

Power Versus Reason and Its Influence on Children's Decision Making – Does Power Trump Reason and Is There a Cultural Difference Between Kenyan and Dutch Children When Making Decisions?

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Abstract

Humans make decisions every day, alone or in groups. Factors such as the composition of a group or the ability to use reason influence the decision to be made. However, little research has been done on how culture impacts decision making and reason giving. This study, therefore, investigates whether even young children reach better collective decisions in egalitarian vs. authoritarian contexts. An experimental between-dyads design with two trials for each of the two conditions was applied, testing 100 Kenyan and 28 Dutch dyads, matched for age and gender. The mean age in the current sample was 6.68, including 126 girls and 128 boys. Model variables included 'decision making' (good/bad), 'condition' (egalitarian/authoritarian), 'reason giving' (yes/no) and 'culture' (Kenya/Netherlands). A binary logistic regression model using SPSS was used to test the hypotheses that the relationship between egalitarian relationships and good collective decisions is moderated by the exchange of reasons. The interaction coefficient was not statistically significant ($B = -0.805$, $SE = 0.571$, $p = 0.158$, $\text{Exp}(B) = 0.447$, 95% CI for $\text{Exp}(B) = 0.146 - 1.369$). When testing the main effects, condition and reason giving were not found to be related to decision making. Reason giving did not moderate the relation between being in an egalitarian relationship and making good collective decisions. Therefore, the exchange of reasons is not more likely to lead to better decisions in egalitarian contexts.

Keywords: Power, decision making, reason giving, culture, egalitarian, authoritarian, children

Power Versus Reason and Its Influence on Children's Decision Making – Does Power Trump Reason and Is There a Cultural Difference Between Kenyan and Dutch Children When Making Decisions?

Humans make decisions every day. Either alone, or together with others. However, there are differences in how individuals make a decision and how accurate this process will be. Abilities of the person making the decision, such as analyzing and evaluating the available information or their use of logic and reason, might influence this process. But also, the decision itself, the importance it has and in which context it is made. For instance, decision making differs when done individually versus collectively where one has to consider another person's opinion, and exchange information or arguments to reach consensus. Already in preschool, children make collective decisions when for example choosing a topic for a group presentation. However, research on how culture impacts the way we make collective decisions is rare. Are there cultural differences in the collective decision making process? Could it for example be that one individual has more influence over group decisions than others? This study therefore investigates how power and reason giving influences collective decision making.

When decisions are made collectively, one can differentiate between egalitarian and authoritarian decision making. Egalitarian decision making describes a process in which all involved individuals have an equal say and contribute with their ideas to determine the best solution. It is often perceived as fair and claimed to yield optimal conclusions (Anderson & Brown, 2010; Mercier & Sperber, 2011). Authoritarian decision making, in contrast, involves one individual having the authority to lead the decision making process, whereas other members are obliged to follow (Anderson & Brown, 2010; Mercier & Sperber, 2011).

In which cultural contexts are these decision making strategies present? On the one hand are horizontally structured cultures, representing more equal relationships between individuals, therefore likely to represent egalitarian decision making strategies (Anderson & Brown, 2010). Those cultures are likely to exhibit a small power distance as referred to the extent to which less powerful individuals in a society expect and accept an unequal distribution of power (Hofstede, 2001, as cited in Hofstede, 2011). When the distance is small, power is supposed to be used reasonably, and hierarchies are set up for convenience and effectiveness (Hofstede, 2011). For instance, in a classroom where the teacher encourages students to use their first name and participate actively, the hierarchy serves a practical role in facilitating learning. On the other hand, cultures who exhibit steeper hierarchies, are often found to represent authoritarian decision making since one or a few individuals display a higher status than others (Anderson & Brown, 2010). These cultures are found to have a larger power distance, where rigid structures of authority are part of society and not questioned, representing existential inequality (Hofstede, 2011). In the classroom example, the teacher's authority is reinforced by being addressed formally and making the decisions, while students are expected to respect and follow instructions without questioning.

One essential tool of collective decision making is the exchange of reasons, described by the ‘argumentative theory of reasoning’ (Mercier & Sperber, 2011). The theory states that individuals provide and evaluate reasons with the intention to win someone over or convince another person of their viewpoint (Mercier & Sperber, 2011). By exchanging reasons an individual can support their interest, and the opposing individual has the opportunity to respond. In this regard, reasoning is seen as a cognitive ability which benefits the communication and makes it more efficient, essential for collective decision making (Mercier, 2011). The skill of reason giving tends to develop and grow as humans get older (Kuhn & Pearsall, 2000). By the age of 3, children are able to differentiate between positive and negative reasons (Mercier, 2011). And at 5 years, children are more selective on the information they receive and start to critically evaluate arguments. They are able to solve problems by using applicable information and creating related counterarguments (Domberg et al., 2017; Köymen & Tomasello, 2020).

Previous research found that egalitarian decision making tends to be more advantageous compared to authoritarian decision making. Since in cooperative contexts, it does not matter who states the winning argument, but all individuals involved want to reach the best decision, they can benefit from improving each other’s argumentation (Tomasello, 2019). As the ‘assembly bonus effect’ states “the performance of the group is better than that of its best member” (Collins & Guetzkow, 1964). Collective decision making where every individual involved can contribute to the process tends to exhibit some sort of error correction function (Anderson & Brown, 2010; Edge & Remus, 1984). Through the exchange of thoughts and information which other individuals may lack, each member can assist the progress of thinking, possibly leading to better decisions (Edge & Remus, 1984; Mann, 2020).

Not only egalitarian relations, but also the exchange of reasons has been found to enhance decision making (Mercier & Sperber, 2011). By exchanging reasons, individuals can point out errors or share alternative ideas, contributing to the above mentioned error correction function (Anderson & Brown, 2010). Already in preschool, group discussions have been found to promote reasoning practice, as even young children exchange reasons to collaboratively come to the best conclusions (Köymen & Tomasello, 2020; Mercier et al., 2014). Relatedly, it has been found that children in collaborative contexts produce more reasons compared to competitive contexts, indicating that reason giving might be more prominent in egalitarian contexts (Domberg et al., 2017). Reason giving is determined by children’s motivation to reach the best joint decision if both partners benefit from it. Like their ability to cooperate and assume shared common knowledge with their partner determines how many reasons children provide (Domberg et al., 2017; Köymen & Tomasello, 2020; Köymen et al., 2016).

Research in the field of decision making and reasoning have mainly been conducted in Western cultures, underlying the sampling bias in developmental psychology (Cheon et al., 2020; Mercier, 2011; Nielsen et al., 2017). To address this gap, this study will be run in two distinct societies,

Kenya and the Netherlands. Because they differ in steepness of their social hierarchies, Kenya exhibiting a steeper hierarchy compared to the Netherlands, it is likely that the relationship between power and decision making differs in strength in these two samples (Anderson & Brown, 2010; Hofstede et al., 2010; Lammers & Hickson, 2013).

Therefore, the current study investigates whether even young children in Kenya and the Netherlands reach better collective decisions in egalitarian versus authoritarian contexts. In the case of decision making, the current study differentiates between good and bad decision making. Based on previous findings where children relayed more on explicit knowledge rather than ambivalent hearsay, evidence that a child sees directly, in this case the perceptually received evidence, is expected to be seen as more reliable than evidence they are only told about, defined as testimonial evidence (Köymen & Tomasello, 2020). Since decision making and reason giving tends to develop at preschool age, the current study is interested in children aged 4 to 10 (Byrnes, 2002; Garon & Moore, 2004; Kuhn & Pearsall, 2000). However, it is not interested in any age or gender effects. Since previous studies found possible age, as well as gender differences with regards to the decision making process and reason giving, the current study controls for any possible effects (Byrnes, 2002; De Acedo Lizárraga et al., 2007; Garon & Moore, 2004; Garon & Moore, 2007). The study will be based on an experimental between-dyads design with two trials for the egalitarian and authoritarian condition. In the egalitarian condition, two children with an equal say in the discussion will interact, whereas in the authoritarian condition, one child will get the power to make the decision. They will play a game in which they have to decide together in which of two boxes the reward will be. During the test trials they are shown conflicting evidence about the box entailing the reward, stimulating them to give reasons.

Following hypotheses will be tested. Firstly, children in egalitarian relationships are expected to make better collective decisions than children in authoritarian relationships, based on studies who found egalitarian groups to be more advantageous in decision making (hypothesis 1; Anderson & Brown, 2010; Edge & Remus, 1984; Mann, 2020; Tomasello, 2019). Additionally, reason giving has been found to enhance decision making and being more present in egalitarian contexts (Domberg et al., 2017; Mercier & Sperber, 2011). It is therefore hypothesized that children in an egalitarian relationship who also exchange reasons with one another are most likely to make good collective decisions (hypothesis 2). Thirdly, the relationship between power and decision making is hypothesized to be stronger in the Kenyan sample, compared to the Dutch one, since Kenya represents a steeper hierarchy culture (hypothesis 3; Anderson & Brown, 2010; Hofstede et al., 2010; Lammers & Hickson, 2013).

Method

Participants

In total 262 children were tested, 206 in the Kenyan and 56 in the Dutch sample. Participants characteristics of the whole sample, as well as for each culture separately, can be found in Table 1. The children's age ranged from 4 till 10 with a mean age of $M=7.03$ ($SD=1.49$) in the whole sample,

Table 1*Descriptive Statistics and Frequencies of participant characteristics*

Sample	Variable	<i>M</i>	<i>SD</i>	<i>Min</i>	<i>Max</i>	<i>Frequencies</i>			
						<i>f</i>	<i>m</i>	<i>f</i>	<i>m</i>
Whole (N=262)	Age	7.03	1.49	4	10	-	-	-	-
	Gender	-	-	-	-	134	128	51.1	48.9
Kenya (N=203)	Age	7.01	1.41	4	9	-	-	-	-
	Gender	-	-	-	-	110	96	53.4	46.6
Dutch (N=56)	Age	7.09	1.74	4	10	-	-	-	-
	Gender	-	-	-	-	24	32	42.9	57.1

Note. Min= minimum score; Max= maximum score.

including a total of 134 girls and 128 boys (Table 1). Participants were matched for age and gender into dyads per culture. A power simulation of 1000 datasets, based on expected medium effect sizes indicated a power of 0.79 for a sample of at least 80 dyads per culture. The prior recruited Kenyan sample included 103 dyads. However, only 28 Dutch dyads could be tested, due to a lack of available schools. Dutch children were recruited through schools and afterschool programs in the Netherlands, while Kenyan dyads were recruited through (pre-)schools who informed the parents and obtained consent prior to the current study. Only children with parental permission were tested. The schools received a game as gift for participating. The study was approved by the Ethical Review Board of the Faculty of Social and Behavioral Sciences of Utrecht University (file number 23-2151).

Materials

The experiment took place in a quiet area, recorded by a camera for transcription purposes. The setup included a table, two chairs, and two differently colored boxes for each of the four decision making trials. In the two familiar trials, one pair of boxes contained a pre-filled reward, and the other was empty, simulating good and bad decisions. In the two test trials, one box had a pre-filled reward, and the other was filled during the game, providing perceptual evidence. A tablet showed a picture of the boxes, with one containing a reward serving as testimonial evidence. The boxes were in a see through box to prevent the children from opening them easily. A bead was used to indicate who made which final decision. Black and golden stones were needed for the power manipulation, along with a crown to symbolize the boss. Cookies of varying sizes were needed for the sharing task.

Procedure

The experiment was performed with one dyad at a time. The testimonial and perceptual experimenters, named after the evidence they would provide the children with during the game, introduced themselves and the game, asking the children to stay seated until told otherwise.

Then the two familiar trials began, allowing children to practice decision-making by choosing one of two boxes for a reward together. If they chose correctly, both received a reward, and if not neither did. The testimonial experimenter explained the game throughout the whole experiment. While both experimenters were out of the room, the children discussed together in which box the reward would be but could not touch the see through box. Once they decided, they called the experimenters back. If no decision was made within a minute, the experimenters re-entered and prompted the children to decide. The testimonial experimenter then gave the children a bead with which they had to indicate their choice. After the bead was placed, the chosen box was set aside to be opened after the second trial, whereas the other box was put out of sight. The second trial followed the same procedure. After a decision was made, the first box was opened, revealing no reward, followed by the second box, which contained rewards. The children were given small paper bags to store them.

Following was the power manipulation, where the children had to come to another part of the room to pick a stone out of a bag. For the authoritarian condition, one child grabbed a golden stone and became the boss who was in charge for the rest of the game, while wearing a crown. The other child grabbed a black stone and was not the boss and not in charge. Afterwards, everyone went back to the table and the boss got asked who could sit where to become comfortable with the role. In the egalitarian condition, both children picked a black stone, so no child would be the boss therefore having an equal say in the decision making.

Both test trials began with a sharing task, where the children got two differently sized pieces of cookie and the boss could decide which piece was for who. In the egalitarian condition both children decided together. Afterwards, the children received different evidence about which box contained the reward. The perceptual experimenter asked one child to come with her, where she presented the two boxes of the following round and placed the rewards in one of them (e.g. red). The child was asked to close the box. Simultaneously, the testimonial experimenter showed the other child a picture of both boxes. This child was told that the rewards are in the other box (e.g. yellow). The child had to point at the box entailing the reward. The children received conflicting information, encouraging them to discuss and decide together. The children then returned to their seats, and the game got re-explained following the same procedures as in the familiar trials. The second trial followed the same procedure as the first test trial. After the children made a decision the second time, they received rewards for both trials.

The entire experiment lasted about 10 minutes.

Variables

Included in the study were the variables 'decision making', 'condition', 'reason giving', and 'culture'. 'Decision making' was defined as good and bad decision. The perceptually evidenced box was a good decision, the testimonial evidenced one a bad decision (coded as testimonial=0, perceptual=1; Köymen & Tomasello, 2020). 'Condition' is defined as egalitarian and authoritarian relation (coded as authoritarian=0, egalitarian=1). 'Reason giving' was defined as either any reason was provided (yes),

or not (no) (coded as no=0, yes=1). 'Culture' differentiates between Kenya and the Netherlands (coded as Netherlands=0, Kenya=1). 'Age' and 'gender' got included as covariates based on previous literature indicating possible differences on those variables (Byrnes, 2002; De Acedo Lizárraga et al., 2007; Garon & Moore, 2004; Garon & Moore, 2007). Children were asked about their age and gender (coded as female=0, male=1) before the experiment.

Statistical Analysis

The data corresponds to an experimental design. To test the hypotheses a binary logistic regression model was conducted including 'decision making', 'condition', 'reason giving', and 'culture' as model variables. The software IBM SPSS Statistics version 27 was used, where the data got cleaned and prepared first. Model and demographic variables were numeric and had the correct measurement level. Each variable was checked for errors indicating no outliers. Missing values were replaced by '999' to indicate them as missing and exclude them from the analysis. Descriptive statistics, including frequencies and percentages for all binary model variables were requested. For further data inspection, the Hosmer-Lemeshow Test in SPSS was requested for all performed logistic regressions to assess the goodness of fit and ensure the model's accuracy in predicting the relationship between the dichotomous variables.

The first hypothesis was tested with a binary logistic regression analysis by setting 'decision making' as dependent and 'condition' as independent variable, including 'age' and 'gender' as covariates (Regression 1: $\text{decision making} = b_0 + b_1 * \text{condition} + b_2 * \text{age} + b_3 * \text{gender}$). To test the second hypothesis, expecting reason giving to moderate the relation between condition and decision making, a logistic regression analysis including the interaction term 'condition*reason giving' was done. 'Decision making' was set as dependent variable, 'condition', 'reason giving' and 'condition*reason giving' were set as independent variables, and 'age' and 'gender' as covariates (Regression 2: $\text{decision making} = b_0 + b_1 * \text{condition} + b_2 * \text{reason giving} + b_3 * \text{condition} * \text{reason giving} + b_4 * \text{age} + b_5 * \text{gender}$). The third hypothesis, expecting the relationship between condition and decision making to be moderated by culture, will be tested using a logistic regression analysis including the interaction term 'condition*culture'. 'Decision making' was included as dependent variable, 'condition', 'culture' and 'condition*culture' as independent variables, 'age' and 'gender' as covariates (Regression 4: $\text{decision making} = b_0 + b_1 * \text{condition} + b_2 * \text{culture} + b_3 * \text{condition} * \text{culture} + b_4 * \text{age} + b_5 * \text{gender}$). In addition, interaction plots using the graphs function and the predicted probabilities in SPSS were created to visualize the interaction term of the second and third regression. In case of a non-significant interaction in regression two and three, the analysis was repeated excluding the interaction terms to check for main effects of the independent variables.

After combining the two variables of age (age.child.1, age.child.2) using principal component analysis, multicollinearity was ruled out and no other model assumptions were violated. The dependent variable was dichotomous, the observations were independent given the research design, and the assumption of linearity of logits was naturally satisfied by only including dichotomous

variables in the analysis. No residuals or influential observations were identified, and the sample size was predicted to be large enough for a logistic regression.

Results

Descriptive Statistics

After excluding four dyads due to missing values on the variables 'decision making' and 'reason giving', the final analysis included 127 dyads, 100 dyads (78.7%) from Kenya and 27 dyads (21.3%) from the Netherlands. Table 2 presents the frequencies and percentages of the study variables for the whole sample and for each culture separately. Frequencies of the whole sample showed that for 'decision making', a good decision was made in 130 trials (51.2%) and a bad decision in 124 trials (48.8%; Table 2). Furthermore, there were 59 dyads (46.5%) in the egalitarian condition and 68 dyads (53.5%) in the authoritarian one (Table 2). Reasons were given in 182 trials (71.7%) and not provided in 72 trials (28.3%; Table 2). The whole sample included 63 female dyads (49.6%) and 64 male dyads (50.4%), with a mean age of $M=6.68$ ($SD=1.47$), ranging from 4 to 10 years (Table 2).

Hypothesis Testing

The first hypothesis, that children in egalitarian relationships make better collective decisions than those in authoritarian relationships, was tested with a binary logistic regression in SPSS, examining the significance of the regression coefficient of 'condition' on 'decision making' while controlling for 'age' and 'gender'. The Hosmer-Lemeshow goodness-of-fit test indicated a good fit, $\chi^2(8)=10.601$, $p=0.225$, implying that the model's predicted probabilities are consistent with the observed data. The Omnibus test of model coefficients indicates that the logistic regression model was not statistically significant, $\chi^2(3)=2.890$, $p=0.409$, indicating that the predictors, as a whole, did not significantly distinguish between children who made better collective decisions and those who did not. The model as a whole explained between 1.1% (Cox & Snell R^2) and 1.5% (Nagelkerke R^2) of the variance in decision making, and correctly classified 52.8% of cases. Looking at the direct effect of condition, the odds of making better collective decisions were 1.2 times higher for children in egalitarian relationships compared to those in authoritarian relationships, although this difference was not statistically significant ($B=0.183$, $SE=0.253$, $p=0.472$, $\text{Exp}(B)=1.200$, 95% CI for $\text{Exp}(B)=0.730 - 1.972$).

The moderating role of 'reason giving' on the relationship between 'condition' and 'decision making', controlled for 'age' and 'gender' was examined by a binary logistic regression including an interaction in SPSS. The Hosmer-Lemeshow test showed a good fit, $\chi^2(8)=10.997$, $p=0.202$, whereas the Omnibus test indicated that the model was not statistically significant, $\chi^2(5)=5.379$, $p=0.371$. The model as a whole explained between 2.1% (Cox & Snell R^2) and 2.8% (Nagelkerke R^2) of the variance in decision making, and correctly classified 53.9% of cases. The interaction coefficient was not found statistically significant ($B= -0.805$, $SE=0.571$, $p=0.158$, $\text{Exp}(B)=0.447$, 95% CI for $\text{Exp}(B)=0.146 - 1.369$), indicating no moderating role of 'reason giving' on the relation of 'condition' and 'decision making'. Excluding the interaction term in the analysis, the model still fit well $\chi^2(8)=15.090$, $p=0.057$,

Table 2*Frequencies of study variables, N=127*

Sample	Variable	<i>Frequencies</i>		<i>%</i>	
Whole sample (N=127)					
		<i>perc</i>	<i>test</i>	<i>perc</i>	<i>test</i>
	Decision making	130*	124*	51.2	48.8
		<i>egal</i>	<i>auth</i>	<i>egal</i>	<i>auth</i>
	Condition	59**	68**	46.5	53.5
		<i>yes</i>	<i>no</i>	<i>yes</i>	<i>no</i>
	Reason giving	182*	72*	71.7	28.3
		<i>Ken</i>	<i>NL</i>	<i>Ken</i>	<i>NL</i>
	Culture	100**	27**	78.7	21.3
		<i>f</i>	<i>m</i>	<i>f</i>	<i>m</i>
	Gender	63**	64**	49.6	50.4
Kenyan sample (N= 100)					
		<i>perc</i>	<i>test</i>	<i>perc</i>	<i>test</i>
	Decision making	102*	98*	51.0	49.0
		<i>egal</i>	<i>auth</i>	<i>egal</i>	<i>auth</i>
	Condition	47**	53**	47.0	53.0
		<i>yes</i>	<i>no</i>	<i>yes</i>	<i>no</i>
	Reason giving	143*	57*	71.5	28.5
		<i>f</i>	<i>m</i>	<i>f</i>	<i>m</i>
	Gender	52**	48**	48.0	52.0
Dutch sample (N= 27)					
		<i>perc</i>	<i>test</i>	<i>perc</i>	<i>test</i>
	Decision making	28*	26*	51.9	48.1
		<i>egal</i>	<i>auth</i>	<i>egal</i>	<i>auth</i>
	Condition	12**	15**	44.4	55.6
		<i>yes</i>	<i>no</i>	<i>yes</i>	<i>no</i>
	Reason giving	39*	15*	72.2	27.8
		<i>f</i>	<i>m</i>	<i>f</i>	<i>m</i>
	Gender	11**	16**	40.7	59.3

Note. * = trial; ** = dyad

but remained non-significant $\chi^2(4)=3.367, p=0.498$. All included variables explained 1.3% (Cox & Snell R^2) to 1.8% (Nagelkerke R^2) of the variance, and the model classified 51.2% of cases correctly. The main effects of 'condition' (see hypothesis 1) and 'reason giving' ($B= -0.208, SE=0.302, p=0.490, \text{Exp}(B)= 0.812, 95\% \text{ CI for } \text{Exp}(B)=0.450 - 1.467$) were not significant, therefore neither being in an egalitarian condition nor giving reason has a direct effect on decision making. See Table 3 for regression coefficients and Figure 1 for the visualized interaction.

A third hypothesis tested the moderating role of 'culture' on the relationship between 'condition' and 'decision making' controlling for 'age' and 'gender' using a binary logistic regression model including an interaction in SPSS. The Hosmer-Lemeshow test again showed a good fit $\chi^2(8)= 5.109, p=0.746$ and the Omnibus test indicated the model to be not statistically significant, $\chi^2(5)=3.383, p=0.641$. The model explained 1.3% (Cox & Snell R^2) to 1.8% (Nagelkerke R^2) of the variance in decision making, classifying 52.0% of cases correctly. The interaction coefficient was not found statistically significant ($B= -0.439, SE=0.626, p=0.484, \text{Exp}(B)=0.645, 95\% \text{ CI for } \text{Exp}(B)=0.189 - 2.200$), indicating that 'culture' did not moderate the relation between 'condition' and 'decision making'. The model still fit well $\chi^2(8)=9.634, p=0.210$, but remained non-significant $\chi^2(4)=2.890, p=0.576$ after excluding the interaction term. The variables explained 1.1% (Cox & Snell R^2) to 1.5% (Nagelkerke R^2) of the variance, and the model correctly classified 52.8% of cases. The main effects of 'condition' (see hypothesis 1) and 'culture' ($B=0.004, SE=0.310, p=0.989, \text{Exp}(B)=1.004, 95\% \text{ CI for } \text{Exp}(B)=0.547 - 1.844$) were not found to be statistically significant, therefore neither being in an authoritarian condition nor being Kenyan has a direct effect on decision making. See Table 4 for regression estimates and Figure 2 for the visualized interaction.

Discussion

This study examined whether giving reasons moderates the relationship between egalitarian or authoritarian conditions and decision making. The binary logistic regression analysis shows that reason giving does not moderate this relationship. Thus, the hypothesis that children in egalitarian relations who exchange reasons are most likely to make good collective decisions is not supported. Additionally, the hypothesis that the relationship between power and decision making is stronger in the Kenyan sample compared to the Dutch one is not supported, as culture did not moderate this relationship. Results also do not support the hypothesis that children in egalitarian relations make better decisions than those in authoritarian ones.

As there was no association found between condition and decision making, the current results were not in line with the first hypothesis that children in egalitarian relationships make better collective decisions than children in authoritarian relationships. Research findings are mixed. Some studies suggest steeper hierarchies might worsen group performance, whereas other studies indicate they might improve group performance (Anderson & Brown, 2010). These differences in findings can be explained by contingency theories of organization, which argue that there is no single best way to organize and that the optimal course of action depends on internal and external situations (Donaldson,

Table 3*Binary logistic regression analysis results, hypothesis 2*

Effect	Coefficient	SE	p	Exp(B)	95% CI		
					LL	UL	
Model 1 (Hosmer-Lemeshow: $\chi^2(8)=15.090$, $p=0.057$; Omnibus: $\chi^2(4)=3.367$, $p=0.498$)							
Constant	-.025	.310	.936	.975	-	-	
Condition	.183	.254	.471	1.201	.730	1.975	
Reason giving	-.208	.302	.490	.812	.450	1.467	
Gender	.272	.253	.283	1.313	.799	2.156	
Age	.170	.136	.213	1.185	.907	1.547	
Model 2 (Hosmer-Lemeshow: $\chi^2(8)=10.997$, $p=0.202$; Omnibus: $\chi^2(5)=5.379$, $p=0.371$)							
Condition x reason giving	-.805	.571	.158	.447	.146	1.369	

Note. CI= confidence interval for Exp(B); LL= lower limit; UL= upper limit.

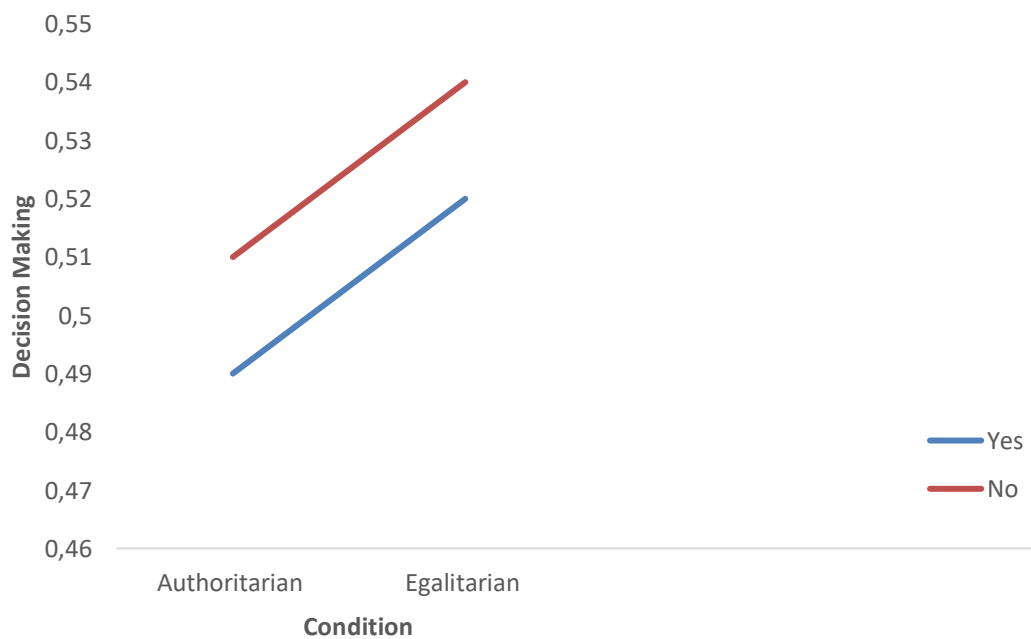
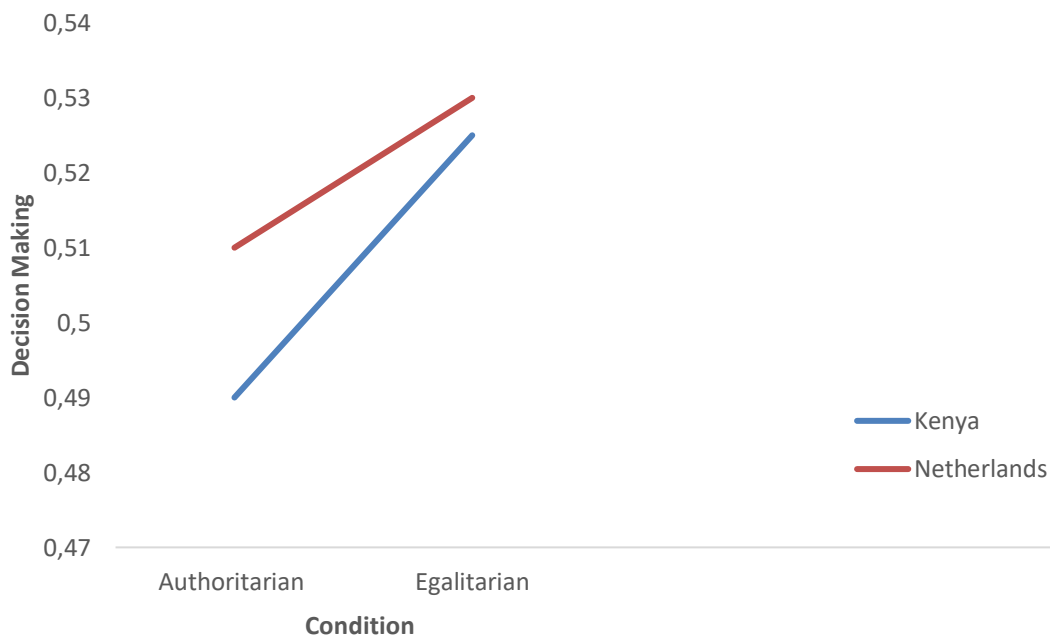
Figure 1*Interaction Hypothesis 2*

Table 4*Binary logistic regression analysis results, hypothesis 3*

Effect	Coefficient	SE	p	Exp(B)	95% CI		
					LL	UL	
Model 1 (Hosmer-Lemeshow: $\chi^2(8)=9.634$, $p=0.210$; Omnibus: $\chi^2(4)=2.890$, $p=0.576$)							
Constant	-.183	.333	.583	.833	-	-	
Condition	.182	.254	.472	1.200	.730	1.973	
Culture	.004	.310	.989	1.004	.547	1.844	
Gender	.282	.254	.266	1.326	.807	2.181	
Age	.136	.127	.284	1.145	.893	1.468	
Model 2 (Hosmer-Lemeshow: $\chi^2(8)=5.109$, $p=0.746$; Omnibus: $\chi^2(5)=3.383$, $p=0.641$)							
Condition x culture	-.439	.626	.484	.645	.189	2.200	

Note. CI= confidence interval for Exp(B); LL= lower limit; UL= upper limit.

Figure 2*Interaction Hypothesis 3*

2006). Consequently, the effectiveness of hierarchy steepness in decision making depends on factors like the coordination and motivation of group members. There is not one single form of organizational

structure, and whether steeper or horizontal hierarchies are more beneficial depends on the specific task or environment (Anderson & Brown, 2010; Donaldson, 2006). Therefore, the current decision making task, or motivation of the children in the egalitarian condition might not have been sufficient to lead to good decisions in the current study. Besides, the error correction function mentioned earlier might not apply in the same way to dyadic contexts as it does to larger groups. As the ‘assembly bonus effect’ mentioned earlier refers to more than two individuals, indicating that two individuals might not be enough to outperform each other (Collins & Guetzkow, 1964; Mercier & Sperber, 2011). A methodological limitation, which might contribute to the lack of an association in the current study, is the power manipulation. Even though one was done, it was not confirmed whether it actually worked. It is unclear if children in the egalitarian condition had an equal say and those in the authoritarian an unequal say in the decision making. Future studies should take this into account and check for the effectiveness of such power manipulations.

Current findings did not support the second hypothesis, expecting reason giving to moderate the relation between condition and decision making. Results therefore contradict with previous literature where reason giving was found to enhance decision making, possibly more so in egalitarian contexts (Anderson & Brown, 2010; Domberg et al., 2017; Mercier & Sperber, 2011). One explanation could be that reasoning does not always enhance decision-making, as strategies based on reasoning are sometimes no better than intuitive choices and may even lead to poorer outcomes or mistakes (De Acedo Lizárraga et al., 2007; Mercier & Sperber, 2011). Effective reasoning requires individuals to be motivated to accurately evaluate arguments (Anderson & Brown, 2010; Mercier & Sperber, 2011). For children, this motivation particularly depends on whether the decision benefits both partners (Domberg et al., 2017; Köymen & Tomasello, 2020). The current experiment accounted for motivation by promising both children a reward for the right decision. However, it did not measure whether this incentive was sufficient to encourage proper reasoning, which should be assessed in future studies. It is also unclear whether the children used reasoning to reach the best conclusion or simply aimed to convince the other child of their viewpoint. As the ‘argumentative theory of reason’ states, one of the main functions of reasoning is to convince others using arguments, making decisions easily justifiable but not always optimal (Mercier & Sperber, 2011). Since this study only assessed whether any reason was given or not, it remains unclear how reasoning was used. One child might have been more convincing than the other, regardless of the quality of the decision. Additionally, the conceptualization of the outcome variable may not have been ideal, as the analysis only considered which box was chosen, either perceptual or testimonial evidenced, and coded the decision as good or bad accordingly. This variable did not account for the decision making process or whether reasoning influenced the final choice. Consequently, it is unclear if the children’s reasoning led to poorer decisions or if other factors played a role. It could have for example been the case that the children did not perceive the perceptual evidence as reliable as assumed and therefore did not consider that box as the better choice (Köymen & Tomasello, 2020). Future research could include a variable coding decisions based on the

type of reason, differentiating between perceptual (e.g. 'I saw it') and testimonial (e.g. 'I heard it') reasons. This approach would clarify whether perceptual reasoning leads to better decisions or if other factors influence the outcomes. To further investigate whether reason giving is actually more prominent in egalitarian conditions, future research should look at the number of reasons provided in each condition.

No support was found for the third hypothesis, expecting a moderating role of culture on the relationship between condition and decision making. Current findings point into the direction of previous findings, suggesting that the relationship between power and decision making would be stronger compared to the Dutch one, however no conclusions can be made at this point (Anderson & Brown, 2010; Hofstede et al., 2010). A theoretical explanation can be drawn from Hofstede's cultural dimensions, which are based on statements using statistics that represent the most extreme forms possible (Hofstede, 2011). However, each statement is not absolute, and the actual situation in a given country may lie somewhere in between the ends of a dimension (Hofstede, 2011). Thus, it is possible that Kenya and the Netherlands do not represent both ends of power distance, therefore differing not as much in terms of hierarchical steepness as previously assumed. Alternatively, power distribution might vary within a culture, as Anderson and Brown (2010) suggest that the stability of power relations differs across social systems, potentially leading to inhibited behavior among powerholders due to this instability. It is possible that dyads within the cultures understood power distribution differently. For example, children from one region might have a different relationship to power than those from another region, potentially introducing noise within a culture. This variability in power perception and stability might explain the lack of a cultural effect. Another limitation of this study is the small Dutch sample, since experimental between-dyads designs where each dyad is exposed to only one condition require larger samples to detect effects (Malloy & Albright, 2001). Although the aim was to test 80 dyads per culture, only 27 Dutch dyads were analyzed, leading to an insufficient power in the current study. This rather large discrepancy between the Dutch and Kenyan sample and the insufficient power could explain the lack of a cultural effect. Future research should replicate this study with a larger and equally sized Dutch and Kenyan sample.

Further limitations of the current study which need to be addressed include potential experimenter flaws. Due to the involvement of multiple experimenters, procedural variations or minor mistakes occurred despite standardized protocols and practice sessions. For example, one experimenter told a child the evidence was a secret (which was not part of the protocol), which could have influenced the child's reasoning by discouraging them from discussing the evidence. Also, experimenters entered the room prematurely in some trials, which may have influenced the children's final decision. To avoid future experimental errors, it should be ensured that experimenters memorize the procedures and practice extensively. Additionally, video recordings could be reviewed to identify and address any mistakes, providing feedback to the experimenters for improvement. Besides, the controlled environment limits the generalizability of the findings, since the conditions might not fully

capture real-world dyadic interactions. However, the current experimental study design also has its strength. The random assignment of dyads to either condition benefits the internal validity and individual variability between participants is minimized by matching them for age and gender. Reliability is enhanced by having two trials per condition, allowing for replication of results within the study.

Since current conclusions on human behavior are mostly based on westernized samples, the current study contributes to the field of cross-cultural research and addresses the sampling bias in developmental psychology by including a non-Western sample.

To conclude, reason giving and culture did not moderate the relation between condition and decision making. Additionally, no association was found between condition and decision making. Besides its limitations, the current study adds to the field of cross-cultural research, filling the gap on possible cultural differences and factors influencing decision making. There is a tendency that better decisions are made in egalitarian contexts, and that this is pronounced in more horizontal hierarchies. Reason giving however did not enhance decision making. Nevertheless, future research is needed to further examine and validate current findings.

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