcripts, we coded whether children mentioned reasons for their respective beliefs about which box to choose. For our main dependent variable, we specified on the dyad-level whether children mentioned (i) both a reason referring to the perceptual evidence (e.g., "I saw her put it in there") *and* a reason referring to the testimonial evidence (e.g., "She told me that it is in the blue box"; coded as [2]), (ii) only one of these reasons (coded as [1]), or no reason at all (coded as [0]). A second coder coded 25% of the data for reliability purposes. Reliability for this variable was very high with $\kappa = 0.93$. Note that children very rarely gave reasons other than the cued perceptual or testimonial reason (e.g., "I want red because it is my favorite color"). These reasons were coded as "other" and were observed in only 16 trials ($\kappa = 0.92$). These reasons were not included in our analyses. In addition to our preregistered main dependent variable, we also coded how many reasons a dyad gave in total (e.g., if a dyad repeated a testimonial reason four times and a perceptual reason twice, they received a count of six. The results from analyses using this dependent measure match those using our preregistered dependent measure and are reported in the SI). To analyze children's box choices, we coded whether the dyads chose to open the box that had been supported by the perceptual or the box that had been supported by the testimonial evidence. For this variable, the interrater reliability was perfect with $\kappa = 1$. To analyze whether power dynamics influence children's choices, we additionally coded whether dyads chose the box for which the dominant child had received evidence (also reaching an interrater reliability of $\kappa = 1$). Description of additional coding for supplementary analyses can be found in the SI.

Data analyses

Statistical analyzes were performed in R (v4.2.3; R Core Team, 2025) using Generalized Linear Modeling (GLMMs, Baayen et al., 2008) implemented in *lme4* (*glmer*; Bates et al., 2015). In line with our preregistration, we fitted two main models, supplemented by several exploratory analyses (described below).

Reason-giving

With the first preregistered model, we analyzed children's reason-giving across cultures. The response variable reason-giving had a lower (0 reason given) and upper bound (2 reasons given). Such variables can be transformed into a binary variable by scoring each given reason (perceptual or testimonial) as 1 and a reason that was not mentioned as 0. Thus, we analyzed these data with a binary response term and a binomial error structure. We generated a full model that contained a two-column response matrix, with the first column indicating reasons given per dyad and trial and the second column indicating reasons not given per dyad and trial. For example, if a dyad mentioned one reason (e.g., the testimonial reason), but not the other (e.g., the perceptual reason), both columns contained a 1, if both reasons were given the first column contained a 2 and the second a 0. As fixed effects, we included condition, age (z-standardized), and culture, as well as the main effects of test trial and gender. Exploratorily, we also included all possible interactions of condition, culture, and age in our analysis. Dyad identity was included as a random intercept, with test trial as a random slope; correlations between random effects were omitted due to identifiability issues. Reduced models and a null model containing only random effects were fitted for model comparison.

As for all reported analyses in this article, the overall R^2 values for the full model were calculated using the r.squaredGLMM function (MuMIn; Barton, 2025), which estimates marginal and conditional R^2 based on the framework by Nakagawa and Schielzeth (2013). Individual R^2 values for fixed effects were computed using the partR2 package (Stoffel, Nakagawa, & Schielzeth, 2023), which quantifies the unique variance explained by each predictor while controlling for all other variables in the model.

To control the Type I error rate, we first tested the overall effect of all predictors by comparing the full model with a null model including only random effects; the full model provided a better fit ($X^2(13) = 45.47$, $p < .001$, $R^2 = 0.17$). Three-way interactions were tested using likelihood-ratio tests (using R's drop1 function) on the full model. Two-way interactions were tested on a reduced model containing only two-way interactions and their corresponding main effects (drop1). Main effects were tested on a model containing only main effects (drop1). Estimates and 95% confidence intervals of significant effects, obtained via 1,000 parametric bootstraps, are shown in the figures.

In addition to the preregistered analyses, we conducted two further analyses with regard to children's reason-giving: First, to test whether the predicted effects held within each culture, we fitted separate models per culture including condition, age, their interaction, and trial as predictors, with dyad ID as a random intercept and trial as a random slope. Second, we tested whether the types of reasons provided by dyads differed across cultures. Therefore, we fitted a model with a binary dependent variable (reason present vs. absent), including type of reason as an additional fixed effect. All other fixed effects followed the preregistered model, with added interactions of age, condition, and culture with type of reason. Similar to the main model, this model explained the data better than the null model ($X^2(11) = 45.79$, $p < .001$, $R^2 = 0.10$). Individual effects were retrieved with the drop1 function.

Box choices

With the second preregistered model, we analyzed children's box choices. The testimonial and perceptual evidence pointed to distinct boxes only in the disagreement condition. Thus, only data from the disagreement condition were analyzed. Since the response variable box choice was binary (testimonial box or perceptual box), we fitted a model with a binomial error structure. As fixed effects, we included age (z-standardized) and culture and their interaction. Dyad identity was included as a random effect with the random slope of test trial (dummy coded and centered). As in the prior model, the correlation between random slope and random intercept were removed from the model. We further fitted a main effect model that lacked interaction term, as well as a null model that only contained the intercept and the random effects. Model comparison revealed that the full model did contribute to the explanation of the data compared to the null model ($X^2(5) = 10.85$, $p = .055$, $R^2 = 0.07$). Thus, we continued to determine the effects of the individual predictors using the drop1 function as described above.

In addition to our preregistered main analysis, we exploratorily analyzed how often dyads chose the box that the more dominant individual had received evidence for. Again, only data from the disagreement condition were analyzed and a model with a binomial error structure was fitted. We included the fixed effects of age (z-standardized) and culture and their interaction. We also included the random intercept of dyad identity and the random slope of test trial (dummy coded and centered). The correlation between random slope and random intercept was again removed from the model. We again fitted an additional main effects model and a null model. Model comparison revealed that the full model did not explain the data better than the null model ($X^2(5) = 4.45$, $p = .487$, $R^2 = 0.03$). Nevertheless, we determined the effects of the individual predictors using the drop1 function. Further information, assumption checks, as well as additional analyses can be found in the SI Appendix.

Results

Reason-giving

As preregistered, we first investigated whether children were more likely to give reasons in the disagreement compared to the agreement condition. The effect for the predictor condition reached significance ($X^2(1) = 21.89$, $p < .001$, $R^2 = 0.06$; Figure 2A), while the effect for the interaction between culture and condition did not ($X^2(2) = 1.58$, $p = .455$, $R^2 < 0.01$). Thus, across cultural contexts, children gave more reasons in the disagreement, compared to the agreement condition. We also found that children's tendency to exchange reasons increased with age ($X^2(1) = 5.30$, $p = .021$, $R^2 = 0.01$; Figure 2B), and that children gave significantly more reasons in the first trial compared to the second trial of the decision-making game ($X^2(1) = 7.11$, $p = .008$, $R^2 = 0.01$; Figure 2C).

When we fitted individual models for each culture, we found that the condition effect persisted in each cultural context (China:

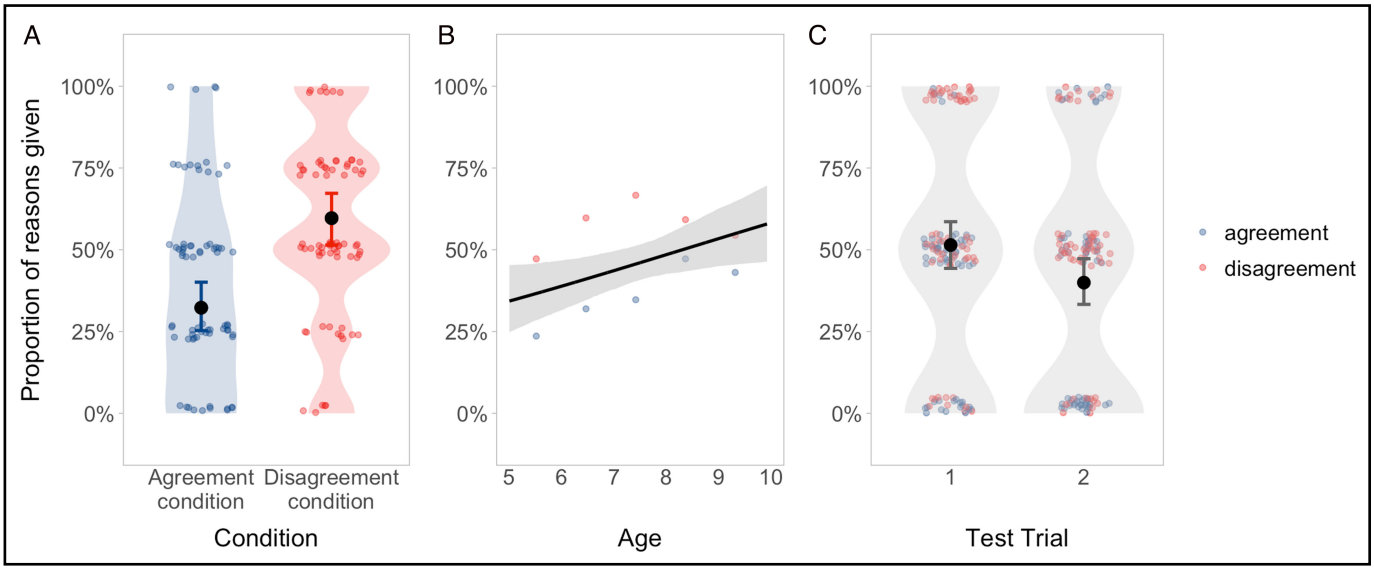

Figure 2 Estimates and confidence intervals of the main analysis of children's reason-giving including data of all cultures as a function of (A) condition, (B) age, and (C) trial. Small dots represent the proportion of reasons given per dyad; in (B), this proportion is averaged across dyads of the same age. In (A) and (B), 100% indicates that dyads provided both a testimonial and a perceptual reason across Trials 1 and 2. In (C), 100% indicates that dyads provided both a testimonial and a perceptual reason within a single trial. The filled circle on the error bar shows the model prediction. The error bars show the bootstrapped 95% confidence intervals (the predictor variables that are not depicted were centered).

$X^2(1) = 12.40$, $p < .001$, $R^2 = 0.09$; Kenya: $X^2(1) = 4.57$, $p = .033$, $R^2 = 0.07$; USA: $X^2(1) = 6.33$, $p = .012$, $R^2 = 0.06$; Figure 3 first row). The age effect held true for Kenya ($X^2(1) = 4.23$, $p = .040$, $R^2 = 0.03$) and the U.S. ($X^2(1) = 3.59$, $p = .058$, $R^2 = 0.04$), but not for China, where even the youngest children frequently provided reasons ($X^2(1) = 0.00$, $R^2 = 0.00$, $p < .985$; Figure 3 second row). With the smaller samples per culture, we no longer found significant effects for trial number; likely because these within-culture analyses were underpowered to detect the trial effect observed in the full sample (China: $X^2(1) = 3.20$, $p = .074$, $R^2 = 0.02$; Kenya: $X^2(1) = 3.40$, $p = .065$, $R^2 = 0.02$; U.S.: $X^2(1) = 0.64$, $p = .423$, $R^2 < 0.01$; see Figure 3 third row).

Including type of reason into the model showed that overall dyads provided testimonial reasons more often (50.8%) than perceptual reasons (42.8%; $X^2(1) = 6.36$, $p = .012$, $R^2 < 0.01$, see Figure S1). There were no significant interactions between type of reason and culture ($X^2(2) = 0.14$, $p = .934$, $R^2 < 0.01$), type of reason and condition ($X^2(1) = 1.11$, $= .292$, $R^2 = 0.10$), or type of reason and age ($X^2(1) = 0.07$, $p = .792$, $R^2 < 0.01$).

Box choice

Next, in line with our preregistration, we investigated whether dyads in the disagreement condition demonstrated distinct preferences for choosing the boxes supported by perceptual versus testimonial evidence, depending on their cultural context and age. Findings revealed that children's box choice estimates did not differ significantly by culture ($X^2(2) = 4.31$, $p = .116$, $R^2 = 0.03$) or age ($X^2(1) = 1.64$, $p = .201$, $R^2 = 0.01$). However, the confidence intervals for the Chinese and the U.S. include chance level, which indicates that children from these cultural contexts did not show a preference for either of the boxes. In contrast, the confidence interval for the Kenyan children is below chance level ($\beta = -0.92$, SE = 0.47, 95% CI [−1.91, −0.05]); thus, Kenyan children showed a slight but significant preference to choose the box supported with a testimonial reason (see Figure 4).

Lastly, we analyzed exploratorily whether dyads in the disagreement condition preferably selected the box the more dominant child in the dyad had received evidence for. This analysis did not reveal that children's decision-making was driven by the more dominant individual. Neither the interaction between culture and age ($X^2(2) = 0.74$, $p = .690$, $R^2 < 0.01$), nor the main effects of culture ($X^2(2) = 1.75$, $p = .417$, $R^2 = 0.01$; see also Figure S2) and age ($X^2(1) = 2.22$, $p = .136$, $R^2 = 0.02$) influenced whether the dyads followed the evidence presented to the more dominant individual.

Discussion

The current study found that 5- to 9-year-old children from three diverse societies–China, Kenya, and the U.S.—exchanged reasons to resolve disagreements and make joint decisions. Reason-giving was spontaneous: children were in no way trained or prompted to provide reasons during our experimental procedure, but nevertheless showed an intuitive and strong tendency to exchange reasons with one another. Reason-giving was also flexible. Rather than justifying their claims independently of context, children provided more reasons in situations of disagreement than agreement, suggesting that they selectively deployed reasons as cognitive tools to manage more complex joint decision-making situations. In line with prior work involving children from WEIRD populations (e.g., Köymen & Tomasello, 2018), children also provided fewer reasons on the second test trial compared to the first, indicating that once common ground had been established, children could coordinate their decisions more efficiently (however this effect did not hold when we analyzed the cultures individually). Finally, we did not find an effect of dominance on children's decision-making.

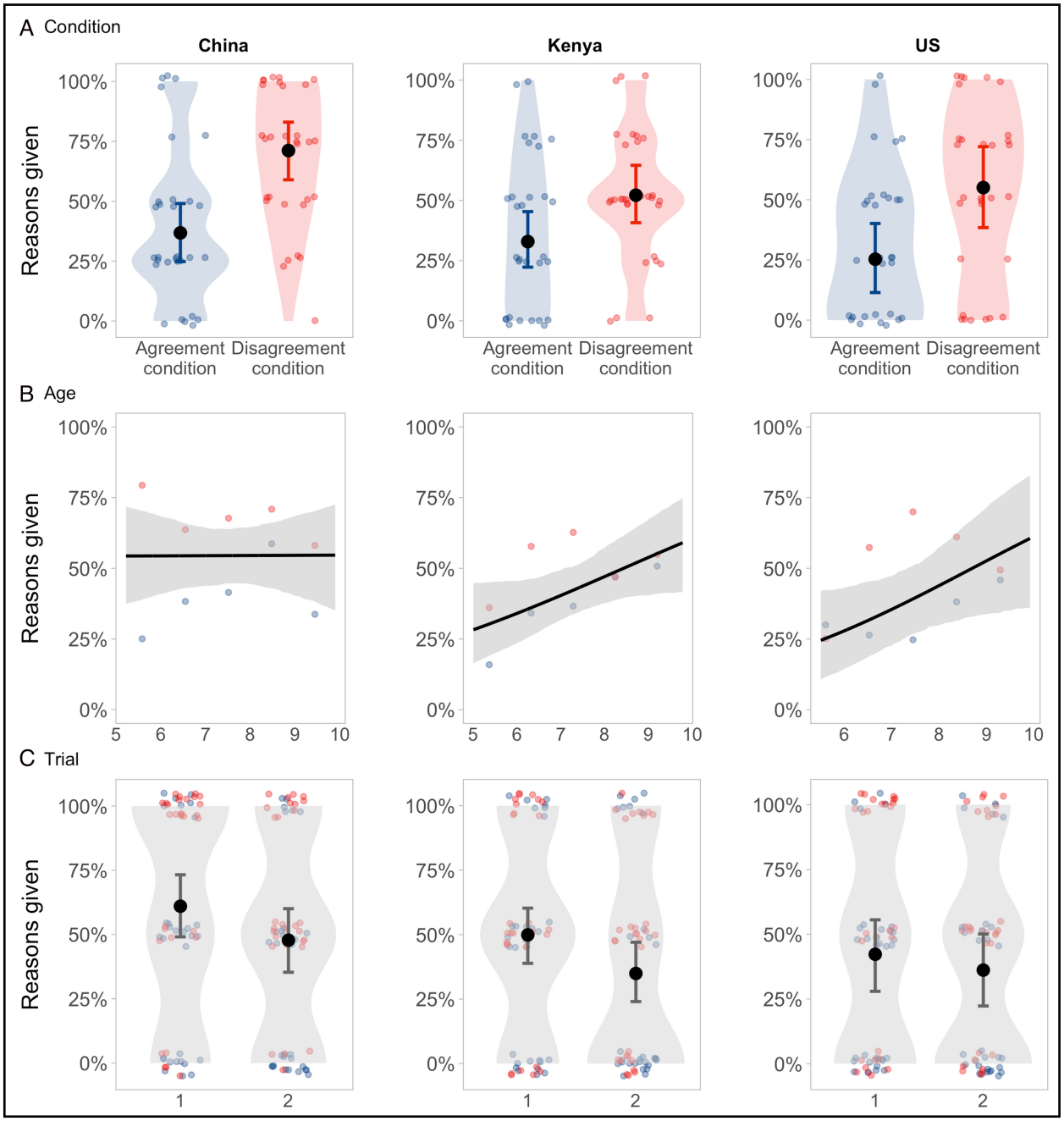

Figure 3 Estimates and confidence intervals of children's reason-giving, analyzed for each culture individually as a function of (A) condition, (B) age, and (C) trial.

Together, these findings suggest that by age 5, children from China, Kenya, and the U.S. possess key capacities for resolving disagreements in a rational and cooperative way—by exchanging reasons. This is remarkable because the three societies differ on various social dimensions that have been singled out as relevant to reason-giving—i.e., the extent to which they emphasize social harmony (Kitayama et al., 2009) and the extent to which they have a more hierarchical versus egalitarian structure (Hofstede, 2011). Moreover, children in these contexts have been argued to grow up exposed to different epistemic practices. While children in the U.S. more often interact with adults who encourage joint reasoning through a focus on giving and asking for justifications (Baumrind, 1971), Chinese and Kenyan children tend to be more commonly surrounded by adults who focus on deference and discourage joint reasoning (Bornstein, 2013; Wang et al., 2024). Despite that, children's reason-giving with their peers looked very similar across cultural contexts. Thus, in addition to help reducing the persistent sampling bias in developmental psychology (Nielsen et al., 2017; see also Lansford, 2022), these findings provide support for the hypothesis that the exchange of reasons in rational discourse is a cross-culturally recurrent—and potentially universal—form of resolving conflicts of interests and making collaborative decisions (Mercier, 2011; Mercier & Sperber, 2011; Pinker, 2021; Sen, 2003).

Yet, although our main findings point to cross-cultural similarity, we also found cultural differences when analyzing the data from each cultural context separately. First, unlike U.S. and Kenyan children, already the youngest Chinese children

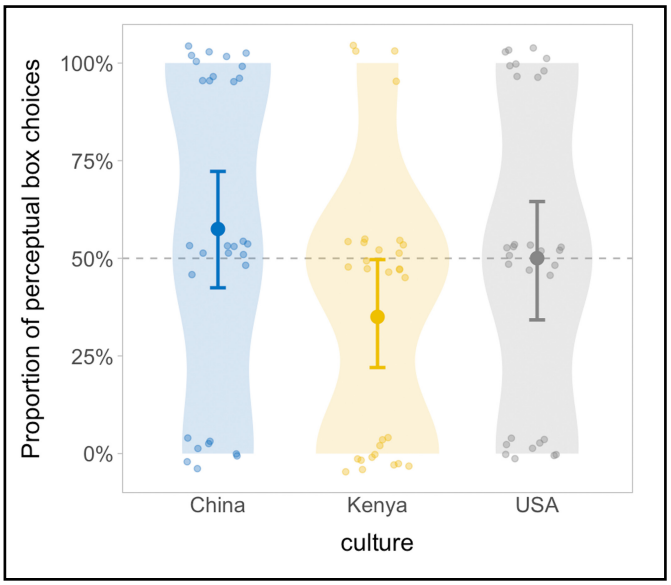

Figure 4 Estimates and confidence intervals of dyad's choices of the box that was endorsed by perceptual evidence as a function of culture. The small dots represent the proportion of perceptual box choices across test trials per dyad. The lines represent the model estimates. The ribbons and error bars show the bootstrapped 95% confidence interval of a generalized linear mixed model with all predictor variables centered except for the ones depicted.

frequently provided justifications for their decisions, particularly in contexts of disagreement. This finding aligns with prior work on children's reason-responsiveness, which likewise reports earlier sensitivity to "good reasoning" in Chinese children relative to their U.S. counterparts (Schleihauf et al., 2023). Together, this suggests that, while the capacities for rational discourse may emerge early across cultural contexts, their precise developmental onset may be shaped by culturally specific socialization practices, which raises interesting questions for future research. For example, future work could explore whether Chinese caregivers are more likely than caregivers in other cultural contexts to explicitly highlight or reinforce examples of good reasoning during early socialization. Second, we also found that Kenyan children considered the testimonial reason as stronger than the perceptual reason (as evidenced by their box choices), while Chinese and U.S. children did not show a preference for either reason. One possible explanation for this effect may be that Kenyan—and specifically, Kikuyu—culture is characterized by a particularly strong hierarchy between adults and children, which could have led Kenyan children to weigh the adult testimony particularly strongly (see Kinoti, 2010).

To give children from various cultural backgrounds the best opportunity to demonstrate their reason-giving abilities, we focused here on peer disagreements—an interactional context widely regarded as particularly supportive of reasoning development (for theoretical perspectives see Köymen & Tomasello, 2020; Langenhoff et al., 2025; Lew-Levy & Amir, 2024; Perret-Clermont, 2022; Piaget, 1952; for recent empirical work, see, e.g., Baer et al., 2025; Helming et al., 2024; Langenhoff et al., 2023; Langenhoff et al., 2024; Mahr et al., 2021; O'Madagain et al., 2022; Ransom et al., 2025). Yet, it is plausible that children's reason-giving might look differently when investigating it in other interactional settings. For example, prior studies on children's moral reasoning (e.g., Kruger & Tomasello, 1986; Mammen et al., 2019) suggest that when disagreeing with authority figures such as parents or teachers, children may be less inclined to justify their own views, and more likely to defer to the adult's perspective. Future studies should therefore explicitly manipulate the relationship between dyads to investigate how different conversational partners shape children's reason-giving during collective decision-making, and how this may differ across cultural contexts.

Further, in our study, children shared an interdependent goal—finding the reward—but, in the disagreement condition, held differing ideas about how to achieve it, due to having been exposed to distinct information sources. This design closely mirrors how public discourse often unfolds in real-world contexts, where decision-makers may share the same overarching goal but disagree on the best course of action (see Habermas, 1996; Tomasello, 2019). For example, in a town hall meeting, community members might all seek to improve public transportation but propose different solutions based on their previous experiences or the information available to them. That said, prior work suggests that more competitive settings—where the primary objective is not to reach a joint decision but to defend one's own position and outperform the other—can significantly alter individuals' decision-making and reasoning strategies (see, e.g., Domberg et al., 2018; Domberg et al., 2021; Felton & Kuhn, 2001; Garcia-Mila et al., 2013; Kuhn, 2015; see also Oktar & Lombrozo, 2025). For example, one study showed that when arguing with peers in a competitive, compared to a collaborative context, German children produced not only significantly fewer but also more biased reasons that favored their own position and less often considered the perspective of the other child (Domberg et al., 2018). Thus, studying how the social context of disagreement shapes both the frequency and the nature of children's reason-giving across cultures represents an additional promising direction for future research.

Relatedly, our exploratory analyses did not reveal an effect of dominance on children's joint decisions, suggesting that across cultural contexts, children primarily relied on the cooperative strategy of exchanging reasons, rather than on coercive strategies to resolve their disagreements. That said, our toy-grabbing measure captures only one facet of dominance (namely, coercive resource control; see Hawley, 1999), and integrating other dimensions of dominance could provide a more sensitive test of whether power dynamics shape children's joint decision-making. This may be especially important in more competitive contexts, where dominance may play a more prominent role in how children make joint decisions.

Another key feature of our experimental setup was that we exposed both children to strong evidence during the evidence-gathering phase, to increase the likelihood that both children would form a strong belief and express it. One child received direct perceptual evidence—they saw where the reward was hidden—and the other child received testimony from an authority—the experimenter told them where the reward was hidden. Thus, there was no clearly stronger reason during the joint deliberation phase and no obvious solution, although we found that across cultures, conditions, and ages, children tended to report testimonial reasons slightly more frequently than perceptual reasons. While this study design provided us with the ideal setup to observe children's reason-giving, it was less ideally suited to test whether children also display the other main skill of rational discourse, besides reason-giving, namely reason-responsiveness: the ability

and willingness to change one's beliefs when presented with better reasons for alternative views (see Kuhn et al., 2013). To investigate reason-responsiveness, future research could systematically manipulate the quality of reasons in a paradigm similar to ours, and see whether children across cultural contexts are able to jointly identify and follow the stronger reason and thereby reach better decisions (for related work with adults, see, e.g., Boku et al., 2018; Mercier et al., 2016; Moshman & Geil, 1998). Such a paradigm could also reveal whether reasons of a given type carry similar persuasive or normative weight across cultural contexts.

Previous research has demonstrated that even young children show remarkable skills of collaboration (Brownell & Carriger, 1991; Hepach & Warneken, 2018; Warneken & Tomasello, 2013). This research has typically focused on physical acts of collaboration, for example when children skillfully move an object together that they could not move on their own (Hamann et al., 2011). Here, we have shown that children also engage in epistemic collaboration. When they hold conflicting beliefs, children cooperatively work through the resulting disagreements by exchanging reasons. Offering someone a reason contrasts starkly with ordering or forcing them to believe something. It is a respectful and egalitarian form of address compared to the hierarchical address of command (Engelmann & Tomasello, 2019). Our results suggest that, across three diverse societies and from at least the age of 5, children view each other as rational agents who are responsive to reasons, and exchange reasons with one another to make joint decisions. Adults can learn a thing or two from them.

Supplementary material

Supplementary material is available at *Child Development* online.

Data availability

The preregistration, information on power analysis, data, analytic code to reproduce analyses and figures, anonymized transcripts of the dialogues between dyads for each cultural context, photos of study materials, and the study scripts in each language are publicly accessible on OSF under the following link: https://osf.io/bmy7s/?view_only=1a90ffe5017a49dbb14075a9dfdb4179.

Author contributions

Hanna Schleihauf (Conceptualization, Formal analysis, Methodology [lead], Data curation, Investigation, Validation, Visualization, Writing—original draft, Writing—review & editing [equal]), Antonia Langenhoff (Conceptualization, Methodology, Writing—original draft [lead], Data curation, Funding acquisition, Investigation, Validation, Writing—review & editing [equal], Formal analysis, Visualization [supporting]), Zhen Zhang (Conceptualization, Methodology, Validation, Writing—review & editing [supporting], Data curation, Investigation [equal]), Yuhan Wang (Data curation, Investigation [supporting]), Esther Herrmann (Conceptualization, Methodology, Resources, Validation, Writing—review & editing [supporting], Data curation, Investigation [equal]), Bahar Köymen (Conceptualization, Validation, Writing—review & editing [supporting]), Henriette Zeidler (Data curation, Investigation, Methodology, Validation, Writing—review & editing [supporting]), and Jan Engelmann (Conceptualization, Funding acquisition, Methodology, Supervision [lead], Resources, Validation, Writing—review & editing [equal])

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Conflicts of interest

The authors declare no competing interests.

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