Do children need to give less reason to get their will when they have the power anyway? – The moderating roles of culture and age on the relationship of power and reason-giving

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Abstract

Social conflicts are part of societies and groups. While social animals, might resolve them using power and dominance, Humans evolved an alternative strategy characterised by debating, arguing, and reasoning. It functions as the basis for social skills; however, the question arises whether power impacts decision-making during children's development. This study aims to gain insights into the relationship between reason-giving and power among children, examining the moderating roles of culture and age, two factors that have been shown to impact reasoning behaviour. We hypothesised that children exchange more reasons with equal others. Cultural context is expected to moderate this relationship, with more substantial effects in hierarchical cultures with high-power distance (Kenya) than in egalitarian, low-power distance cultures (the Netherlands). Additionally, we hypothesised that power's influence on reason-giving changes with age, weakening in the Netherlands and strengthening in Kenya. Participants included 131 dyads of children (M_{age} = 7.49, SD = 1.56) from Kenya and the Netherlands. A mixed experimental, within-subjects design was applied, and children's reasoning was observed during a problem-solving task involving conflicting evidence in either the equality or inequality condition. Experiments were recorded, transcribed, coded and finally analysed using GLMMs. Results support the third hypothesis that reason-giving increases with age. The other three hypotheses were not supported. However, the study contributed to previous research on reason-giving in children. The cross-cultural approach offered first insights into the relationship between power and reason-giving in children and the role of culture and age, offering first indications and suggestions for future research.

Do children need to give less reason to get their will when they have the power anyway? – The moderating roles of culture and age on the relationship of power and reason-giving

Social conflicts are inherent aspects of interactions among social non-human animals, usually resolved using force to maintain group cohesion, with the most powerful or dominant one prevailing. Humans, however, have evolved a unique strategy to resolve social conflicts – we debate, argue, and reason with one another. We have the ability to use the "unforced force of the better argument" (Habermas, 1998). Living in society requires collective decision-making to maintain group cohesion, making reason exchange an essential social skill. Since these constructive social skills are the foundation for consensus and cohesion, their development in children is necessary. This raises important questions on development, specifically, how the significant role of power in the animal world impacts our patterns in problem-solving and decision-making. In this context, it remains unclear to what extent children provide reasons to others to get their will in decision-making, especially when they already possess the power to make these decisions. Is reason-giving and its impact as universal to humans as we think, and what factors might influence decision-making and reason-giving patterns in children? By exploring these questions, we can better understand reasoning in children and, more precisely, its relation to power.

Reasoning is a cognitive process involving the formation of beliefs and arguments and the ability to justify those, providing the ground for drawing conclusions and making inferences based on evidence and logic (Adler & Rips, 2008; Martin & Valiña, 2023; Mercier & Sperber & Sperber, 2011; Soong et al., 2011). The argumentative theory of reasoning proposes human reasoning evolved for social purposes, allowing us to develop arguments, convince others, and justify our beliefs and actions, thus serving as precondition for decisions and discourse (Mercier & Sperber, 2011). It seems indispensable in private relationships, professional environments, politics, and modern society. Individuals are expected to engage critically with societal norms and decisions, making the acquisition and education of these social skills critical to maintaining and enhancing democratic processes and group cohesion (Soong et al., 2011). The importance of examining reasoning in children lies in understanding the development and functioning of reasoning skills, fostering necessary social skills, identifying developmental progress, and informing parenting and educational practices. In line with previous literature, this study will focus on reason-giving as reasoning skill. Reason-giving and understanding reasons typically emerge around four to five years and mature gradually. (Köymen et al., 2018; Mercier & Sperber, 2011; Perlman & Ross, 2005). While this suggests reasoning to be fundamental to human thinking, certain conditions may be fulfilled for effective reason-giving.

Proposedly, deliberative reasoning only functions if communication partners address each other as equals (Cohen, 2005). This means all participants recognise and treat each other without hierarchical distinctions, creating space for discussion. According to Piaget (1959), this navigation of deliberate reasoning in children is essential with peers rather than adults. Adults are often seen as

authorities, possibly leading to simply accepting their claims. Consider this example: a teacher can assign homework to students without providing a rationale solely based on their authority position. In given instances of unequal power distribution, the need for offering reasons and reason-giving of conversation partners diminishes, potentially impeding reason exchange. In peer deliberations, both viewpoints are judged equally valid, allowing for reason exchange (Köymen & Tomasello, 2020; Langenhoff et al., 2022). In addition, children prefer reasoning over using power and exhibit increasingly advanced reasoning in peer interactions (Kruger & Tomasello, 1996; Perlmann & Ross, 2005). Equality in status appears essential for facilitating constructive dialogue and encouraging perspective-taking in children (Tomasello, 2019). This suggests greater inclination to provide reasons during egalitarian interactions, implying disproportional power dynamics might impact reason-giving behaviour. Thus, the question of whether children practice reason-giving primarily in relationships with equal others arises, which will be the focus of this study.

Previous research proposes power dynamics as relevant factor in reason-giving behaviour. Power can be conceptualised as the ability to exert influence, understood as "capacity of A to motivate B to think or do something that B would otherwise not have thought or done" (Allen et al., 2014, p.12). Power significantly impacts social interactions, organisational hierarchies, and societal structures, influencing thinking and behaviour patterns (Galinsky et al., 2015). However, rational critique and reason-giving may weigh more in reason acceptance and problem-solving than power (Allen et al., 2014, p. 17). This raises the question of whether this is also the case in children.

Power dynamics are evident in child interactions. Preschool children accept power structures and reproduce them in play, making power an essential part of their learning progress in interactions (Cederborg, 2019). Power and hierarchical structures are not met with resistance but are co-constructed in play and communication (Cederborg, 2019). Additionally, power might "seal the space of reasoning for others" (Allen et al., 2014, p. 12), suggesting power to overrule reasoning. Research demonstrated power dynamics significantly impact reasoning processes among children. For instance, in an experiment by Castelain et al. (2015), children were more likely to select a testimony of the dominant character in decision-making tasks, indicating a preference for power-based influence. Additionally, in paired decision-making scenarios, the dominant child often holds significant influence over the final decision (Köymen et al., 2016). These findings suggest status could limit the space for reason and impact reason-giving behaviour when power discrepancies exist between conversation partners. This illustrates how power dynamics influence reason-giving behaviour, highlighting the importance of exploring these dynamics in children. While the interplay between power and reasoning usually focuses on whether one overrules the other or the outcome in decision-making processes, it has not yet been considered whether power and reason-giving, specifically in children, are associated.

Previous research on reason-giving in children has primarily been conducted in Western countries. As decision-making processes are affected by cultural differences (Sagi, 2015), reasoning

behaviour likely differs across cultures. Examining cross-cultural differences between two countries, namely Kenya and the Netherlands, addresses the present sampling bias in Psychology and enhances the generalizability of the study (Henrich et al., 2010; Nielsen et al., 2017). There is no consensus on reasoning being a universal social skill. Some recognise a universal norm of reasoning and argumentation based on logic and probability, suggesting the tendency to evaluate and respond to reasons and consider their quality is not confined to Western cultures (Castelain et al., 2016; Karaslaan, 2018; Mercier & Sperber, 2011). Others argue cultural differences in reasoning arise from varying cognitive abilities and behaviours (Norenzayan et al., 2002; Nisbett et al., 2001; Tomasello, 2019; Valadez, 2010). Environment greatly influences the development of cognitive abilities in children, as "norms, attitudes, expectations, and beliefs arise from an interaction with the cultural or social environment" (Hammer, 2011, p. 1396). This is grounded in the social learning theory (Bandura & Walter, 1977). Social learning explains how behaviour and norms are acquired and internalised, allowing us to understand cultural/societal variations (Tomasello, 2019) and depicts one theoretical reason why culture might impact the relationship between power and reason-giving.

Moreover, cultural differences are reflected in parenting practices, impacting the acquisition of social skills and development (Prevoo & Tamis-LeMonda, 2017). Cross-cultural differences in parenting styles likely influence the development and use of reasoning, and how power structures are reinforced. Western parents more often follow an authoritative parenting style, while non-Western parents, for example, Kenyan parents, tend to display more authoritarian parenting strategies (Bornstein et al., 2011; Harkness & Super, 2002). Authoritative parenting encourages verbal discourse, sharing the reasoning behind rules, and thereby valuing the autonomous self-will of the child (Baumrind, 1968). Authoritarian parenting, on the other hand, values obedience, teaches respect for authority, discourages children from questioning their statements, and does not foster a verbal give or take as the child is expected to accept what is said (Baumrind, 1968). The authoritarian parenting style implies and invites power discrepancies as the parent is considered the powerful one in the interaction with a child.

This is reflected in power distances within a culture, further indicating power as predictor. Power distance refers to the manner of interpersonal relationships within a society on a hierarchical scale (Hofstede, n.d.; Hofstede, 2011). Hofstede's framework, the Cultural Dimensions Theory (Hofstede, n.d.), allows for comparing cultures. The Power Distance Index, one of six categories, indicates the power distance present in a country and suggests whether a country is somewhat hierarchical or egalitarian. It measures the extent of a society's tolerance for inequality and hierarchical power structures. A high-power index suggests acceptance of power differences and inequality, while low scores indicate an emphasis on equality and decentralisation of power (Wale, n.d.).

Based on the above cultural factors, this study examines the relationship between power and reasoning in Kenya and the Netherlands.

Kenya. The Republic of Kenya is in the Eastern African region and has a population of approximately 54 million people. The native language is Swahili. Having the largest and most advanced economy in East and Central Africa, Kenyas economy is driven by agriculture, service, tourism, and manufacturing (Ministry of Foreign Affairs Kenya, n.d.). The children who participated in this study come from relatively rural and low socioeconomic status (SES) households. Kenya scores 70 on the power index (Hofstede, 2011), identifying it as a high-power distance (HPD) country that accepts and expects hierarchical order. In this non-Western context, respect for authority is embedded in society and parenting practice.

The Netherlands. Located in Western Europe, the country has a population of approximately 17 million people, with one in four people having a migration background. The official language is Dutch (The Federal Government, n.d.). The children from typical upper-middle-class, higher-SES backgrounds from and around Utrecht. The Netherlands scores 38 on the power index, suggesting a low power distance (LPD; Hofstede, 2011). Their score reflects a more egalitarian society, where hierarchical distinctions are minimised, and power is decentralised. This is also reflected in a more authoritative parenting style (Yaman, 2010).

Applying this knowledge to our research, we can conclude that asserting power may be more difficult in Western cultures (Castelain et al., 2015, p. 2). The Netherlands, therefore, is associated with a preference for reasoning over power (Castelain et al., 2015). Contrariwise, there might be a tendency of individuals in positions of power to influence decisions in Kenya. This acceptance of a structured hierarchy without extensive justification suggests lower reasoning levels among Kenyans than Dutch people. Considering the role of social learning, parenting and social hierarchies understood in power distance, culture portrays an essential factor in reason-giving behaviour and the effect of power on children.

Next to the significant role of culture, age is another essential but subtle influencing factor. Social learning theory (Bandura & Walter, 1977) and the principles of cultural learning, suggest reasoning skills and the understanding of power dynamics to develop differently across ages and cultural contexts. As children age, reason-giving skills become increasingly refined (e.g., providing arguments and comparing arguments; Köymen & Tomasello, 2018). Especially during school age, children go through crucial developmental milestones (Tomasello, 2019). Scientific discussion reveals different views on the development of reasoning skills in relation to age (Köymen et al., 2016; Tomasello, 2019). The changing cognitive landscape in childhood is highlighted by changes in the evaluation of beliefs, shifting from a focus on the content of beliefs to considerations about the justification of beliefs (Schleihauf et al., 2023). Furthermore, children increasingly align their behaviour with cultural norms as they age (Bandura & Walter, 1977), emphasising the nuanced interplay of culture, power, and reason-giving and the importance of examining children's reasoning skills in the context of their development.

The review of existing literature reveals contradicting findings and a gap in understanding how power dynamics influence reason-giving in children. This study addresses the gap by examining reason-giving behaviour in children, whether they need to provide reasons to get their will in decision-making when they have power, and how power dynamics affect reason-giving behaviour in peers. Building on existing research, this study assesses whether reasoning-giving depends on equal power dynamics and the general association between power and reason-giving in children. To counter the Western bias in psychological research, this study explores cultural differences between Kenya and the Netherlands, suspected to arise from differences in power distance, the influence of cultural learning and parenting on our cognitive development and interactive patterns. Given the social role of reasoning in groups and democracy, a greater understanding of the development and factors impacting reasoning-giving is essential. Following the literature discussed, the research will assess four main hypotheses:

H1: There is a negative association between power and reason-giving. Children exchange more reasons if they see each other as equals and exchange fewer reasons if one is granted more power than the other.

H2: Culture moderates the relationship between power and reason-giving, with a more substantial effect of power on reason-giving in children from more hierarchical cultures (Kenya).

H3: Age is positively associated with reason-giving.

H4: Age moderates the relationship between power and reason-giving, such that in the inequality condition, Kenyan children reason less with age, and Dutch children reason more with age.

Methods

Participants

Participants were recruited by contacting schools and BSOs via email. The aim was a total of 160 dyads, as the Kenyan sample obtained in 2021 comprises a minimum of 80 dyads matched for gender and age. A previously conducted power simulation for the expected sample size indicated a power of b = 0.79 (< .05). Data was collected from 132 dyads aged between four and 10 years (M = 7.49, SD = 1.56): all met the inclusion criteria of being within given age range, either from Kenya or the Netherlands, and provision of signed informed consent by a legal guardian. Data collection concluded end of April 2024, ensuring compliance with time planning. Before the recruitment of participants, ethics approval was obtained from the Ethical Review Board of the Faculty of Social and Behavioural Sciences of Utrecht University (23-2151).

Design

The study employed a mixed experimental design with a between-subjects design. Children participated in dyads in four trials with two conditions (equality/inequality). In the equality condition, no child was granted decisional power. In the inequality condition, one child was granted power, manipulated by a crown. Reminders of powers included choosing where to sit and who got the bigger piece in a sharing task conducted before test trials (stickers or cookies).

Procedure

We paired children into dyads matched for age and gender. The experiment consisted of four trials: two training and two test trials. Only data from test trials was analysed. In all trials, dyads engaged in a decision-making task: they were presented with two boxes and told one contained two rewards, while the other was empty. The instructions were to choose one box together.

During training trials, children were not assigned to conditions nor received evidence regarding the reward's location, requiring them to guess. Before test trials, children each drew a marble: same-coloured ones in the equality condition and different ones (one coloured, one golden) in the inequality condition. The golden marble determined the boss, who was told to be in charge and could make decisions. A crown and a sharing task acted as a reminder of the power. They received decisional power in where to sit, and during the sharing task, which was done before both test trials, the boss received either two cookie pieces or two stickers varying in size and was advised to share them among the two.

During test trials, contradicting evidence was provided about which box contained the rewards. One child received perceptual evidence (saw where the rewards were hidden), and the other received testimonial evidence (was told where the rewards were hidden). The setup was the same for all trials: after receiving the evidence, two boxes were placed under a bigger, see-through box, preventing children from opening or shaking the boxes during discussion. Children were reminded to stay seated and asked to discuss for one minute which box they thought would contain the reward while the research assistants left the room. The children were supposed to call them once they had reached a decision. Otherwise, the trial ended after two minutes. Upon the return of the assistants, a stone was placed on top of the see-through box, and the children were asked to put it on top of the chosen box. This ensured the choice of one box in case the children disagreed on which one to choose. Rewards were distributed at the end of the study.

Data Recording and Coding

Trials were recorded (video and tone), transcribed and coded by coders fluent in both the original language and English.

Reason-giving. In line with the research question and compliance with Kenyan data, the response variable *reason-giving* was computed, indicating how many reasons (testimonial and perceptual) children gave per trial. Additionally, two discrete count variables were computed: one for reasons based on testimonial evidence (e.g., "I heard it", "she told me") and one for perceptual evidence (e.g., "I have seen it", "she showed me"). For the Dutch data, another variable (*reason-giving total*) counted all reasons given, independent of the received evidence (e.g., "this makes more sense because (…) ", "because it is my favourite colour", "last time you chose, so this round I should choose") was computed.

Power. This variable indicated whether the dyad participated in the equality condition (0) or inequality condition (1).

Culture. Culture was coded as Kenya (0) or the Netherlands (1).

Age. The dyads' mean age was calculated using the birthdates. In case of a missing birthdate, we used the grouping age.

Statistical Analysis

Data analysis was conducted using the statistical program IBM SPSS Statistics (Version 29). First, sample descriptives were calculated. The main analysis used Generalized Linear Mixed Modeling (GLMM) to account for the nature of the data and repeated measures (two test trials).

The first model examined reason-giving across conditions, cultures, and ages (H1-H3). The response variable *reason-giving* was included as a discrete count variable. As fixed effects, we included the main effects of *condition, culture,* and *age*, as well as the interaction effects of *condition* and *culture*. Random effects (dyad) accounted for repeated measures. Robust estimation was used to handle potential violations of assumptions. The hypotheses were accepted if the fixed effect of *condition* was significant ($p < .05$) and had a negative coefficient (H1), the interaction between condition and culture was significant ($p < .05$) (H2), and the main effect of age was significant ($p < .05$) and had a positive coefficient (H3).

A second model examined reason-giving and age across cultures in the inequality condition (H4) with the interaction term of culture and age. The hypothesis was accepted in case of a significant interaction term ($p < .05$). Exploratory analysis was conducted to explore the data beyond the hypothesis.

Results

Of the 132 dyads, 131 were included in the analysis after data cleaning. One dyad was removed due to missing values. Condition and gender distributions were balanced, while culture distribution was not: the majority of the sample consisted of Kenyan students (78.6%). The participants' descriptives and distributions are displayed in Table 1.

Table 1

Sample Characteristics

Variables	Equality	Inequality	Total
Mean age (SD)	7.51 (1.59)	7.47 (1.54)	7.49 (1.56)
Age range	4.61-9.96	4.92-10.67	4.61-10.67
Gender			
Female	34 (54%)	33 (48.5%)	67 (51.1%)
Male	29 (46%)	35 (51.5%)	64 (48.9%)
Culture			
Kenya	50 (79.4%)	53 (77.9%)	103 (78.6%)
the Netherlands	13 (20.6%)	15 (22.1%)	28 (21.4%)
Total	n = 63	n = 68	N = 131

Table 2

Average Scores and Standard Variations of the Dependent Variable Reason-Giving and Additional Variables per Trial: Perceptual Reason-Giving, Testimonial Reason-Giving, and all Reason-Giving.

Variable	Mean (SD)						
	Equality			Inequality			Total
	Kenya	NL	Total	Kenya	NL	Total	
Reason-giving	1.27 (1.29)	1.08 (1.29)	1.23 (1.29)	1.59 (1.33)	0.77 (1.01)	1.41 (1.31)	1.32 (1.29)
Perceptual reason-giving	0.61 (0.79)	0.68 (0.95)	0.68 (0.82	0.82 (0.83)	0.36 (0.68)	0.72 (0.82)	0.68 (0.82)
Testimonial reason-giving	0.66 (0.76)	0.41 (0.67)	0.61 (0.74)	0.77 (0.82)	0.45 (0.63)	0.70 (0.82)	0.66 (0.78)
Reason-giving total		2.42 (2.49)			1.70 (1.78)		

Children provided an average of 1.32 reasons per trial (*SD* = 1.29). Kenyan children in the inequality condition had the highest mean reason-giving (*M* = 1.59, *SD* = 1.33). Dutch children in the inequality condition exhibited the lowest mean (*M* = 0.77, *SD* = 1.01). Reason-giving based on either perceptual or testimonial evidence was equally distributed (see Table 2).

Main Analysis

The first model examined reason-giving across conditions, cultures, and ages (H1-H3). The selected model provided an adequate fit to the data (AIC = 834.09, BIC = 848.12). The main effect of condition was not significant, $F(1, 257) = 0.01$, $p = .907$, indicating reason-giving is not directly impacted by power condition. Thus, the first hypothesis was not supported. Secondly, the interaction effect of condition and culture was insignificant, $F(1, 257) = 2.43$, $p = .120$, indicating no moderation of culture on the relationship between power condition and reason-giving. The second hypothesis was not supported. However, a significant main effect of culture was found, $F(1, 257) = 5.34$, $p = .022$. In line with the third hypothesis, age was positively associated with reason-giving as indicated by the significant main effect of age, $F(1, 257) = 13.57$, $p < .001$. Corresponding fixed effects are displayed in Table 3.

Table 3

Fixed Effects of Model 1 Including Reason Giving as Target, Condition, Culture and Age as Main Effects and the Interaction Effect of Condition and Culture.

	F	df1	df2	Sig.
Corrected model	5.675	4	257	<.001**
Condition	0.014	1	257	.907
Culture	5.339	1	257	.022*
Age	13.571	1	257	<.001**
Condition*culture	2.428	1	257	.120

Table 4

Fixed Effects of Model 2 Including Reason-Giving as Target, Culture and Condition as Main Effects.

	F	df1	df2	Sig.
Corrected model	3.491	3	132	.018*
Culture	.440	1	132	.508
Age	3.831	1	132	.052
Culture * age	.011	1	132	.917

A second model examined reason-giving across cultures and ages in the inequality condition (H4). The interaction effect of culture and age was insignificant, $F(1, 132) = 0.01$, $p = .917$). Therefore, the fourth hypothesis was not supported. The fixed effects are displayed in Table 4.

Exploratory Research

To account for the within-subjects design and explore additional sample characteristics, an additional analysis using GLMM was performed to test reason-giving in relation to trial, culture, gender, age, and their interactions with trial number as random slope. This model provided an adequate fit (AIC = 833.18, BIC = 850.60). The main effect of the trial was insignificant, F(1, 253) = 0.00, p = .950; estimated means, however, indicated higher mean reason-giving in the first trial (M = 1.35, SE = 1.03) compared to the second trial (M = 0.99, SE = 1.03). Though, those differences were not statistically significant, $t(253) = 0.34$, $p = .731$.The interaction effect of trial and condition was significant, $F(1, 253) = 6.09$, $p = .014$, indicating inconsistent differences in reason-giving between trials across conditions with greater differences in the equality condition. In addition, a significant main effect of culture was found, $F(1, 253) = 5.31$, $p = .022$. Estimated means and pairwise comparisons indicated significant differences, $t(253) = 2.31$, $p = .022$, in reason-giving between Kenya ($M = 1.43$, $SE = 0.09$) and the Netherlands ($M = 0.90$, $SE = 0.17$). The main effects for condition and gender were insignificant (see Table 5).

Table 5

Fixed Effects of Model 3 Including Reason-Giving as Target; Trial, Condition, Culture, Age and Gender as Main Effects, and The Interactions of Trial with Condition, Age, and Culture.

	F	df1	df2	Sig.
Corrected model	3.416	8	253	<.001**
Trial	.004	1	253	.950
Condition	1.198	1	253	.275
Culture	5.314	1	253	.022*
Age	13.340	1	253	<.001**
Gender	.322	1	253	.571
Trial * condition	6.090	1	253	.014*
Trial*age	.692	1	253	.406
Trial*culture	.183	1	253	.669

Table 6

Fixed Effects of Model 4 Including Reason-Giving Total as Target, with Condition and Age as Main Effects.

	F	df1	df2	Sig.
Corrected model	2.993	2	53	.059
Condition	2.690	1	53	.107
Age	3.471	1	53	.068

Another variable was computed for the Dutch sample, counting all reasons given, independent of the received evidence. This comparison allowed for assessing reason-giving based on the testimonial and perceptual evidence versus general reason-giving. The results of the paired samples t-test revealed significant differences, $t(55) = 5.24$, $p < .001$. The mean score of the newly computed variable reason-giving total ($M = 2.04$, $SD = 2.15$) was significantly higher than the mean of the initial variable reason-giving ($M = 0.91$, $SD = 1.15$).

A fourth model with the new variable reason-giving total as outcome in the Dutch sample assessed reason-giving across conditions and age. The model fit well (AIC = 247.64, BIC = 256.21). While a marginally significant effect of condition was found, $F(1, 53) = 2.69$, $p = .107$, estimated means and pairwise contrasts revealed marginally significant differences between the conditions, $t(53) = 1.64$, $p = .107$, with higher mean reason-giving in the equality condition ($M = 2.41$, $SE = 1.56$) compared to the inequality condition ($M = 1.51$, $SE = 1.55$). This model also revealed a marginally significant main effect of age on total reason-giving in the Dutch sample, $F(1, 53) = 3.47$, $p = .068$. The fixed effects of the corresponding model are displayed in Table 6.

Discussion

Humans acquire reasoning skills that enable engagement in discourse and decision-making, which is essential for social cohesion. The study investigates whether power impacts reason-giving in children, if children practice reason-giving primarily with equal others, and what factors influence this relationship. This is explored by examining reason-giving across power conditions, cultures and ages using GLMMs. Contrary to expectations, findings support one of our hypotheses: reason-giving increases with age (H3). Based on our findings, power does not directly impact reason-giving behaviour in children (H1), culture does not cause any differences in the relationship between reason-giving and power (H2), and lastly, age does not impact the relationship between power and reason-giving differently across cultures (H4).

The main conclusion is that children from diverse countries engage in reason-giving during problem-solving. Supporting previous literature (Köymen et al., 2018; Köymen & Tomasello, 2020; Tomasello, 2019), reason-giving increases with age - in Kenyan and Dutch children. This developmental trajectory emphasises the universality of reason-giving as a social skill and supports the understanding that reasoning skills gradually mature. As children age, cognitive abilities refine, providing the basis for reasoning in discourse. The findings lay the ground for future research investigating developmental progress across cultures.

Contrary to our first hypothesis, power does not directly impact reason-giving: Children in the problem-solving task with equal others do not necessarily give more reasons than children who engage with an unequal other. This finding contrasts previous research suggesting addressing conversation partners as equals is a precondition for deliberate reasoning (Cohen, 2005). Children engage in reason-giving across conditions, indicating that power dynamics do not influence children's reasoning behaviours as expected (Allen et al., 2014; Castelain et al., 2015; Köymen et al., 2016). Several factors might explain these discrepancies. First, the used power manipulation might be ineffective. The crown and sharing task may not be sufficiently meaningful and familiar to alter children's behaviour, particularly across different cultural contexts where conceptualisations of power vary (Torelli et al., 2020). In individualistic cultures, like the Netherlands, power is focused on self-benefit, while in collectivistic cultures, such as Kenya, power is focused on others, shown in norm adherence and compassionate behaviour (Hofstede, n.d.; Torelli et al., 2020). Our sharing task indeed addresses both (choosing the bigger piece for oneself vs sharing). Thus, the question remains whether the visual reminder of power (crown) might not be appropriate or whether children are not used to such games, impacting the effectiveness of power manipulation. Another possible explanation is familiarity among children, as they attend same schools/BSOs. We do not control for their relationships, which could overshadow the effect of the experimental power manipulation: if dyads are friends, they potentially rely on shared experiences and trust in decision-making, meaning a child's claim (e.g. trust me) might be accepted, independent of the power distribution (Nelson & Aboud, 1985). In addition, children are likely to be cooperative to remain friends (Hartup, 1992). On the other hand, children might feel more comfortable disagreeing with friends and, therefore, engage in more extensive reason-giving (Nelson & Aboud, 1985). Regardless, children's relationships could influence the impact of power, suggesting the relationship and direction of impact as an essential factor in further research on reasoning development in children.

The impact of power on reason-giving is not affected by culture, thus not supporting our second hypothesis. Based on knowledge about cultural differences in reasoning and social interactions (Nisbett et al., 2001; Norenzayan et al., 2002; Tomasello, 2019) and the influence of parenting practices and social learning (Baumrind, 1968; Hammer, 2011; Prevoo & Tamis-LeMonda, 2017), we expected differences in the relationship of power and reason-giving between Kenyan and Dutch children; specifically Dutch children to engage more in reason-giving and react less to power. Contrary to our assumptions, Kenyan children engage in more reason-giving than Dutch children, conflicting with previous literature suggesting less reason-giving in Kenyan children due to the influence of power distance and acceptance of power structures (Castelain et al., 2015). Moreover, the fourth hypothesis is not supported: age does not affect the relationship between power and reason-giving, specifically in unequal power distributions, differently per culture. This suggests the developmental increase in reason-giving as a robust phenomenon whose relation to power is relatively unaffected by cultural context and social learning. However, the cultural findings must be interpreted

cautiously due to unequal sample distribution, with more Kenyan children (N = 103) than Dutch children (N = 28) because of recruiting difficulties in the Netherlands. In addition, cultural diversity within the Dutch sample may obscure cross-cultural comparisons. The large expatriate and immigrant Dutch population (The Federal Government, n.d.) suggests children may have diverse backgrounds, potentially being raised with varying parenting styles and norms (Yaman et al., 2010). To prevent cultural diversity from obscuring cultural influences, this should be controlled for. However, an experimenter's error could have contributed to the differences: In the Dutch sample, when presented with the evidence, some children were accidentally told that this information was a secret, possibly causing them to withhold knowledge during decision-making. Regardless, the findings support the notion that reasoning is a universal social skill, enabling understanding and giving reasons at the age of four to five years (Köymen et al., 2019; Mercier & Sperber, 2011), with potential cross-cultural differences that require further exploration.

Next to our main analysis, we examine the impact of the study design by exploring the effect of trial number on reason-giving and decision-making. Although children give, on average, more reasons in the first trial, the difference is insignificant. The interaction with condition reveals that children, specifically in the equality condition, give more reasons in the first trial than in the second. Once common ground is established (e.g., in trial 1), children might give fewer reasons in later trials (Köymen et al., 2016). However, this requires further examination, as it is unclear why this differs per condition. Literature lacks possible explanations. I assume that in the equality conditions, decision outcomes of the first trial affect reasoning in the following trial. Consider this example of one Dutch experiment: the children argued for one minute without reaching a decision. Eventually, they agreed that one would choose now, the other in the next round. This resulted in a shorter second trial with less reason-giving, as they already agreed on an alternative solution. While this might explain differences in the equality condition, we do not specifically assess this.

The strategy mentioned above exemplifies advanced reasoning and problem-solving techniques. To assess reason-giving more broadly, *reason-giving total* was introduced for the Dutch sample (since the Kenyan Data was already obtained and coded). Findings reveal children, particularly in the equality condition, give more reasons in total, although this finding is only marginally significant. Power might indeed affect reason-giving in children, but the Dutch sample is too small to detect a main effect. Significant differences between conditions are expected in a larger sample, highlighting the importance of sufficiently powered studies and the challenges in operationalising reason-giving. Determining what constitutes a reason can be subjective and, therefore, bias-prone. Our findings indicate that reason-giving should not be limited to specific types of reasons (e.g. referring to testimonial or perceptual evidence) to capture reason-giving more accurately.

While providing valuable insights into the relationship between power and reason-giving in children, the study faces several limitations, mainly methodological. First, the sample is smaller than

deemed necessary to achieve a power of $\beta = .80$, resulting in an underpowered study and challenges in answering the research questions (Case & Ambrosius, 2007). The risk of accepting a false premise (type II errors) increases due to a small sample size, decreasing the chance of detecting a true effect (Faber & Fonseca, 2014). Participant recruitment in the Netherlands failed to reach the expected 80 dyads as in the Kenyan sample, leading to unequal proportions of Dutch and Kenyan dyads. This threatens reliable interpretations of cultural differences.

Secondly, experimenter errors occurred during the data collection process. For example, inconsistent instructions were provided. In some experiments with Dutch children, one child was accidentally told the information was a secret, perhaps impacting their reasoning behaviour. In addition, boxes were occasionally mixed up, leading children to hastily conclude the decision-making by pointing out those inconsistencies.

Third, the process of translating and coding the video recordings was done by multiple coders, although each video was only handled by one coder. This increases the chance of errors, biases, and variations in data interpretation and coding, as there is a lack of inter-rater reliability (Hallgren, 2012). Especially regarding the challenges around operationalising reason-giving, high inter-rater reliability is crucial. Moreover, although the coders were fluent in both the original language and English, not all were native speakers, possibly impacting the accuracy of some translations. Thus, transcribing and translating data poses a risk of potential transcription and translation errors (Nikander, 2008), emphasising the importance of high-quality transcriptions and multiple transcribers and coders.

Notwithstanding these limitations, the study demonstrates several strengths. The Western bias in psychological research is addressed by applying cross-cultural comparisons on a topic not specifically explored in previous reasoning research. Regardless of the unequal distribution, the findings are valuable as they indicate first directions and suggestions for future research. In addition, the study design contributes to the broader understanding of cognitive development and allows for a developmental focus, which is essential in studying social skills. The use of GLMMs accounted for the study design and allowed the exploration of additional factors. Both fixed and random effects can be addressed, providing a robust framework for examining the effect of the variables of interest and their interactions, ensuring a comprehensive and reliable analysis.

While the study adds to existing research in the field, future research should address limitations and factors that potentially affect our findings. Ensuring sufficient sample size and equal cultural distributions is crucial to ensure sufficient power and accurate cross-cultural comparisons. Given recruitment challenges in the Netherlands, enough time should be planned for recruitment and involve Dutch-speaking researchers, as this increased the likelihood of responses from schools and BSOs for this study. Additionally, the importance of operationalisation of reason-giving across contexts and coders emphasises the need to develop and validate clear criteria for reason-giving in children. A broader approach allows for comparing factors, such as the quality of reasons, that add substantially to our understanding and the development of reason-giving in children. Furthermore,

mitigation strategies should be applied to minimise experimenter errors and data coding bias (Rosenthal, 1976). How inter-rater reliability is achieved should be specified beforehand, and multiple coders should be involved (Hallgren, 2012). Next, effective power manipulation must consider cultural differences and whether the operationalisation is relevant and known to the participants. Finally, familiarity between participants should be controlled for or avoided by using independent samples. Given that this is challenging and time-intensive in the context of children, measures assessing participants' relationships should be applied and considered in the analysis. Considering the above in future research will allow for reliable conclusions on the development of reason-giving in children.

In conclusion, the research questions cannot be sufficiently answered, given the underpowered study. However, the current study adds to existing literature by investigating the link between reason-giving and power in children, indicating reason-giving as a social skill independent of culture and power dynamics and increasing with age. Despite its strengths, the study faces multiple limitations that should be addressed in future research to further inform on reason-giving behaviour in children.

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