THE UNIVERSITY OF CHICAGO

WHAT'S FAIR IS NOT FAIR! CHILDREN'S CONTEXTUAL UNDERSTANDING OF IMPARTIAL RULES

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Dedicated to Han Hae Ryuh & Oh Jae Jung

유모있으시고 지식이 넘치는 나의 빛나는 할아버지 오재정, 그리고 가족에 대한 사랑과 헌신을 가르쳐주신 따뜻한 할머니, 한혜려 에게 바칩니다.

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Abstract

Children inhabit a complex social world in which they must learn to navigate and understand the various rules used to coordinate decisions and behavior between themselves and others. Although people commonly think about rules as being either categorically fair or unfair, established rules can be highly context-dependent in how they are used. In this dissertation, I demonstrate that children are flexible and sophisticated reasoners about the use of impartial decision rules – both in determining when rules are fair to use, but also in determining that fair rules themselves can be utilized in highly unfair ways. In Chapter 1, I explore two very canonically fair rules studied within the resource distribution literature: merit and equality. I show that children evaluate these rules as *unfair* if they are applied in a morally inconsistent way to benefit the self. Importantly, I find that children do not have a broadly negative view of inconsistent rule use, but that it is specifically morally inconsistent rule use that is negative: although they believe that inconsistently using rules to benefit the self is bad, they do not think that inconsistently using rules to benefit others is bad. Next in Chapters 2 & 3, I explore a novel and important decision-making rule that has been underexplored in young children's thinking but undergirds much of adult decision-making today: going with majority rules. In Chapter 2, I establish that children understand the use of majority rules and they use it across group decision-making contexts, even preferring it to another procedure that is viewed as very fair (coin flip).

I further demonstrate that children are highly nuanced in how they evaluate majority rules voting. They understand that majority rules should be used for group decisions but not for decisions on behalf of individuals, and that they discern between *types* of claims that can be voted on (e.g., it is totally appropriate for preference decisions, but should not be to decide what is true or moral). Finally, in Chapter 3, I combine insights from the first two chapters to demonstrate that, although children believe that majority rules is fair as a decision-procedure for groups, they even attend to who is voting and benefiting from the decision rule—when those voting against a policy are the ones being disproportionately disadvantaged by it, it is seen as less fair than if they were in favor. Altogether, these results demonstrate a nuance in how children think about, and reason about complex impartial rules in the social world.

Committee: Alex Shaw (chair), Amanda Woodward, Lin Bian, Fan Yang

Introduction

What's fair is fair. This cliché belies a much more complicated question: What is "fair"? In a highly complex social world with myriad different ways of instituting decisions, deciding what is fair can often be an unexpectedly complicated task. There are cases in which the answer to this question seems quite clear. In cases where people don't have conflicts of interest or where they generally agree on a desired outcome, making a decision can be quite simple. However, coordinating with others is rarely so easy. In cases where people need to coordinate between preferred outcomes, using impartial rules can be a way to increase satisfaction and decrease conflict. There are often innumerable competing rules and justifications that one could use to make decisions. These rules play a substantive role in much of human life, but there is still much to discover about how children come to learn and flexibly utilize impartial decision-rules in their day to day lives. This dissertation will explore how children evaluate others' use of rules in making decisions, demonstrating that children's rule use is quite sophisticated. Namely, that children do not merely think of rules as always being fair across the board. Instead, children evaluate rule-use in highly contextual ways and believe that "what's fair" can suddenly become quite murky depending on children's inferences about the motivations behind the rule in question.

We know that adults believe that ostensibly fair rules can be seen as quite *unfair* depending on the circumstance in which they are employed. Take, for example, the

Parable of the Unforgiving Debtor, a biblical story likely composed some time between 70 to 110 AD. In this story, a servant owes a king a significant sum of money and begs to have his debt forgiven. The king, showing mercy, cancels the debt. Later, when the servant is in a similar situation, with a fellow servant owing him money, he refuses to forgive the debt and demands payment. This callous behavior is deemed despicable by the king, who chastises the servant for his lack of mercy. One can consider that in abstract, the rule of being paid what you are owed can be viewed as "fair" if nothing else is known. However, its context in the story highlights the idea that rules can suddenly seem unfair depending on the circumstances surrounding them – i.e., invoking the rule of 'pay back your debts' when you are the debtor but not when you are the debtee – may strongly invoke a feeling of unfairness even if you believe the rule itself is just. Although people commonly think about rules as being either categorically fair or unfair, this is a phenomenon we encounter quite frequently within the social world across lifespan, culture, and context—that established rules may suddenly seem unfair depending on the circumstances under which they are utilized. Understanding this may be a principal aspect of rule-use because it transforms the fairness of the rule itself, and may explain many cases in the world in which this phenomenon can be observed. Understanding what makes rules contextually fair or unfair requires several different considerations: When can rules that are considered 'fair' be seen as unfair? What may be some underlying aspects of rules that grant them their fairness or lack thereof? And importantly, what cognitive

precursors to nuance in rule use are required for children to understand and identify this particularly tricky type of rule understanding?

In this dissertation, I explore the development of children's understanding of rule-use and how they evaluate different rules which can be used in decision making. Further, I explore the ways in which children decide the fairness of a rule – both in children's nuanced understanding of rule use as contextually fair or unfair, as well as when children may evaluate a decision-rule as such. There is growing evidence that children do not believe that rules are either fair or unfair, but that the fairness of a rule may be rooted in whether children perceive the rule's use to be self-serving or immoral. Because of this, fair rules can be perceived as unfair depending on how and when those rules are used—some contexts will make a clearly fair rule suddenly seem unfair. To do so, I cover first extant literature on how children think about rules. Specifically, the studies in my dissertation explore how children evaluate "fair rules" (e.g., making decisions based on merit, equality, and majority rules decision making) and the circumstances in which children think that using these rules is not so fair. In the three chapters of this dissertation, I demonstrate how children consider several aspects of decision-making (including the intent behind the rule use as well as the consequences of using that rule) in evaluating the fairness of utilizing rules.

How do children think about rules?

Across the extant scholarship of social cognitive development, developmental psychologists have long been fascinated by how children learn, react, and think about rules, both in the abstract and in everyday life. Children are born into highly structured social worlds governed by norms and rules set by groups, authority figures, and peers. Not only are children embedded in contexts where rules are present, but children themselves begin enforcing rules from early in life. Research has shown that children follow social rules and begin enforcing social norms as early as the second year of their lives (Game & Daum, 2016; Hardecker et al., 2016). For example, children between 2- and 3-years old raise normative objections in response to the violation of novel rules in games (Rakoczy et al., 2008). Even infants as young as 18-months old will spontaneously protest against nonconforming agents (Schmidt et al., 2019) and demonstrate self-distress when faced with the violation of previously imitated norms (Essler et al., 2023). Further, observational research in naturalistic settings has shown that children will tattle on their siblings when rules are broken, a tendency which increases with age (Ross & Bak-Lammers, 1998). The presence of rules is a robust phenomenon for both children and adults. Children are aware of rules and learn to navigate, respect, and endorse them from an early age.

Indeed, early research on children's social behavior noted the ubiquity of rules in young children's lives and built theories around the idea that children's notions of

rules were highly concrete. In particular, canonical theorists dating back to Piaget (1932) and Kohlberg (1968) explored rules in relation to children's belief about their immutability. Piaget's early claims posited that early in development, young children had a rigid and inviolate conception of rules and rule-following. Specifically, Piaget believed that from between 5- to 9-years old, children evaluated rules as primarily externally levied by authority figures, and that it wasn't until 9- to 10-years old that children begin to understand that the morality of rule violations can depend on other factors such as intention (Piaget, 1932).

Subsequent research has revealed that this early scholarship into children's belief about rules underestimated the type of reasoning young children *can* do about rules. For example, one aspect of nuance missing from this literature is that children are sensitive to the *types* of rules that may be mutable or immutable. Most prominently, work in social domain theory has found that by as early as age 3- to 5-years-old children treat the violations of moral versus conventional rules differently. Researchers found that children do not believe that moral and conventional rules are equally independent of authority, but rather that violating a moral rule (e.g., hitting someone) is worse than a conventional rule (e.g., wearing pajamas to school) regardless of whether an authority figure claims the violation is acceptable or not (Nucci and Turiel, 1978; Smetana et al., 1991; Turiel, 1978). That is, young children do not believe all rules are created equal and understand that some rules 1) are indeed

mutable and 2) may be more mutable than others. Not only that, but as they mature into later childhood, they also understand that these different types of rules can apply in different interpersonal spheres, understanding that people have many different types of social relationships (school, family, friends, community) where different rules and concerns might apply (for review, see Dahl & Killen, 2018).

Further, children also go beyond the concrete outcomes of rule violations in evaluating a moral transgression, focusing on the intent behind both outcomes and rules. Research has found that as young as 3- to 5-years-old, children believe that intentionally causing a bad thing to happen is morally worse than causing it accidentally (Armsby, 1971; Darley & Shultz, 1990; Yuill & Perner, 1988). As children mature, around the age of 7 or 8, they start to appreciate more nuanced distinctions between intentions and outcomes (Cushman, Sheketoff, Wharton & Carey, 2013; Shultz, Wright & Schleifer, 1986). They may view someone who attempts to harm someone but fails as worse than someone who accidentally harms someone. A similar type of reasoning occurs beyond the intention behind actions themselves, but also in the intention behind rules (and breaking them). Indeed, the intention behind a rule (e.g., "legislative intent", for review see Sunstein, 1989) plays a key role in adults' assessments of how and when a rule should be applied. That is, adults do not care only about the letter of a rule, but also the spirit behind it, and the spirit of the law can often trump the letter of the law. Recent work has demonstrated that children too

appear to care about the "legislative intent" (Bregant, Welbery & Shaw, 2019), allowing for others to break rules in cases where breaking the rule does not violate the reason or "spirit" behind the rule. For example, imagine that there is a rule at the library that students can only take home four books at a time. The reason this rule is established is because more than four books do not fit in a backpack, and therefore the books could fall out and become dirty. That is, the rule was established to prevent the books from getting dirty—that is the reason or spirit of the law. However, the letter of the law says you cannot take more than four books home. These studies asked whether or not children thought it could be acceptable to violate the letter (e.g., taking home more than four books) if they take proper care to make sure the books don't become dirtied (e.g., by having an extra-large backpack that fits 6 books)? Here, the authors found that children from the ages of 4- to 9-years old believe it is less wrong to violate the letter of the law if the spirit is kept intact – a distinction which is strengthened with age. These researchers show that children can reason flexibly about rules – children understand that a rule has an intention behind it, and that the intentions matter in deciding whether a rule should or should not be followed.

These studies demonstrate that children flexibly reason about rules in complex ways. Children understand that rules may have a function or intent, and will evaluate the breaking of rules depending on whether the action upheld the intent or not. They furthermore understand that rules apply selectively to certain contexts or domains and

that applying a rule that is completely appropriate for one type of decision may be inappropriate for another type of decision.

Procedural fairness, impartiality, and disliking partiality

Extant research exploring procedural justice literature has suggested that, as opposed to the traditional account of distributional justice where procedures are valued because they create *outcomes* to be favorable, adults' fairness judgments are affected by the belief that a rule is fair or impartial (Tyler, 1989; Tyler, Rasinski & Spodick, 1985). In particular, research in adults focuses on impartial procedures as an important way to negotiate conflict resolution; adults are less averse to outcomes that are not ideal (such as inequality) when created using an impartial procedure (Blount, 1995, Bolton et al., 2005) and generally are more satisfied with outcomes which are reached with procedural fairness (Thibault & Walker, 1975). Although much of the research examining how children think about procedural fairness focuses primarily on how adolescents think about concrete procedures such as legal procedures (e.g., Easton & Dennis, 1969; Fagan & Tyler, 2005), research within the past decade has specifically examined how children think about the impartiality of rules.

Like adults, one particularly important factor that children may use in evaluating a rule is whether or not the rule seems to be partial or biased in the distributor's favor (Shaw, 2013, for a related account see Engelmann & Tomasello, 2019). We already know that, between the ages of 6- and 8-years-old, children do this

in their evaluation of rules—e.g., they clearly endorse giving oneself more based on merit rather than someone just wanting more (e.g., Schmidt et al., 2016). Some specific work that demonstrates that children are concerned with procedural justice and specifically procedures that are impartial is work by Shaw & Olson (see relatedly, Grocke et al., 2015) in which children chose to use an impartial procedure over a partial one. Specifically, when asked to decide how to split resources between two participants, children chose to spin an impartial wheel that gives two recipients a 50-50 chance to get the reward rather than a wheel that is biased in one of the recipients' favor (Shaw & Olson, 2012).

Further, there is some evidence suggesting that children begin to understand and become sensitive to partiality by around 6- to 8-years old. Children believe that judges will be partial or biased against enemies and in favor of friends (Mills & Grant, 2009) and understand that partiality may be a possible explanation for disagreement in subjective cases (Mills, et al., 2012). This fits in with other research that suggests that children increasingly become sensitive to self-serving motivation as well. For example, children distrust self-serving reports (Mills & Keil, 2005) and become increasingly likely to discount bragging, because they expect that the speaker may be motivated to improve his or her reputation (Heyman et al., 2007; Heyman & Legare, 2005).). These data suggest that children can evaluate the exact same behaviors or utterances quite

differently depending on the inferred self-serving motivations of the actor--they understand the ways in which self-serving motivations can bias decision makers.

Additionally, children are sensitive specifically to who is *making* decisions, and who the decision *affects*. For example, some research by Shaw and colleagues (2016) demonstrates that children will disadvantage themselves, but dislike when others disadvantage them. Across these studies, children were put in resource distribution contexts in which outcomes were disadvantageously inequal (e.g., that there was inequality in which the child was disfavored or had less). Children either themselves created disadvantageous inequity or disadvantageous inequity was created by another person. These researchers found that children aren't just sensitive to any disadvantageous inequity, but specifically whether the inequity is created in a partial way – when children themselves were the ones that made the decision, even if the outcome was disadvantageously unequal to them, they still said it was more fair than if the decision was made in a way where they had less agency. Children also will infer partiality from the scope of the decision as well: children believe that when one makes a decision to favor one equally deserving person over another, it will be seen as partial to one person over the other. However, one exception to this is when the allocator is favoring someone else in a way that disadvantages the self. Thus, children seem to understand that the relative effect of decisions made, and who is instituting these decisions, may point to an underlying partiality. Relatedly, the role of agency increases

satisfaction with disadvantageous inequality. Gordon-Hecker and colleagues (2022) found that 4- to 10-year old children were more satisfied with outcomes that were disadvantageously unequal towards them when they had a sense of agency in enacting these decisions—specifically, when children were given the opportunity to decide themselves what to do with a resource versus two non-agentic contexts (having the experimenter decide and deciding by lottery. In the same way that children can increasingly discount self-serving motivation, children are sensitive to these two types of inequity. Thus, given that children are sensitive to how and by whom decisions are being made, and that they can make subtle inferences about self-serving motivations that may lead to bias, then they should be able to evaluate a "fair rule" as unfair if they received information that would cause them to infer that the rule is being used in a self-serving way.

Dissertation Overview

Across seven studies within this dissertation, I explore the development of how children think about the fair and unfair decision rules. In Chapter 1, I explore two very well studied allocation rules from the literature: merit-rules and equality-rules. Dividing resources based on either merit or equality seem like a defensible way to allocate resources between others, and previous work has demonstrated that children (and adults) endorse both of these rules (e.g., for review see Hook & Cook, 1979; Baumard, Mascaro, & Chevallier, 2012)). However, we hypothesize that these fair

rules can suddenly appear considerably less fair if one picks and chooses when to use the merit rule and the equality rule: Merit when I have more merit, equality when I have less. That is, we hypothesize that children may negatively evaluate others for hypocritically using rules in a morally inconsistent fashion to benefit themselves. Across three studies (N = 379, US 4- to 9-year-olds), we find that children do indeed respond negatively to moral inconsistency that benefits the self (e.g., distributing based on merit when one does better and not when one does worse). Further, this belief strengthens with age -- older children respond more negatively to selfish inconsistency than younger children (4- to 6-year-olds). These data suggest that children, at least by age 7, are discerning about the use of these rules. They do not only think about the fairness of the decision rule itself when forming their evaluations (indeed, we find that children do think that both merit and equality are perfectly fair in the absence of information about inconsistent rule use), but rather their evaluations are driven by their inferences about how and why the rule is being used. Further, we find that children are not merely responding negatively to inconsistency—when someone uses a rule inconsistency to benefit someone else (e.g., I have higher merit on two days and one day give myself more based on merit and the other day give equally), children do not think this is unfair. Taken together these results provide a compelling demonstration for children evaluating rule use based on their inferences about how and why the person is using that rule.

In the next two chapters, we explore a decision-rule that is ubiquitous in many day-to-day decisions, but surprisingly understudied in young children: deferring to majority rules (for an exception, see Helwig, 1998; 2003). In Chapter 2, we examine children's inferences about if and when it is appropriate to use majority rules. We ask children from both the US and China to evaluate (N= 540 4- to 9-year-olds) how a group should make a decision: by using majority rules or some other set of procedures. Note, we investigated these two cultures because they have two systems of federal governance that seem to differentially endorse norms around democracy. However, we expected that our task was basic enough that there might not be strong cultural differences, but still felt it was important to attempt to see if our findings would generalize. Overall, we demonstrate that, in both the US and China, even the youngest children (4- year-olds) we tested endorse majority rules in contexts that adults would (e.g. they think a group should go with the majority to decide what the group will have as a snack), but not it all contexts (e.g. they do not think a majority should get to decide what an individual eats for snack). Although children in both cultures showed some early competencies regarding voting, we do observe developments in children's endorsement of using majority rules: 6-year- to 9-year-old children prefer voting to another "fair" procedure (flipping a coin) whereas younger children do not. Importantly, we demonstrate 4- to 9-year-old children do not endorse majority rules merely based on dominance or conformity; they differentiate when one should and should not use majority rules to make decisions (e.g., when a

decision is being made for a group, but not for a single individual). Finally, we show that 4- to 9-year-old children are sensitive to the *types* of decisions one can make using majority rules voting – children believe that groups can use majority rules to make decisions on preference-based decisions, but not moral or truth-based decisions. Altogether, these studies suggest that children have a sophisticated understanding of majority rules voting as a rule, and generally believe it to be a fair way of making decisions.

In Chapter 3, we combine insights from the previous two sets of studies and explore whether children evaluate majority rules voting differently depending on *who* is being disadvantaged by the majority's choice—that is, if it looks like a majority is using their rule in a self-advantaging way. Across two studies, we test whether children believe majority rules voting is a fair way to make decisions based on *who* is voting for *what* outcome. We find that children evaluate a circumstance in which a majority votes to disadvantage another group as less fair than if they vote to disadvantage their own group. These studies find that children (N = 243, US 4- to 9-year-olds) attend to the compositions of majorities and minorities voting. Children believe that using majority rules is more appropriate when the majority voting for some policy is disadvantageous to their own group than when it is disadvantageous to another group.

Together, these three chapters illustrate a coherent image of children as thoughtful and sophisticated decision-makers, negotiating their beliefs and evaluating

different "fair rules" using cues about whether the rule is being used in a self-serving fashion (Chapters 1 and 3) as well as the consequences and contexts that the rule is being used in (Chapter 2). We demonstrate this sophistication across several different impartial decision-rules that use different underlying principles: Merit & Equality (Chapter 1) and Majority Rules Voting (Chapters 2 and 3). Most importantly, we demonstrate that children are discerning in using these rules. They have clear beliefs about when these rules may be considered fair and appropriate, and when they are not depending on several different aspects of the decision being made.

Chapter 1: Moral inconsistency in the use of impartial rules

Introduction

Children are sensitive to rules and enforce rules in order to negotiate behavior as early as the second year of life (Game & Daum, 2016; Hardecker et al., 2016; Rakoczy et al., 2008). In particular, a rich body of literature has demonstrated that there are a large number of rules children can use in order to make decisions about how to share or split resources amongst themselves (Damon, 1977). For example, when deciding how to share resources between oneself and a partner, children by the age of 6 or 7-years-old believe sharing resources equally or using a merit principle in which the harder worker gets more are both fair and justifiable ways to allocate resources (Hook & Cook, 1979; Sigelman & Waitzman, 1991). While either rule is considered fair on its own and would be totally justifiable way to allocate resources (by both children and adults), there may be cases in which these rules can seem *unfair* depending on how they are used by an allocator – for example, consider the following case. Imagine two people who work together and split their profits, Albert and Bill. On Monday, Albert works harder on a task and when asked how he should split the resources with Bill, Albert says they should divide the profits based off of merit, because that's the most fair – he should get more because he worked harder that day. On face value, this seems fair enough. As suggested above, many children and adults would agree on Bill's suggested rule. However, consider that Bill works less hard on the very next day. When asked how to divide

profits, Bill changes his mind and says that *equality* is the way to go because that's the most fair rule. We might have very different beliefs about Bill and his rule use here – it does not seem very fair for him to suggest equality as a rule now, even though equality would have been totally fair if Bill had suggested that from the start. Why might this be so?

Selectively using these rules clearly interferes with one of the primary functions of such rules: namely ensuring impartiality (e.g., Shaw, 2016; Tyler, 2000). Changing the rules whenever it benefits oneself may be a clear indication that one is not using the rules in a principled way to achieve an impartial allocation mechanism, but instead as a tool for promoting one's selfish ends. In line with this, prior literature has demonstrated that children are sensitive to fairness in decision rules and procedures (Grocke, Rossano, & Tomasello, 2015) and that they do not think partial procedures (e.g., such as spinning a wheel that guarantees successes for one recipient) are fair (Shaw & Olson, 2014). However, no work that we are aware of has explored whether children can view fair and impartial procedures (like equality or merit) to be unfair and partial based on the inferences they make about how and why those rules are used. We posit that one of these cases is selective (and self-benefiting) rule use (like Bill in our example from above). Such moral inconsistency, in which one endorses different rules as a way to benefit the self, certainly seems partial and biased, which we argue children should see as unfair. In Chapter 1, we explore the development of children's evaluations of such

moral inconsistency. We first discuss extant literature on how children may think about the impartial rules behind distribution.

The rules behind fair distribution

Research has demonstrated that young children respond quite negatively to unfairness in the form of unequal treatment and use an increasing number of other rules and impartial procedures to create what they see as unequal, but fair, divisions of resources as they get older (Hook & Cook, 1979; LoBue, Nishida, Chiong, DeLoache, & Haidt, 2011; Sigelman & Waitzman, 1991). While equality is often a good heuristic for achieving fairness and impartiality, there are many cases where unequal allocation can seem fair. For example, instead of pure equality, in many cases children will endorse an 'equity' rule based on merit (equal work for equal pay) and this seems intuitively fair to both adults and children (e.g., Hook & Cook, 1979). Indeed, as children age they become more aware and discerning about the *kinds* of justifications and procedures that are appropriate or inappropriate like merit, need, and chance-based procedures (Kogut, 2012; Paulus, 2014; Rizzo, Elenbaas, Cooley, & Killen, 2016; Rossano, & Tomasello, 2015; Sigelman & Waitzman, 1991).

When an outcome is reached in an impartial manner, even if the outcome *itself* is not equal or based on merit, one may accept the outcome based on whether the procedure itself was impartial—so called procedural justice. Research has demonstrated that both adults and children are more likely to accept a variety of outcomes when fair

or legitimate procedures are used to determine them (e.g., Grocke et al., 2015; Rasinski and Tyler, 1988; Sunshine and Tyler, 2003). For example, children endorse using randomized procedures such as spinning a wheel in order to come to a decision about how to split resources—e.g., they choose to spin wheels that have a 50-50 chance for two recipients. Given that children seem to evaluate rules based on whether the rule seems to be partial or biased in the distributor's favor (Shaw, 2013, for a related account see Engelmann & Tomasello, 2019), it seems likely that children may understand that rules can seem *ostensibly* fair, but unfair in practice. For example, while they usually think that 50-50 wheels are fair, they also think that such wheels can be unfair if one recipient already has less, and one could instead give the resource to the person who has less rather than risk increasing the inequality by using the 50-50 wheel (Shaw & Olson, 2014).

If children believe that impartiality is important for evaluating rule use, then factors that make one believe that a distribution is biased or partial may make even an ostensibly fair procedure seem unfair. For example, work with adults suggest that there are cases when a fair rule may seem unfair if people believe you are doing it for the wrong reason (e.g., merit rules are generally fair, but may seem unfair if the meritorious person you're rewarding is your friend; Shaw, Choshen-Hillel & Caruso, 2018). Thus, it seems plausible that when evaluating an ostensibly fair rule such as merit, if children get cues from a distributor that the person's endorsement of this rule is not actually

impartial (e.g., instead, that they endorse merit only because it benefits them or their friends), then they should no longer think of this rule as fair or appropriate in use. Next, we discuss some work on strategic selfishness and explore whether children themselves are 1) selfish actors and 2) can identify selfish behaviors and motives.

Strategic Selfishness

Previous research has revealed that children can be strategically selfish and unfair in many circumstances; that is, they select to act much more selfishly when they can get away with it rather than when an audience is watching them (Shaw et al., 2014; Engelmann & Rapp, 2018; Leimgruber et al., 2012; Rapp, Engelmann, Herrmann & Tomasello, 2019). Further, Gonzales, Ahl, Cordes and McAuliffe (2021) demonstrated that children strategically conceal their selfishness from game partners when they can do so. Specifically, six- to nine-year-olds were given an opportunity to make 'strategically selfish' offers that seemed fair based off of their partner's partial knowledge in a game. Specifically, children played an ultimatum game as the distributor with a partner who was either fully informed or only partially informed of the endowment quality. Children distributed strategically based off of whether their game partner *thought* they were giving generous offers – that is, when they could have had either 2 or 10 to split, children frequently shared only 1 because that allowed them to seem fair (they could have had only to split). That is, when acting selfishly and benefitting the self might seem fair to unwitting game partners, children were more

likely to act selfishly versus when game partners would know the action was selfish. Taken together, this work (for review see, Engelmann & Rapp, 2018) demonstrates that children are able to act strategically selfishly themselves, and are sensitive to the knowledge states of cooperative partners and audiences.

Similarly, children will and *do* invoke rules in a self-serving manner instead of a principled one. For example, in an observational study with preschool-aged children in a classroom setting, researchers observed that children will purposely invoke rules during disagreement to establish hierarchy or get their way (Jordan, Cowan & Roberts, 1995). Similar observations were made when examining 4- to 6-year old children in classrooms and their likelihood to appeal to rules set by teachers or other authority figures in order to get their way (Cromdal, 2001; Cobb-Moore, Danby & Farrel, 2007)—e.g., in cases where there is a dispute in ownership in a classroom, researchers found that children appeal to extant rules in order to delegate the conflict. Relatedly, in the experimental research in which children were put in group social dilemmas such as right-of-way conflicts (Grueneisen & Tomasello, 2019), authors found that though the presence of generated rules led to children protesting less at each other, they did not necessarily find that rules led to equal payoffs, suggesting that children may have been generating these rules in a way that was self-serving. This selective rule use is not something that children grow out of. Research has demonstrated that adults reason about and select rules that will benefit them – for example, DeScioli and colleagues

(2014) had adult participants play an economic game in which one player acted as a distributor and distributed based on equality rules or merit rules. These researchers found that participants not only preferred to use rules that benefitted them the most, but that they also explicitly judged these rules are more fair or more moral. Further, adults *changed* their evaluations of rules based off of what benefitted them the most. Thus, from a relatively young age all the way through adulthood, people can strategically endorse rules in ways that benefit themselves.

However, are children sensitive to when *other* characters engage in these actions, particularly when the rules being used are all ostensibly fair? While it might seem obvious that children who engage in selfish behavior themselves would be able detect this behavior in others, this is not always the case: children appear to have difficulty understanding that others strategically manage their reputation (for review see, Silver & Shaw, 2018). For example, although children as young as 5-years old may act more generously in public than in private (e.g., Leimgruber et al., 2012), it isn't until children are 8- to 9-years old that they infer that the publicly nice person is less nice than the privately nice person (Heyman, Barner, Heumann, & Schenck, 2014). Relatedly, children have an emerging understanding of others' self-serving motivation as they mature: from the age of 6- to 9- years old they increasingly distrust self-serving reports (Mills & Keil, 2005; 2008) and become more likely to discount bragging, because they expect that the speaker may be motivated to improve his or her reputation (Heyman et

al., 2007; Heyman & Legare, 2005). That is, the extant literature suggests there may be a gap between the propensity to engage in self-serving behaviors oneself, versus identify selfish behavior in others. Altogether, these data suggest that children, at least by 7- or 8-years old, can and do evaluate the exact same behaviors or utterances quite differently depending on the inferred self-serving motivations of the actor.

Current Studies

The current studies investigate not children's own strategic behaviors around fairness, but how they evaluate others' strategic use of rules. Specifically, we examine children's evaluations of inconsistent use of fair rules (merit and equality), across different distributions. Despite that each of these rules are considered fair in isolation (and in the contexts we examine), previous work has not examined how children evaluate these rules when used *inconsistently* – that is, when one flexibly shifts between two fair rules to benefit oneself, how are these fair rules evaluated by children age 4- to 9-years-old?

To do so, we tell children a story about two different characters in a classroom who have to decide how to share a number of resources. In Study 1, we examine children's evaluations of moral inconsistency by showing them a distributor who changes what rule they use across two different days (e.g., using an equality rule on day 1, but a merit rule the next). In Study 2a, we specifically examine inconsistency more broadly versus moral inconsistency by showing two inconsistent distributors:

one who is selfishly inconsistent (changing rules to benefit the self) and one who is selflessly inconsistent (changing rules to benefit someone else). Finally, in Study 2b, we replicate Study 2a, but also ask children to make a prediction about whether or not the agent in question will do something fair or unfair in the future. These studies allow us to probe the development of these intuitions in 4- to 9-year-old children.

Given the evidence reviewed above, it seems likely that older children (certainly by age 8 or 9) should be able to make these inferences, but it is harder to know if younger children will. On the one hand, given that young children engage in selfish behavior themselves and understand that rules are valuable in-so-far as that they are impartial, it seems be possible that young children (4 to 5-year-olds) attend to the moral inconsistency of rules and rule use. However, given the previous work demonstrating that these same children have some difficulty in identifying others' selfish behavior, it may be possible that children do not appreciate moral inconsistency until they are older. This investigation provides critical information not only about children's understanding of others' strategic motives, but also crucial insights into children's inferences about rule use, which undergird many important social interactions.

Study 1

In Study 1, we explore how children evaluate the inconsistent use of two ostensibly fair decision rules—dividing equally or based on merit. Previous research has shown that children believe a number of rules can be used in order to distribute

resources– notably, both merit rules and equality rules have been studied extensively in children, and these rules are generally treated as quite fair by as early as 3-years old (Hook & Cook, 1979; Sigelman & Waitzman, 1991; Baumard et al., 2012). Thus, we examine here whether children would regard these rules as unfair if they were being used in a morally inconsistent way that benefits the distributor.

To test this question, we show children a short story in which two characters have to share resources between each other. We specify one of these characters as a Distributor, and show that the Distributor can decide how to share these resources between himself and another. In one condition (Consistent condition), we show the Distributor is consistent in their use of a decision rule – i.e., the character uses the same rule across two different time points (here, represented by days) Specifically, the Distributor uses a merit rule on Day 1, when he works less hard and thus gets less, and again uses a merit rule on Day 2 when he works harder and thus gets more. In a second condition (Inconsistent condition), we show the Distributor is *inconsistent* in their use of a decision rule – i.e., the character uses *different* rules across the two time points. Specifically, in the Inconsistent condition, the Distributor uses an equality rule on Day 1when he works less hard and thus both receive equal resources, and a merit rule on Day 2 when he works harder and thus gives himself more. We ask children to evaluate the fairness of each distribution. Our critical test is the Day 2 evaluations in which the distribution rule and distribution are identical. Across both conditions, the

Distributor uses a merit rule on Day 2 and distributes more resources to himself. Thus, children will evaluate the exact same thing, with the single difference being how the Distributor distributed resources on the day previous. If children evaluate this rule as less fair in the Inconsistent case than the Consistent case, this suggests that children have some belief about inconsistency being an unfair way to distribute resources. We predicted that at least our oldest children would show this pattern of results—negatively evaluating the fair merit rule in the inconsistent condition as compared to the consistent condition.

Methods

Participants. In Study 1, 139 4- to 9-year-olds (M_{age} = 81.96 months, SD = 18.36 months, 58 female) were tested. In total, there were 71 participants in the Inconsistent condition (M_{age} = 82.8 months, SD = 18.12 months, 39 female) and 68 participants in the Consistent condition (M_{age} = 81.24 months, SD = 18.6 months, 37 female). Data were collected at a science museum in a Midwestern city in the United States. We did not collect specific demographic information beyond gender at the museum because of the fast-paced nature of data collection. However, our museum partner provided us with a summary of their own survey data of museum visitors between March 2018 – 2019 which is about when these studies were run. The survey revealed that 68% of museum visitors self-identified as White; 12% as Hispanic, Latino, or Spanish origin; 12% as Asian; 8% as Black or African American; 4% as some other race or origin (6%

of visitors surveyed selected more than one category). Approximately 65% of adults reported having completed a Bachelor's degree or higher. We expect that our sample is, at least approximately, representative of this broader museum sample.

Procedure. Children were told stories about two anthropomorphic characters in a classroom: Circle, and Square. Children were told that these characters were going to clean the classroom and then decide to share some number of resources across some days. One of the characters was designated as the distributor, and would decide how to share the resources among themselves and the other character. Children saw two different time points, or "days" in which resources were divided. After each day, they were asked to evaluate how fair the distributions were. In all cases, the distribution on Day 2 was based on merit, with the distributor giving more to herself because she did a better job. What varied between conditions is what happened on Day 1. Children saw either one of two conditions: an "inconsistent" condition in which the distributor inconsistently used the same decision rule across Day 1and Day 2, or a "consistent" condition, in which the distributor consistently used a decision rule across Day 1and Day 2. Below, we attach the actual scripts by day:

Day 1

In the inconsistent condition, children were read the following script with associated images:

"This is a story about a classroom that makes a lot of decisions together.

This is Circle and this is Square. Today, they both have to help clean the classroom and decide how to share these four stickers!"

Circle does a really, really good job cleaning today! Circle worked really hard to help clean!

Square doesn't do a really good job cleaning today. Square didn't work so hard to help clean."

Children were then asked for their first comprehension check: they were asked if they remembered who worked harder to clean today between Circle and Square. If children answered incorrectly, they were corrected and then continued with the task.

"It's time to share the stickers! Square is going to decide how to share the stickers.

Square says everyone should get the same amount of stickers because that is the most fair.

Square gives two stickers to Circle, who did a good job,

And keeps two stickers for himself, who did not do a good job.

The consistent condition was structurally similar. The introduction of the characters was identical, but the rule that Square chose as a distributor was different. Here, children instead saw a distributor who on Day 1 who suggested a merit rule-based distribution. Children were told:

"This is a story about a classroom that makes a lot of decisions together.

This is Circle and this is Square. Today, they both have to help clean the classroom and decide how to share these four stickers!"

Circle does a really, really good job cleaning today! Circle worked really hard to help clean!

Square doesn't do a really good job cleaning today. Square didn't work so hard to help clean.

It's time to share the stickers! Square is going to decide how to share the stickers.

Square says the person who worked the hardest on cleaning should get the most amount of stickers because that's the most fair.

Square gives three stickesr to Circle, who did do a good job,

And keeps one sticker for himself, who did not do a good job.

Across both conditions, children were asked for a fairness evaluation. Children were asked if this was "fair" or "unfair". After children responded in their selection, they were asked a follow up question of whether it was "very un/fair" or "a little un/fair". After giving their fairness evaluation, children were told about a brand-new day.

Day 2

Across both conditions, Day 2 was identical: children were told that today, one of the kids (Distributor) worked very hard to help clean the classroom and did a good job while the other kid (Non-distributor) didn't work very hard to clean the classroom

and did not do a good job. They were then shown an array of four markers and were told that the Distributor (who did NOT do a good job today) would decide how to share these markers. Children were then shown that the Distributor decides to split the resources by merit, because "that is the most fair": he gives one to the Non-distributor, who did not work very hard, and keeps three for himself, who did work very hard. The exact script is as follows, with condition specific script in brackets:

> *"The next day, there are four markers! Today, they both have to help clean the classroom and decide how to share these four markers!*
>
> *Circle doesn't do a really good job cleaning today. Circle didn't work so hard to help clean.*
>
> *Square does a really, really good job cleaning today! Square worked really hard to help clean.*

Children were asked to answer another comprehension check: they were asked if they remembered who worked harder to clean today between Circle and Square. If children answered incorrectly, they were corrected and then continued with the task.

> *It's time to share the markers! Square is going to decide how to share the markers again.*
>
> *Last time, Square said [**inconsistent:** everyone should get the same amount of stickers. Today, Square changes his mind and says the person who worked the hardest*

on cleaning should get the most amount of markers because that's the most fair. / ***consistent****: the person who worked the hardest should get the most amount of stickers. Today, Square says the person who worked the hardest on cleaning should get the most amount of markers because that is the most fair again.]*

Children were again asked a fairness evaluation for the Day 2 distribution, similarly to Day 1.

Attached below is a chart that shows the set-up flow of Study 1. This chart is not the exact stimuli that children saw (instead refer to the script above for the exact information), but is instead a helpful way to visualize the difference between the two conditions. See Figure 1

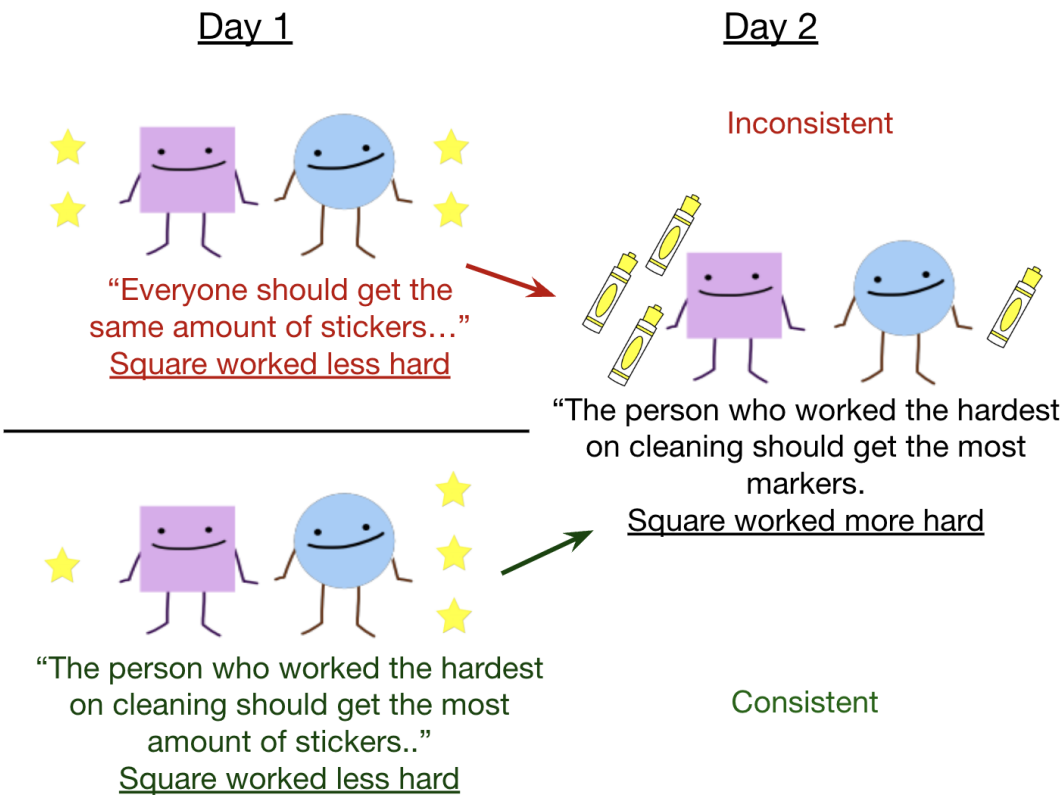

Figure 1. A visual representation of the set-up flow of Study 1 distributions across the consistent and inconsistent conditions. Here, Square is the Distributor character. For exact script information refer above to the methods section.

Here, we specifically aimed to examine how children evaluate the *exact same distribution (*merit at Day 2) across conditions. Specifically, how might previous distribution behavior affect the way that a distribution is seen? We predicted that the inconsistent case would be seen as worse than the consistent case. Although Day 2 was our primary measure of interest, we also collected Day 1 evaluations. Critically, in our design, Day 1 rules were different across our two conditions. In our Consistent condition, the Day 1 distribution used a merit rule, whereas in the Inconsistent

condition, the Day 2 distribution used an equality rule. If there were differences in children's evaluations of these two rules at Day 1, this could bleed over to the evaluations of the distribution at Day 2. For example, if their decision rule at Day 1was the selfishly give more to themselves for no reason, one might expect that they might impugn their Day 2 decision. Although we assumed that children would treat both equality and merit as fair procedures at Day 1, it was important to verify this. If children strongly believed that the equality rule was unfair, this would give us our predicted result but for the wrong reason. Thus, to control for this we collect Day 1 evaluations. Importantly, we predict an interaction between condition and time points such that the differential evaluation is larger on Day 2 than Day 1. Indeed, we had expected there to be no significant difference in evaluations on Day 1.

Results.

A mixed ANOVA was conducted to investigate the interaction between condition (consistent or inconsistent) and day (Day 1 or Day 2) on evaluation, with condition being a between-subjects factor and day being a within-subject factor. The analysis revealed a significant interaction effect on evaluation between condition and day, $F(1, 137) = 15.12$, $p < .001$, $\eta 2 = 0.10$. Follow-up t-tests showed that this interaction was driven by significant differences in children's evaluations between the inconsistent and consistent conditions on Day 2, with children rating the inconsistent condition as less fair ($M = 1.95$, $SD = 1.15$) compared to the consistent condition (M

= 2.92, SD = 0.98), $t(137) = -5.30$, $p < .001$, $d = 1.09$. Additionally, a between-subjects t-test revealed no significant difference in evaluations between the inconsistent (M = 2.80, SD = 1.12) and consistent (M = 2.86, SD = 1.02) conditions on Day 1, $t(137) = -0.355$, $p = .723$, $d = 0.06$. Figure 1 illustrates these findings.

We further ran a linear regression analysis to investigate the relationship between fairness and age, with fairness evaluations set as the dependent variable and age continuously as the predictor. The results indicate that age was not a significant predictor of fairness ($\beta = 0.028$, $t = 0.638$, $p = 0.524$).

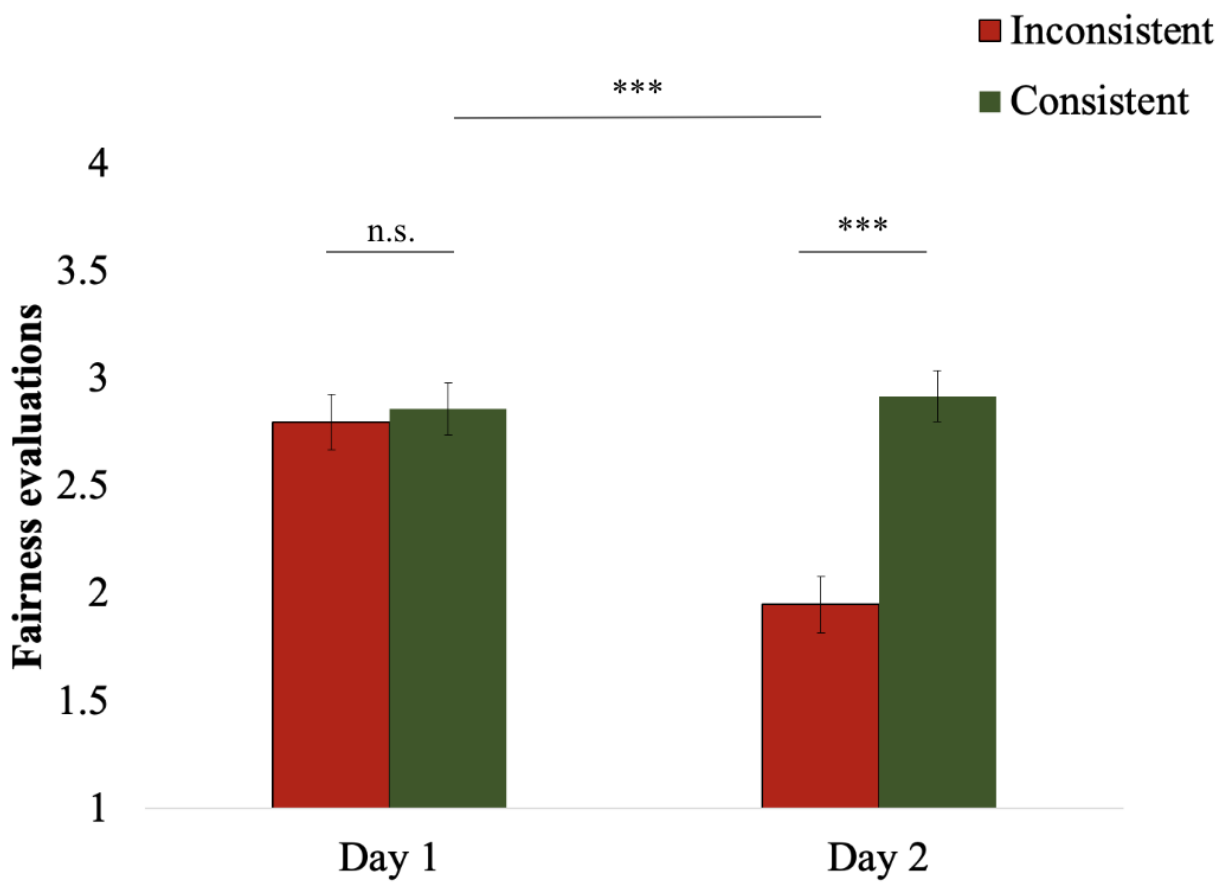

Figure 2. Study 1 results. Mean fairness evaluations of 4- to 9-year old children across condition (inconsistent and consistent) and timepoint (day 1 and day 2). Results for the interaction of condition and timepoint as well as post-hoc tests for within day differences by condition. (= $p < .05$, ** = $p < .01$, *** = $p < .001$)*

Discussion

In Study 1, we found evidence that children are indeed sensitive to inconsistency in the use of decision rules – children evaluated a normally fair

distribution rule (sharing based on merit) as significantly less fair when the Distributor changed their decision rule from Day 1 to Day 2 than if the Distributor was consistent. That is, children believed that even a rule that is considered fair in the abstract may be unfair depending on one's previous rule use. It is important to note that children were evaluating the exact same distribution and rule on Day 2: they saw a distributor use a merit rule to give themselves more when they did better. The only difference was what they saw precede Day 2 on Day 1. When children saw the Distributor change the rule used from the first day (be inconsistent), they more negatively evaluated the distribution on the second day.

One possibility for these Day 2 results is that children had different baseline evaluations for distributions on Day 1, given that two different rules were used on Day 1: merit (in the consistent condition) and equality (in the inconsistent condition). It could be possible that any difference in Day 2 evaluations in bleed-over from Day 1 evaluations. If children particularly thought equality was unfair in cases where the two people differed in merit, then they would think of the distributor as being unfair and then may have thought their Day 2 distribution was unfair no matter what. However, we demonstrated with Day 1 evaluations that this was not the case. Children's evaluations of the two people were nearly identical on Day 1 and so the large difference in children's evaluations of the exact same action on Day 2 cannot be because of differential evaluations on Day 1.

Study 2a

Study 1 provided evidence that children respond negatively to inconsistent rule use, which we have interpreted as evidence that they dislike moral inconsistency. However, it could be that children merely were negatively evaluating inconsistency itself as negative and that it had nothing to do with *moral* inconsistency. Perhaps they just thought it was rather capricious for someone to switch around their moral standards There is even some previous research suggesting that infants dislike agents who circumvent expectation and preferentially learn from agents who are consistent rather than inconsistent (e.g., Colomer & Woodward, 2023; Zymj et al., 2010). Thus, it is possible that children merely disliked inconsistency generally instead of *moral* inconsistency in particular.

To examine this possibility, in Study 2a, we included a condition in which there was someone inconsistently using a rule, but in a way that was not selfish to test whether children thought inconsistent rule use was bad because it was inconsistent generally or if this was more focused on selfish moral inconsistency. Specifically, we showed children two inconsistent Distributors who switched which rule they used across two different time points. However, one distributor was inconsistent in a selfish way (what we call "selfish inconsistency"—similar to the "inconsistent" condition from Study 1) whereas the other distributor was inconsistent in a selfless way (what we call "selfless inconsistency"). We hypothesized that if children are

specifically attending to moral inconsistency and not just inconsistency broadly, that they should differentiate between these two distributors. Specifically, they should negatively evaluate the selfish inconsistent distributor not the selfless inconsistent distributor. However, if children are instead responding to mere inconsistency, then they should treat both distributors equally and think they are both negative.

Methods

Participants. In Study 2a (pre-registered), 120 4- to 9-year-olds (M_{age} = 76.92 months, SD = 20.26 months, 47 female) were tested. In total, there were 60 participants in the Selfish condition (M_{age} = 77.76 months, SD = 21.12 months, 30 female) and 60 participants in the Selfless condition (M_{age} = 76.2 months, SD = 19.44 months, 28 female). Data was collected over Zoom due to the SARS-CoV-2 pandemic. Participants tested over Zoom were from diverse areas across the United States, as the platform made remote participation possible. Most of the families participating were of middle- to high-SES.

Procedure. In Study 2a, children were shown either a selfish distributor or a selfless inconsistent distributor. Across both conditions, the distributor allocates inconsistently across these two days, but the selfish inconsistent distributor changes their rule use to benefit themselves, whereas the selfless inconsistent distributor changes their rule use to benefit the other character. In both conditions, children see an identical Day 1: Two characters have cleaned a room (Distributor and Non-

distributor) and are going to split some stickers as a reward. They see that Distributor does a good job helping to clean the classroom whereas Non-distributor does a not so good job. They are then told that Distributor is going to decide how to share the resources. Distributor decides to use a merit rule on Day 1 (e.g., the person who did a better job gets more stickers) and children see a distribution in which Distributor takes three for himself (who did a better job) and gives one to Non-distributor (who did a not so good job). The exact script is below.

Day 1

Across both conditions, children were read the following script with associated images:

> *"This is a story about a classroom that makes a lot of decisions together.*
>
> *This is Circle and this is Square. Today, they both have to help clean the classroom and decide how to share these four stickers!"*
>
> *Square does a really, really good job cleaning today! Circle worked really hard to help clean!*

Children were then asked for their first comprehension check: they were asked if they remembered who worked harder to clean today between Circle and Square. If children answered incorrectly, they were corrected and then continued with the task.

> *"It's time to share the stickers! Square is going to decide how to share the stickers.*

Square says the person who worked the hardest should get the most stickers because that's the most fair.

Square gives one sticker to Circle, who did not do a good job,

And keeps three stickers for himself, who did a good job.

Given that children saw the exact same stimuli for Day 1, we omitted the Day 1 fairness evaluations.

The only difference between the conditions is who did a better job on *Day 2*: in the Selfish condition, Distributor does a worse job than Non-distributor at helping to clean the classroom. In the Selfless condition, Distributor does a better job than Non-distributor at helping to clean the classroom. Thus, switching the decision rule would benefit the Distributor in the Selfish condition, but the Non-distributor in the Selfless condition. The exact script is below.

Day 2

In the selfless inconsistent condition, children were read the following script with associated images:

"The next day, there are four markers! Today, they both have to help clean the classroom and decide how to share these four markers!

Circle doesn't do a really good job cleaning today. Circle didn't work so hard to help clean.

Square does a really, really good job cleaning today! Square worked really hard to help clean.

Children were asked to answer another comprehension check: they were asked if they remembered who worked harder to clean today between Circle and Square. If children answered incorrectly, they were corrected and then continued with the task.

It's time to share the markers! Square is going to decide how to share the markers again.

Last time, Square said everyone should get the same amount of stickers. Today, Square changes his mind and says they should share the markers equally.

He gives two markers to Circle, who didn't do a good job and keeps two markers for himself, who did do a good job.

In the selfish inconsistent condition, children were read the following script with associated images:

"The next day, there are four markers! Today, they both have to help clean the classroom and decide how to share these four markers!

Circle doesn't do a really good job cleaning today. Circle didn't work so hard to help clean.

Square does a really, really good job cleaning today! Square worked really hard to help clean.

Children were asked to answer another comprehension check: they were asked if they remembered who worked harder to clean today between Circle and Square. If children answered incorrectly, they were corrected and then continued with the task.

> *It's time to share the markers! Square is going to decide how to share the markers again.*
>
> *Last time, Square said everyone should get the same amount of stickers. Today, Square changes his mind and says they should share the markers equally.*
>
> *He gives two markers to Circle, who did a good job and keeps two markers for himself, who didn't do a good job.*

Across both conditions, children were asked for a fairness evaluation. Children were asked if this was "fair" or "unfair". After children responded in their selection, they were asked a follow up question of whether it was "very un/fair" or "a little un/fair".

Attached below is a chart that shows the set-up flow of Study 2. This chart is not the exact stimuli that children saw (instead refer to the script above for the exact information), but is instead a helpful way to visualize the difference between the two conditions. Figure 3

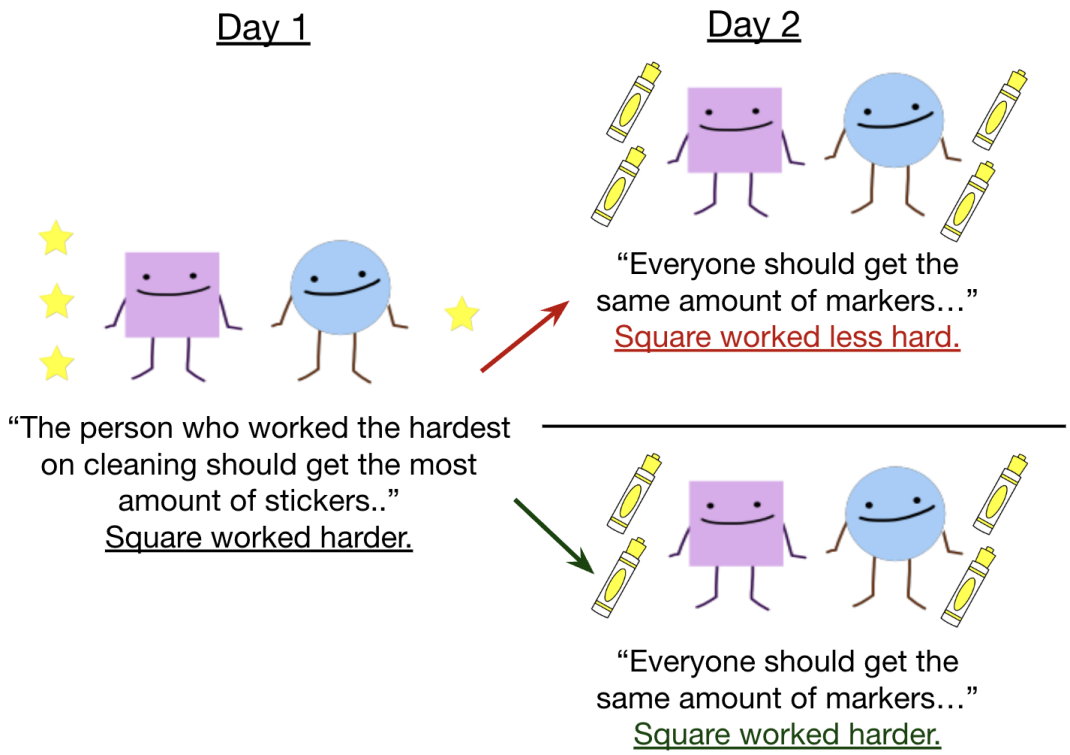

Figure 3. A visual representation of the set-up flow of Study 2a & 2b distributions across the selfishly inconsistent condition and the selflessly inconsistent condition. Here, Square is the Distributor character. For exact script refer above to the methods section.

Results.

A between subject t-test was conducted to examine the difference of Day 2 evaluations across conditions. As we predicted, the analysis revealed that children evaluated the Selfish condition as less fair (M= 2.6, SD = 1.2) than the Selfless condition (M= 3.5, SD = 0 .75) conditions; $t(118)=4.74$, $p < .001$, $d = 0.87$. See Figure 4. We further ran a linear regression model in order to observe if children's responses were affected by age. We found a significant age effect in that children

generally seemed to believe the distribution was less fair with age, $\beta = -0.20$, $t = -3.74$,, $p < .001$ and we saw a hint that this might be happening more strongly for the selfish inconsistent trials, though the interaction between age and condition was not significant ($\beta = -0.10$, $t = -0.96$, $p = 0.338$).

Discussion

Study 2a replicated what we found in Study 1, children thought that it was bad to be morally inconsistent and to selectively use a rule to benefit oneself. Moreover, these results supported the hypothesis that children specifically dislike moral inconsistency rather than just inconsistency itself. Children specifically negatively evaluated a selfishly inconsistent actor and not a selflessly inconsistent actor, suggesting that children dislike *moral* inconsistency in particular. We also found an age trend such that children were more negative about inconsistency as they matured.

Study 2b

In Study 2b we attempt to replicate these findings and extend them by further probing whether children make different predictions about those who are selfishly inconsistent rather than selflessly inconsistent. Would they predict that these individuals would be more likely to engage in strategically selfish behavior (flipping a coin a second time when they had privately lost a coin toss)? Here we attempt to answer this question by testing whether or not children believe that a selfishly

inconsistent actor, but not a selflessly inconsistent actor, would be more likely to engage in a related subsequent sneaky and selfish behavior. Further, we attempt to replicate our age effect from Study 2a for both the previously used fairness measure and for this new behavior prediction measure.

Methods

Participants. In Study 2b, 120 (pre-registered) 4- to 9-year-olds (M_{age} = 78.48 months, SD = 20.76, 54 female) were tested. In total, there were 60 participants in the Selfish condition (M_{age} = 78.6 months, SD = 21.07 months, 27 female) and 60 participants in the Selfless condition (M_{age} = 78.24 months, SD = 20.62 months, 27 female). Data was collected over Zoom due to the SARS-CoV-2 pandemic. Participants tested over Zoom were from diverse areas across the United States, as the platform made remote participation possible. Most of the families participating were of middle- to high-SES.

Procedure. Study 2b was identical to Study 2a in design (up until the added behavioral prediction measure) in order to replicate the results from Study 2a: children were either presented with the selfish inconsistent or selfless inconsistent trial from Study 2a and rated how fair they thought those distributors were (refer to Study 2a for exact script). Following these evaluations children participated in a behavioral prediction measure. Children were told it was a new day and that on this new day, these characters were going to decide how to share four candies – but this time, they

were going to flip a coin to decide. We told children that if the coin flipped heads, more candy would go to the Non-distributor. If the coin flipped tails, more candy would go to the Distributor. Children were told that when the Distributor flipped the coin, that it landed on heads, and thus more candy would go to the Non-distributor. We told children that actually, nobody had seen the coin flip. The Distributor could decide to flip the coin one more time privately. Children were asked to predict whether the Distributor would flip the coin again (coded as 1) or not flip the coin again (coded as 0).

Results.

A between subject t-test was conducted to examine the difference of Day 2 evaluations across conditions. As we predicted, the analysis revealed that children evaluated the selfishly inconsistent condition as less fair (M= 2.67, SD = 1.09) than the selflessly inconsistent condition (M= 3.34, SD = .91) conditions; $t(118)=3.69$, $p < .001$, $d = 0.76$. See Figure 4. We further ran a linear regression to examine whether children's responses were affected by age. We found a significant age effect in that children's evaluations of fairness decreased with age, $\beta = -0.15$, $t = -3.02$, $p = .003$. We further found a significant interaction effect of age and condition in that children were more likely to believe the inconsistent condition was less fair with age, ($\beta = -0.24$, $t = -2.35$, $p = 0.021$). Given that this second study was a pure replication, we additionally opted to analyze Studies 2a and 2b together in fairness evaluations to see

if the age and condition interaction would hold. We indeed found that when pooled together, there was an interaction effect of age and condition in that children thought the selfishly inconsistent condition was more unfair with age ($\beta = 0.79$, $SE = 0.38$, $z = 2.05$, $p = 0.04$). See Figure 5.

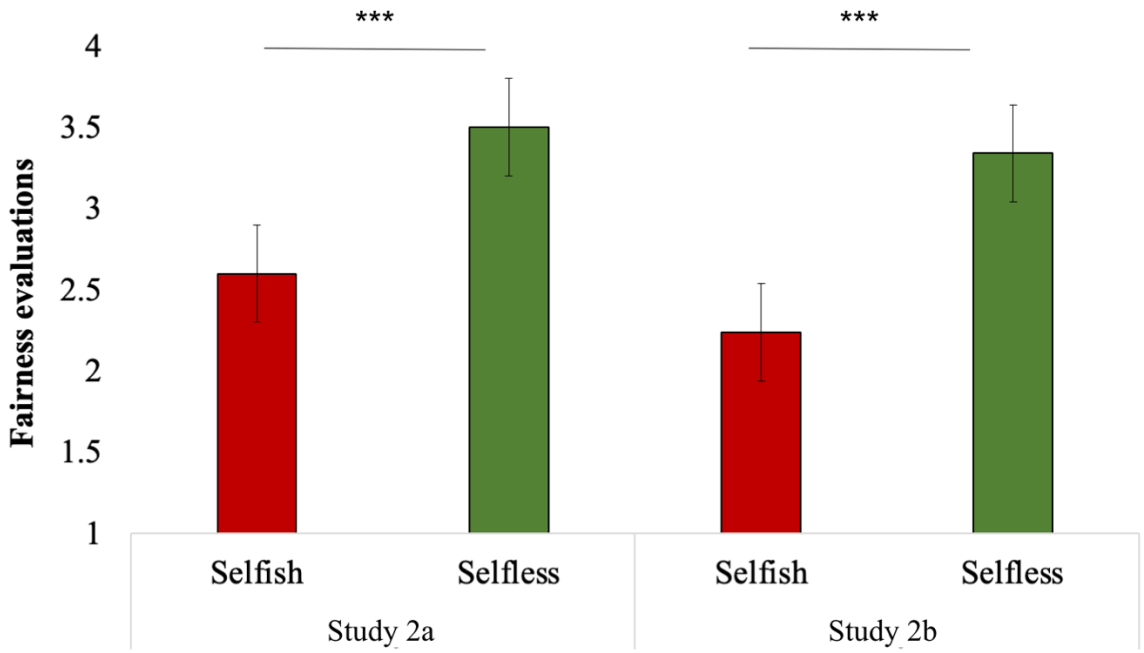

Figure 4. Mean fairness evaluations of children from 4- to 9-years old across conditions in Study 2a & 2b by conditions (selfishly inconsistent and selflessly inconsistent conditions). (= $p < .05$, ** = $p < .01$, *** = $p < .001$)*

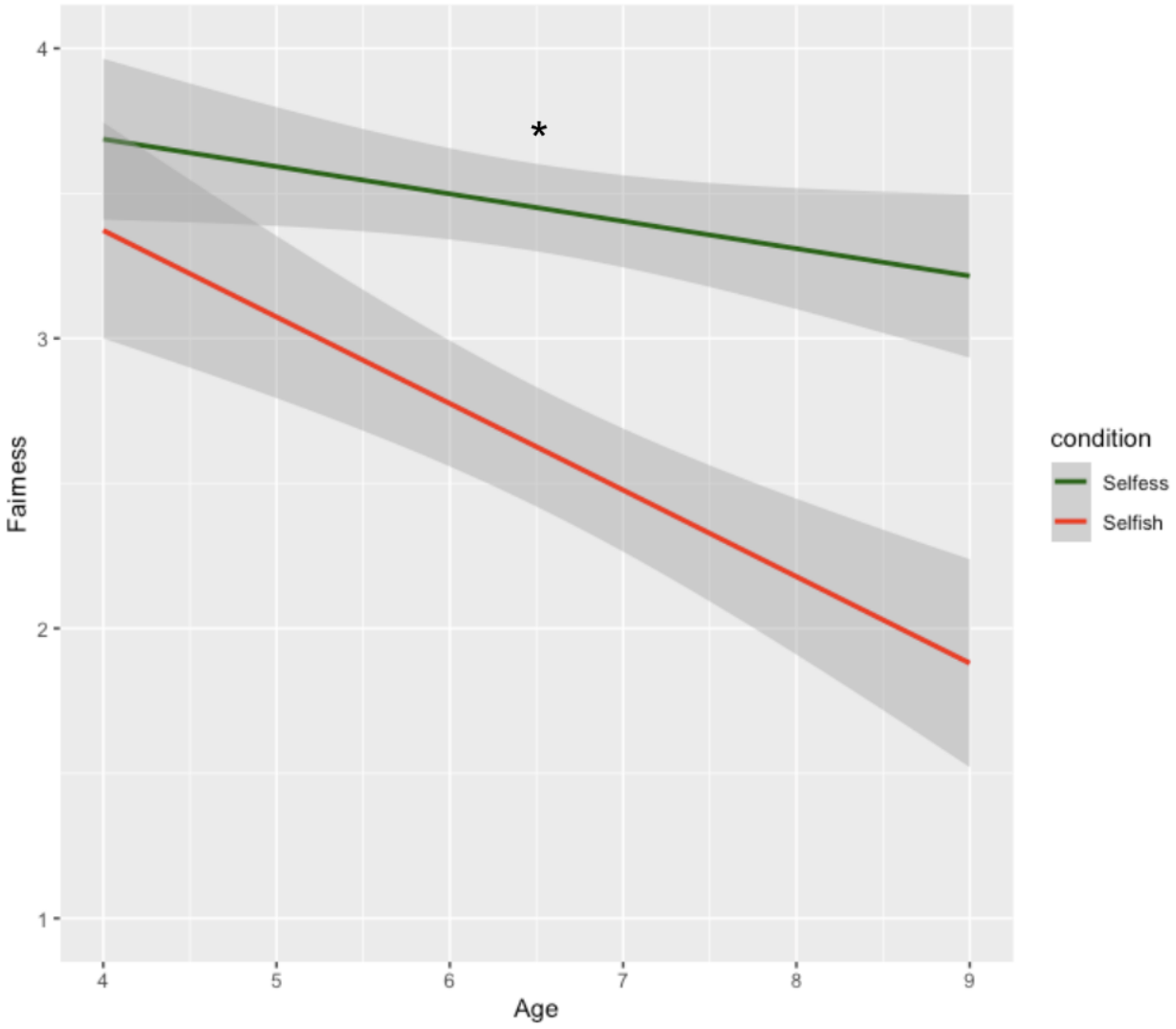

Figure 5. Relationship between age as a continuous variable and fairness evaluations as a continuous variable across conditions (selfishly inconsistent and selflessly inconsistent) in pooled samples of Study 2a & 2b. Asterisks denote interaction effect (= $p < .05$, ** = $p < .01$, *** = $p < .001$)*

We hypothesized that children would predict the selfishly inconsistent character would be more likely to flip the coin in the behavior measure than the selflessly inconsistent character. We ran a binomial logistic regression to test whether children believed one of these characters would be more likely to flip a coin. As hypothesized, we found that

children were significantly likely to predict the selfishly inconsistent character would flip (44 of 60, 73%) than the selflessly inconsistent character (28 of 60, 46%), ($\beta = 0.79$, $SE = 0.38$, $z = 2.05$, $p = 0.04$). Interestingly, we also found a significant age and condition interaction such that as children aged, they were more likely to believe that the selfishly inconsistent character was more likely to flip the coin ($\beta = 0.53$, $SE = 0.23$, $z = 2.26$, $p = 0.02$).). Young children did not make differential predictions about these two cases whereas older children did (for an age split graph to clearly see the effect, see Figure 6).

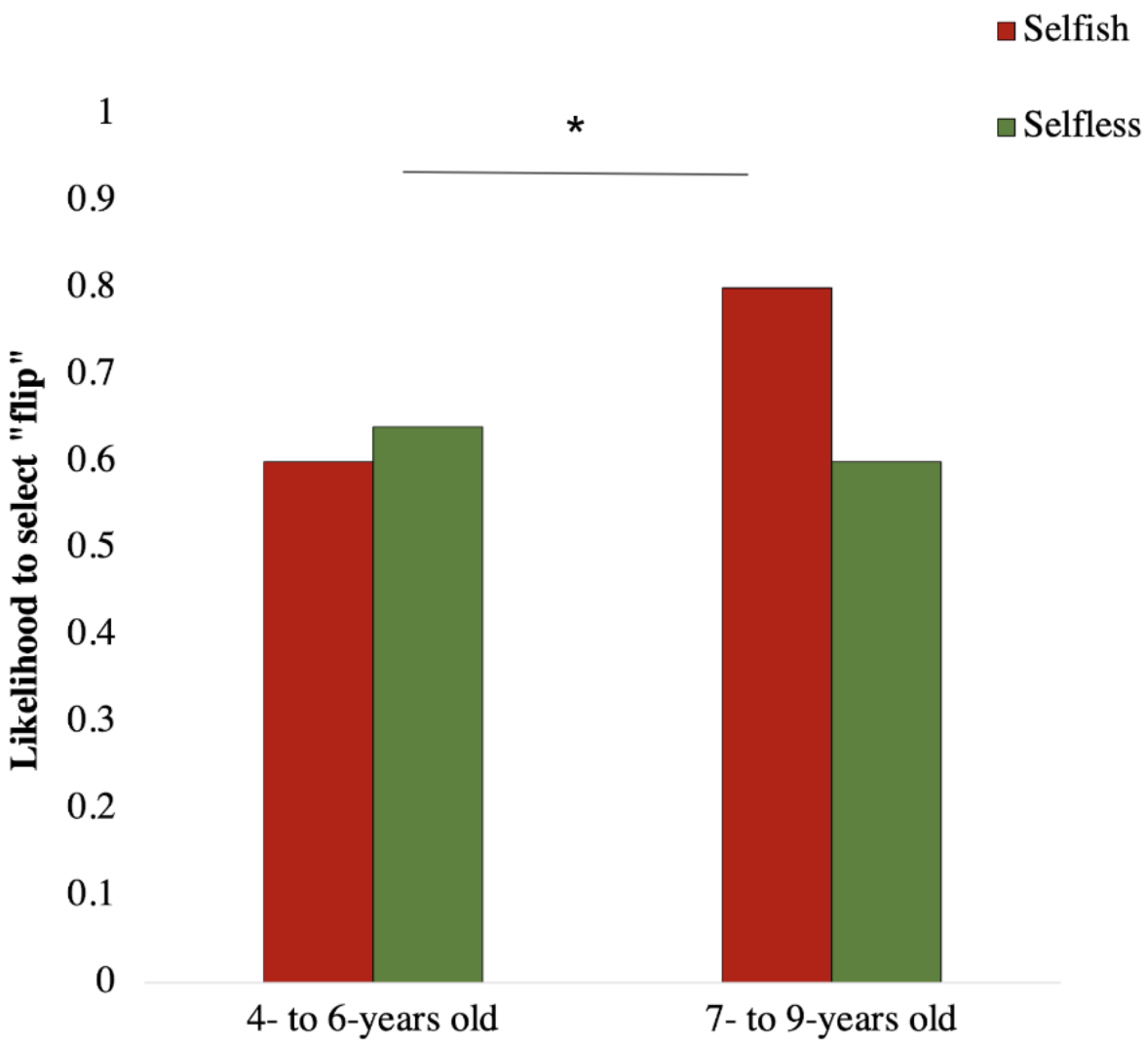

Figure 6. Relationship between age (continuous, but pooled by 4- to 6-years old and 7- to 9-years old for visual convenience) and fairness evaluations across conditions (selfishly inconsistent and selflessly inconsistent) in Study 2a & 2b. (= $p < .05$, ** = $p < .01$, *** = $p < .001$)*

Discussion

In Study 2b, we replicated our findings from Study 2a – children evaluated the fairness of the selfishly inconsistent Distributor as significantly less fair than the

selflessly inconsistent distributor. That is, they thought it was quite unfair to use a fair rule when in an inconsistent way that benefits the self. However, they thought it was quite fair to use rules inconsistently in a way that benefitted someone else at the expense of the self. Further, we conceptually replicated this effect with a secondary behavioral measure. We found that when asked to predict whether or not the Distributor was more likely to re-flip a coin that had not turned out in their favor, children believed that the selfishly inconsistent Distributor would be more likely to flip than the selflessly inconsistent Distributor. Additionally, we found age effects for both measures. Together these data suggest that, at least by 7- to 9-years old, children are sensitive to the moral inconsistency of impartial rule use.

What about younger kids? In Study 2b we found an age by condition interaction and replicated the age effect with the behavioral measure. Indeed, when we pool together the data from Studies 2a and 2b for our fairness evaluation task, we find young children (before the age of 6 or so) do not differentiate between the two conditions at all and it is only with age that children were more likely to believe the selfishly inconsistent condition was more unfair.

One might wonder why we found an age effect in Studies 2a and 2b, but not for Study 1. Specifically, one might ask *why* children seem sensitive to inconsistency in Study 1 but not Studies 2a and 2b. There are a few low-level features present in Study 1 that might have allowed younger children to respond like older children without fully having

to process moral inconsistency. First, one possibility is that younger children in Study 1 simply *did* dislike inconsistency itself instead of moral inconsistency, as we attempted to rule out in Studies 2a and 2b. Indeed, previous research examining whether children dislike inconsistent or inefficient actors has demonstrated that children are sensitive to this aspect of agent behavior from infancy (Colomer & Woodward, 2021), suggesting that children in even our youngest age group should be sensitive to inconsistent behavior. However, this explanation would have predicted that younger children should respond quite negatively to both conditions in Study 2a and 2b given that both included inconsistency. Indeed, they should have thought the selfless inconsistency was much worse than older children. If anything, we found the opposite. A second, more likely, possibility is that younger children may not have been attending to the consistency and inconsistency as well as the older children, but were instead responding to the number of resources that the different parties received. If they did this, they could have responded the same way as older children in Study 1, but for a different reason. For example, in the consistent trial when they were confronted with unequal sharing on Day 2, they thought back and realized that the distributor had received less on Day 1 and so they thought that was fair. On the inconsistent trial, when they thought back to Day 1, they realized that both parties had received the same and so they thought it was unfair that the distributor was receiving more on Day 2. That is, they may have been merely negatively evaluating the Inconsistent condition over the Consistent condition because the Distributor got *more* resources across two time-points in the Inconsistent condition,

but not the Consistent condition. In contrast, in Studies 2a and 2b they may have thought that all distributions were relatively fair because the distributor opted for equality. Given these considerations, we caution against too strong of an interpretation of young children's responding in Study 1 and instead suggest that these results suggest that by at least 7- to 9-years old, children seem to be tracking and negatively evaluating moral inconsistency and selfishness across the use of impartial rules.

General Discussion.

Together, these three studies demonstrate that children, at least by age 7- to 9-years old, are sensitive to moral consistency in rule use. That is, children believe that a normally fair rule can actually become *unfair* to use, in particular when it is used inconsistently by an agent for self-serving ends. Study 1 demonstrates that children can evaluate the exact same situation—giving more to oneself based on merit—very differently depending on an agent's past use of a rule. If the distributor had used a merit rule in the past (even in cases where they did less well than someone else), then children viewed using the merit rule again as quite fair. However, if the distributor had used *an alternative* fair rule in the past (here, an equality rule) and used a merit rule on a new day when it benefited them, children evaluated that as much less fair. Study 2a conceptually replicated this effect and ruled out that it was purely an effect of disliking "inconsistency" per se. Whereas children thought selfish inconsistent rule use was unfair (at least by age 7), they thought selfless inconsistent rule use was fair—that is, if

the inconsistent agent was not being inconsistent to benefit themselves, inconsistency seemed acceptable to children. Finally, Study 2b replicated our results from Study 2a and extended these results by showing that children predict that a selfishly inconsistent character was more likely to circumvent a decision that disfavored them (in this case flipping a coin again to not lose a coin toss) than a selflessly inconsistent character was. While these studies reveal information about children's evaluations of fair rule use, some open questions remain.

First, what is the precise aspect that our 7- to 9-year-olds are evaluating so negatively? If, indeed, these studies are testing a sensitivity towards selfish moral inconsistency, we may suppose that older, but not younger, children have some intuitions that selfish inconsistency in using moral rules is a negative behavior. This work fits in with much of the previous research of children's intuitions about related cognitions such as hypocritical condemnation and how self-serving motivation affects behavior (e.g., Good & Shaw, 2022; Heyman et al., 2007; Heyman & Legare, 2005). Most relevantly, some of my own work has suggested that children may be sensitive to hypocritical behavior and hypocritical condemnation around 7- to 9-years old (Hok et al., 2020), and that they struggle to identify this behavior at earlier ages. In these studies, we told 4- to 9-year old children stories about two characters: one character that condemns a behavior (here, stealing) and one character that does not condemn a behavior but instead makes another statement (we vary this across studies, and

include characters who make neutral statements like "I hate broccoli" and characters who explicitly say they do not engage in the transgression at hand like "I don't steal"). We asked children to predict whether or not the condemner would be more likely to engage in the condemned behavior than a non-condemner. Further, we asked children who should be punished more harshly upon transgressing between a condemner and non-condemner if both of them were caught stealing. These studies suggest that children from around 7- to- 9-years old have a rich understanding of condemnation and the hypocrisy of engaging in an action that one has previously condemned: children believe a condemner is both less likely to engage in an action, but should be punished more harshly than one who did not transgress to begin with. Younger children did not hold these expectations. This research is relevant because it demonstrates a similar cognition: children clearly understand strategic selfishness and hypocrisy by somewhere around age 7- to 9-years old.

Beyond children's intuitions about strategic selfishness, this work may have implications for people's broader thinking about rule breaking and the intentions behind rules. Specifically, some recent work has examined how children think about subverting already established rules to get their way. Research suggests that one important aspect of rules that children reason about is the 'intent' behind the rule itself. In particular, one's beliefs about the intent or the function of the rule at hand may play an important part in determining how children think one should be evaluated for

breaking a rule and whether the rule itself was even broken. For example, Riggs and Kalish (2016) found that 7- to 8-year-olds think it is acceptable to violate a rule if it has helpful consequences. More recent work has suggested that children not only take other outcomes into account when deciding if one should follow a rule, but they may also consider the function and intent behind a rule in evaluating the person who broke it. Indeed, the intention behind a rule (e.g., "legislative intent", for review see Sunstein, 1989) plays a key role in adults' assessments of how and when a rule should be applied. That is, adults do not care only about the letter of a rule, but also the spirit behind it and the spirit of the law can often trump the letter of the law. Some work has demonstrated that children too appear to care about the "legislative intent" (Bregant et al., 2019), allowing for others to break rules in cases where breaking the rule does not violate the reason.

Further, some recent work by Bridgers, Schulz and Ullman (2021) has examined how children think about subverting already established rules in order to get their way, exploring how children are able to use different 'loopholes' in rules. For example, imagine a child playing with toys and scattering them on the ground. A mother might say, "When I come back, I don't want to see any toys on the ground." The child, who wants to continue playing with her toys but also not be punished for disobedience, may instead put all of her toys on the bed. Thus, she has followed her mother's literal request (removing the toys from the ground) but still has access to the toys to play with, as she

wanted. These authors found that parents reported children by 5- to 6-year olds are quite good at finding and engaging in these "gray areas" of compliance. Further, children believe that characters who are compliant but subversive (e.g., using loophole behavior) will be in less trouble than a character who is just non-compliant in general, but in more trouble than someone who is compliant without any loophole behavior. That is, they understand there may be some differentiation in response to loophole behavior. This work examines how children understand the implicit pragmatics of rules and requests, and that this type of loophole compliance to a rule may allow for the rule-subverter to get their way, while still technically following the rule at hand. Although this work touches upon important aspects of rule function (e.g., intentions of rules, and how to appear like one is 'following' the rule while engaging in self-serving behavior), it focuses primarily on the emergence of this behavior (as reported by adults) and how children think loophole behavior may be punished by adults.

There are several other important and interesting questions that the intersection between these two domains of literature can open up. For example, one very useful question is *when* and *what type* of interactions may be necessary for children to gain some competency in understanding the relative and contextual unfairness of ostensibly fair rules. What experiences may be necessary in order for children to become sensitive to when legitimate rules can be used selfishly? One way to consider this idea is that children may need experience specifically with other peers that may be

motivated to use rules to get the one-up on them. Indeed, one way to examine this would be to explore children's social interactions with peers, whether it be in the classroom, in play settings, or in home-life. If children have more social interactions, particularly with older children, might they have an increased competency in being able to identify this behavior in others? One might imagine how often this behavior is pointed out to children themselves when they engage in it around their peers. Future research should aim to examine the relationship between these two domains of research by examining what sort of experiences may be necessary in order for children to become sensitive to the inconsistent usage of impartial rules.

One limitation is that we focused here primarily on *distributive* rules instead of rules broadly. We suspect that distribution rules are merely a subset of impartial rules, and that distributive rules seem like a useful way to think about rule-use for a few particular reasons: First, resource distribution is a clear case in which two parties have a conflict of interest (e.g., if there is an unequal number of resources present and two parties each want *more).* Second, there is a dense literature that has already explored children's developing intuitions about what constitutes a fair way to allocate resources. For these two reasons, we thought distributive rules would be a particularly useful lens with which to examine the current question. However, given that each of the rules in the present studies focused on distributive rules only, one should certainly examine whether or not this effect applies to other types of rules more broadly. For example,

there are various non-distributive rule such as right-of-way tasks or conflicts in which one person wishes to engage in a behavior first. Some ongoing research extends this current set of studies, but applies this paradigm to a case in which children think about who gets to play with toys first: those who brought them from home (emphasizing ownership) or did not bring them from home (emphasizing a need to share). We again predict that either rule might be fair in the abstract, but that both will seem quite unfair when they are applied selectively: the ownership rule when its mine, the sharing rule when it's yours. Exploring these types of conflicts will move the current research past mere resource distribution contexts.

Conclusion

To conclude, children have a sophisticated, emerging understanding about the use of impartial rules in self-serving or morally inconsistent ways. Across these studies, we demonstrate that children by at least 7- to 9-years old understand that a single impartial rule itself may be seen as *unfair* depending on how or why it was used. These results further have implications for tying extant research together. In particular, that the relationship between rules, impartiality, and reputation need to be further explored in order to demonstrate a more full, more nuanced picture of how children understand rules.

Chapter 2: When should the majority rule? Children's developing intuitions about majority rules voting

Introduction

While voting as a formal process is a relatively recent cultural invention, informal voting in the form of majority rules decision making has a much longer history and is still used to resolve disagreements across many cultural contexts (for discussions, see Bor et al., 2020; Sen, 1977). Given the importance of majority rules voting in coordinating human decision-making, it seems important to understand the cognitive machinery necessary for endorsing this form of decision-making. Developmental psychologists have long been interested in children's emerging understanding of social norms, decision-making, and coordination (e.g., Damon, 1977; Noyes & Dunham, 2017; Schmidt et al., 2016), yet there has been little systematic research into the developmental roots of majority rules voting in young children (for an exception, see Helwig & Kim, 1999). The present studies investigate children's developing intuitions about the use of majority rules in making group decisions. When in development do children endorse majority rules voting, and do they understand that majority rules may not always be appropriate? Across these studies, children are asked to decide whether or not majority rules should be used to resolve disagreements among peers regarding what the group should do (e.g., what they should eat as a snack). Probing the development of these intuitions can provide

some insight into early building blocks of social decision-making and group coordination.

Recently developmental psychologists have begun exploring how young children think groups can and should make decisions, and this early work suggests children highly value consensus (i.e., everyone agrees). Schmidt and colleagues (2016) demonstrated that 3-year-olds' enforcement of norms is dependent on consensus at the time of establishing rules. In these studies, 3-year-olds gladly enforced norms when groups collectively agreed to them. Interestingly, when there was any dissent during the norm-setting process, children did not enforce these norms. The authors take this as evidence that young children require unanimity of group members (e.g., consensus) for groups to establish norms. Further, Zhao and Kushnir (2018) demonstrate that 4- to 7-year-old children think that consensus is required in order to enact changes to rules agreed upon by a group. Specifically, children were told that a group of friends decided on a rule for a game together, and then one group member wanted to change the rule. The authors found that children did not think any individual could change the rule of the game unless the individual got agreement from other group members. Relatedly, Helwig (1998) found that 6- to 7-year-olds have some preference for consensus-based models of government, in which everyone in the country must agree on all decisions, over other models of government. These studies suggest that although young children can use the opinions or preferences of

group members to enact decisions, they strongly favor unanimous agreement in order to enact these decisions.

Consensus can be an attractive way to resolve some disputes between group members. However, it is very rarely plausible. Many adults routinely encounter situations where consensus is impossible and so have devised numerous ways to resolve such impasses (Thibault & Walker, 1975; Tyler, 2000), including randomization devices (like a coin flip) or voting, where the group does what is agreed upon by the majority (Bor et al., 2020; Keren & Teigen, 2010). Majority rules decision making, or voting, has been argued to be a particularly effective way to resolve such disagreements and adults frequently use voting in both formal and informal contexts (for review, see Hastie & Kameda, 2005). Indeed, DeScioli and Bokemper (2019) found that adults robustly support majority rules decision-making, more so than using consensus, leadership, or chance (this preference has been demonstrated across multiple cultures, including in Denmark, Russia, India, and Hungary; see Bor et al., 2021).

Voting by majority rules is a highly prevalent way of making decisions across many different contexts, and one that children encounter in day-to-day life. Despite its prevalence and importance as a decision-making procedure, there are only a few papers of which we are aware that examine if young children think that majority rules should be used as a decision-making tool. Much work that has been done in this area

focuses on formal voting in contemporary political systems and has primarily focused on adolescents (e.g., Barrett & Pachi, 2019; Sherrod et al., 2010). However, some work has investigated young children's more basic intuitions about majority rules decision-making, most notably by Helwig and colleagues, who conducted interviews probing 6- to 11-year-old children's evaluations of different rules one could use to make decisions for both governmental and day-to-day contexts (e.g., Helwig, 1998). Helwig and Kim (1999) examined children's beliefs about consensus-based, majority-based and authority-based decision rules in three different contexts: peer groups, family settings, and classrooms. They found that children differentiated what decision rules to use depending on the context. Children preferred consensus for peer and family contexts, whereas they preferred authority-based procedures for school decisions. These findings are consistent with broader work in this area suggesting that children younger than 7 strongly prefer consensus decision-making to majority-rules decision making (for a review, see Helwig et al., 2003).

This work has clearly established children's preference for consensus decision-making, but it may have additionally underestimated the extent to which young children prefer majority rules decision-making. If children have an overwhelmingly strong preference for consensus in resolving disagreements, this could obscure any preference they have for using majority rule when the two are compared to each other. One possibility is that young children actually *do* think majority-rules decision-

making is appropriate, but that consensus decision-making is *more* appropriate—indeed, all else being equal, consensus decision-making might just seem like a kinder way to make a decision because that way everyone ultimately agrees with the decision. If this is the case, then young children should endorse majority rules decision making at high rates when compared to many other (non-consensus based) procedures, both those that are fair and unfair. Alternatively, it is possible that young children do not like majority-based decision rules and do not think that they are the right thing to do. If this were the case, then young children should not endorse majority rules procedures as compared to other fair procedures, or perhaps even as compared to unfair procedures. Thus, in order to explore children's preference for majority rules decision making specifically, our studies examined if and when children believe that one should use majority-rules decision-making to resolve group disagreements between peers.

Additionally, to further probe the sophistication of children's beliefs about using majority rule to make decisions, our studies investigate if children are discerning about when majorities should or should not rule. Specifically, when children *do* believe that people should side with the majority, it seems important to demonstrate that there are boundaries to their endorsement of this rule—they should not think that majority rule is always appropriate. Although adults frequently prefer majority rules to resolve disagreements between people, they do not do so in all circumstances. For

example, adults are much less likely to endorse majority rules decision-making in circumstances where going with the majority means causing harm (DeScioli & Bokemper, 2019). We therefore presented children with different circumstances in which majority rules decision-making could be regarded as unfair because, for example, it results in the tyranny of the majority (e.g., using majority rules to decide what a single individual should have for his own snack, Study 2) or causing harm (e.g., honoring a majority that wants to harm a rabbit, Study 3). How children respond to these varying contexts provides valuable information about the richness of their intuitions about majority rules. If children believe majority rules generally should be used and followed across all circumstances (even ones that seem unfair to adult intuitions), this would suggest that children's beliefs about majority rules are relatively shallow and that they may favor majorities for reasons that are disconnected from normative considerations (e.g., they think majorities will or should get their way based numerical dominance). On the other hand, if children are discerning about using majority rules, this would provide some evidence that their intuitions about majority rules are connected to normative considerations.

Another goal of the current study was to examine the extent to which children's intuitions about majority rules voting is similar or different across cultures. There has been an important, recent push to expand research beyond WEIRD samples (e.g., Henrich et al., 2010). We chose to examine the United States and China,

as these two cultures differ on several different dimensions that may influence children's intuitions about the use of majority rules. One potentially relevant dimension is that China is considered less "democratic" than the United States (see Democracy Index compiled by the EIU), which might suggest that we would see an earlier emergence of endorsing majority rules in American children. However, the U.S. and China also differ in some cultural aspects, such as orientations toward individualism and collectivism. Societies with more individualistic orientations (like the United States) focus more on valuation of the self, whereas societies with more collectivist (or interdependent) orientations (like China) focus more on the extended network and the group (for review, see Triandis & Suh, 2002). Thus, it would also be possible that children in China are more oriented toward thinking about what the group wants compared to children in the U.S., and thus more likely to endorse majority rules as this is a very effective procedure to executing a group's desires. However, given that our research is exploring more basic questions about majority rules voting in simple classroom decision-making, we did not have a strong expectation that children would respond in a drastically different fashion in these two cultures.

Of course, finding similarities in responding from children in these two cultures on this basic task would in no way indicate that one's culture does not influence children's intuitions about voting or democracy in other contexts. However, it would

suggest that the effects are robust to sizable differences in one's sociopolitical environment. Further, we acknowledge that finding an effect in these two cultures would not establish that even children's responses in this basic scenario are universal and return to these issues in the General Discussion. Despite these limitations, these experiments represent one of very few investigations of young children's intuitions about majority rules and we endeavored to conduct these experiments in two different cultures.

Current Studies

The current studies examined if and when children think that majority rules should be used for group decisions. To do this, 4- to 9-year-old children were told about different scenarios in which a classroom must make a decision. We asked children how the group should make such a decision: either going with majority rules or using another decision-making procedure (a fair procedure in Study 1 and an unfair procedure in Study 2 and 3). We explored contexts in which adults would be likely to say that majority rule was the right thing to do (Studies 1a-3) as well as contexts in which they would be likely to say it was the wrong thing to do (Study 2a, 2b, Study 3). Generally, we operationalized majority rules voting as going with what "most of the group wants to do."

We tested these questions in 4- to 9-year-old children, which is an important age range for several reasons. First, extant work examining majority rules in younger

populations has compared it to consensus, and has previously concluded that children younger than 7-years-old have strong preferences for consensus as a decision-making procedure (Helwig, 1998). As we argued in the introduction, this previous work may have under-estimated younger children's preference for majority rules decision-making because it often pits majority rules against consensus. Thus, it seems important to explore young children's endorsement of majority rules decision making without consensus as a competing selection. Second, previous research finds developments in children's intuitions about fairness during this age period (Kogut, 2012; Shaw, 2013). In particular, by age 7 or 8, children are much better at differentiating between legitimate and illegitimate reasons for creating inequality; children 5 years old and younger appear to have more difficulty differentiating between different kinds of fair procedures and often endorse both legitimate and illegitimate procedures (Schmidt et al., 2016; Shaw & Olson, 2014). Based on this previous research, it seems informative to explore 4- to 9-year-olds' intuitions about majority rules voting and compare it to other fair and unfair procedures. As noted above, we explore children's intuitions in both the United States and China to evaluate whether or not we see similar or different developmental trajectories across these two societies.

Studies 1a and 1b

Studies 1a and 1b examined children's endorsement of majority rules in comparison to another decision-procedure that should be both fair and commonly used in day-to-day life. A randomization procedure (like a coin flip) seemed like a good option because it is a simple and fair procedure that is commonly used by adults (Keren & Teigen, 2010) and children as well (Dunham, Durkin, & Tyler, 2018; Grocke et al., 2015; Shaw & Olson 2014). Thus, in Study 1 we opted to have children select between using majority rules and flipping a coin. Doing so allowed us to understand if there are circumstances in which children believe majority rule is a better decision-tool than another procedure, one that they are familiar with and regard as fair. As noted above, although adults regard both voting and coin flips as fair, in many circumstances (e.g., when deciding what snack a group should have) they prefer to use voting rather than coin flips (e.g., Bor et al., 2021). We wanted to explore if children also showed this preference.

Thus, in these first studies, children were told that a class was trying to decide what to have for a snack and were asked which procedure the class should use to make this decision: go with what most people would prefer (majority rules) or flip a coin. As noted above, given that children show strong developments in their ability to differentiate between fair and unfair procedures as they mature (e.g., Schmidt, Svetlova, et al., 2016), we predicted that we would see a developmental increase in children's endorsement of majority rules as they grew older and that at some point in

development their intuitions would ultimately align with adults' choices in this context—that is, picking majority rules over a coin flip (Bor et al., 2021). We explored this research question in a sample of American children (Study 1a) and Chinese children (Study 1b) to examine whether or not our results would generalize across these two different cultural contexts.

Study 1a

Methods

Participants. Ninety 4- to 9-year-olds (M_{age} = 83.22 months, SD = 21.24 months, 38 female) were tested in the greater Chicago area for Study 1a. We recruited 30 participants per every 2-year age bracket: thirty 4- to 5-year-olds (M_{age} = 58.4 months, SD = 6.76 months, 12 female), thirty 6- to 7-year-olds (M_{age} = 83.8 months, SD = 8.04 months, 15 female), and thirty 8- to 9-year-olds (M_{age} = 107.28 months, SD = 6.84 months, 11 female). Data were collected at a science museum in the greater Chicago area. We did not collect specific demographic information beyond gender at the museum because of the fast-paced nature of data collection. However, our museum partner provided us with a summary of their own survey data of museum visitors between March 2018 – 2019, the approximate time frame in which these studies were run. The survey revealed that 68% of museum visitors self-identified as White; 12% as Hispanic, Latino, or of Spanish origin; 12% as Asian; 8% as Black or African American; 4% as of another race or origin (6% of visitors surveyed selected

more than one category). Approximately 65% of adults reported having completed a bachelor's degree or higher. We expect that our sample is, at least approximately, representative of this broader museum sample.

Procedure. Participants were told a story about a classroom that was deciding what snack to eat for snack time. Children were then asked which of two procedures the class should use to make the decision: voting or flipping a coin. Each procedure was accompanied by a definition. Participants were read the following script alongside clip-art images on a tablet:

> *"Today, the class is going to decide whether to eat popcorn or chips for snack time. They have to figure out a way to decide between voting & flipping a coin. Voting means that everyone will decide by doing what most of the kids want to do. Flipping a coin means everyone will decide by whether the coin comes up heads or tails. What should they do? Should they vote to decide? Or should they flip a coin to decide?"*

Participants were asked: "How should they decide?" and responses were a forced choice between flipping a coin or voting, coded as 0 and 1 respectively. The order in which the options (flipping a coin and voting) were introduced was counterbalanced across sequences. IRB approval was received by [blinded], (Study Number: IRB19-1629, Study Title: [blinded]). These studies were not preregistered. Methods and data are available to view at https://bit.ly/3xahvRT (contributors anonymized for review).

Results.

A logistic regression analysis was conducted to reveal whether children's choices between selecting coin flip or voting changed with age. Age was set as the continuous factor and decision rule choice (coin or vote) as the binary dependent variable. The analysis revealed a significant effect of age on choice, Wald $X^2(1, N = 90) = 8.44$, $p = .004$. We subsequently looked at each age group separately (4-5, 6-7, and 8-9) in order to examine whether their responses differed from chance. Binomial sign tests revealed that 4- to 5-year-olds were significantly below chance at choosing voting (8 out of 30, 27%, $p = .016$), whereas 6- to 7-year-olds were significantly more likely to choose voting over chance (23 out 30, 76%, $p = .005$), as were 8- to 9-year-olds (21 out of 30, 70%, $p = .043$). See Figure 1.

Discussion

Study 1a found that American children became more likely to endorse majority rules as they got older. Indeed, by the time children were 6 to 7 years old, they strongly endorsed majority rules as a group decision procedure, favoring it over another procedure they regard as fair (i.e., a randomization device, Shaw & Olson, 2014). Children younger than six not only endorsed majority rules less strongly than older children, but actually preferred the coin flip to majority rules. These results clearly document a systematic endorsement of majority rules in 6- to 7-year-old children's decision-making. We next tested a sample of children in an identical task in

China in order to examine whether these effects would generalize to a country in which the state structure differs in its explicit use of democracy (which might tamp down endorsement of majority rules voting) and also is more collectivistic (which might strengthen endorsement of majority rules).

Study 1b

Methods

Participants. Ninety 4- to 9-year-olds (M_{age} = 83.16 months, SD = 19.86 months, 53 female) were tested in Study 1. We recruited 30 participants per every 2-year age bracket: thirty 4- to 5-year-olds (M_{age} = 62.15 months, SD = 6.98 months, 13 female), thirty 6- to 7-year-olds (M_{age} = 80.04 months, SD = 6.84 months, 15 female), and thirty 8- to 9-year-olds (M_{age} = 106.8 months, SD = 5.4 months, 25 female). Due to the SARS-CoV-2 pandemic, participants were recruited and tested via VooV Meeting video calls (a Chinese platform similar to Zoom). Online participants were from diverse urban areas of China. They predominantly came from middle to high SES families. Most of the parents hold a bachelor's degree or a higher degree. Children all spoke Mandarin Chinese as their native language and were of the Han ethnicity.

Procedure. Participants were told the same story as in Study 1a, but translated into Chinese by a native speaker, which was then back translated to ensure correspondence between the English and Chinese scripts. The children were shown

the same story and pictures using Microsoft PowerPoint and the screen share function of VooV Meeting. These studies were not preregistered. IRB approval was received by [blinded], (Study Number: IRB19-1629, Study Title: [blinded]). Methods, data and analyses are available to view at https://bit.ly/3xahvRT (contributors anonymized for review).

Results.

Similarly to Study 1a, a logistic regression analysis was conducted to reveal whether children's choices between selecting coin flip or voting changed with age. Age was set as the continuous factor and decision rule choice (coin or vote) as the binary dependent variable. The analysis revealed a significant effect of age on choice, Wald $X^2(1, N = 90) = 13.79$, $p < .001$. We subsequently looked at each age group separately (4-5, 6-7, and 8-9) in order to examine whether their responses differed from chance. Binomial sign tests revealed that 4- to 5-year-olds did not select vote over coin at levels significantly different than chance (selecting vote 13 out of 30, 43%, $p = .585$), whereas 6- to 7-year-olds were significantly more likely to choose vote over chance (29 out 30, 97%, $p < .001$), as were 8- to 9-year-olds (29 out of 30, 97%, $p < .001$). See Figure 7.

Comparison between U.S. and Chinese samples. We further examined whether children's endorsement of majority rules voting varied by culture and age. We conducted a logistic regression analysis to explore whether children's choices were

affected by culture and age, and if there was an interaction between the two. Culture was set as a binary factor (U.S. or China), age as a continuous factor, and choice (coin flip or majority rules voting) was set as the binary dependent variable. The analysis revealed a significant main effect of culture, Wald $X^2(1, N = 180) = 5.92, p = .015$) and a significant main effect of age, Wald $X^2(1, N = 180) = 16.44, p < .001$). Further, there was an interaction present between culture and age, Wald $X^2(1, N = 180) = 5.79, p = .016$). Specifically, children were more likely to select voting in China (71 out of 90, 78%) than in the United States (52 out of 90, 58%), particularly younger children. However, both age groups were significantly likely to pick majority rules by age 6.

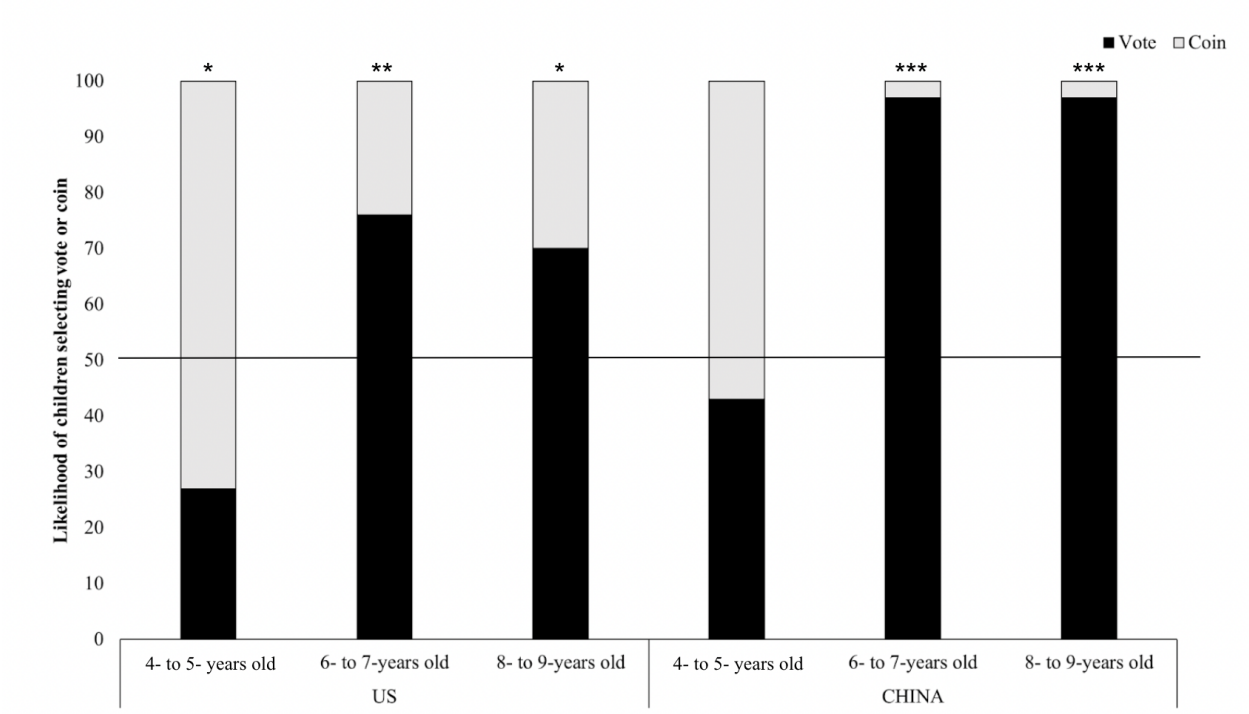

Figure 7. Study 1a & 1b results. Mean percent of children from the U.S. and China selecting to go with voting or coin flip in how to make a group decision. Data were broken down by age group (4 to 5 years old, 6 to 7 years old, and 8 to 9 years old). (= $p < .05$, ** = $p < .01$, *** = $p < .001$)*

Discussion

Study 1b found that Chinese children, like American children, were more likely to endorse majority rules (over coin flip) with age. Again, by the time children were 6- to 7-years-old, they strongly endorsed voting as a group decision-making procedure, even preferring it over flipping a coin to make the decision. Younger children in this sample again were less likely to opt for voting than older children, opting for voting at chance levels. We find that both Chinese and American children increasingly preferred majority rules voting as a decision-making tool with age, particularly by 6 to

7 years old. Chinese children were even stronger in their selection of majority rules than were American children.

One may wonder whether children's selection of voting here may be driven by a preference for human decision-making (here, voting) over non-human decision-making (here, coin flip). We think there are at least two reasons not to favor this explanation. First of all, children selected voting more as they got older and so one would have to posit that younger children have less of preference for human as compared to non-human decision making, which does not seem particularly likely. Second and more importantly, previous work demonstrates that 5- to 8-year-old children will use random, fair procedures (e.g., spinning a wheel) rather than exercise their own sense of agency (e.g., Shaw & Olson, 2014), which suggests that they do not always prefer human decision making to non-human decision making. Thus, it seems unlikely that the results here are driven by children showing a blanket preference for human vs. non-human based decision making. Instead, these results reveal that children think this type of human decision-making (voting) is more fair than another procedure that past research has suggested they regard as fair (Grocke et al., 2015; Shaw & Olson, 2014). Our subsequent studies explore children's endorsement of different types of human decision making.

Finally, it is worth noting that 4- to 5-year-old children in the United States and in China did not significantly favor voting over coin flipping (and in the United States

they even preferred coin flipping to voting). Given that there has been no previous research on young children's endorsement of majority rules, it is unclear why 4- to 5-year-olds endorsed voting at such low rates. Does this mean that they have no intuitions about the fairness of majority rules voting? To examine younger children's more basic intuitions about voting, in our next study we asked if younger children would endorse majority rules voting over a less fair procedure: letting one individual decide for the group.

Study 2a and 2b

In Study 2a and 2b, we examined a simpler scenario in which children were not asked to evaluate majority rules as compared to another fair procedure (e.g., coin flip), but were instead asked to compare majority rules voting to an unfair decision rule. We again told participants a story about a group of children making a decision about what to have for snack time. This time, children were asked to decide how the group should make the decision: between picking what the three people wanted (majority preference) or what the one person wanted (dissenter preference). We will refer to this as our group condition because the four boys are voting on what the group will have as a snack. If young children have no intuitions about voting (as might have been indicated by our previous result), then they may not differentiate between these two options. However, if children think that voting is somewhat fair, then they should select the option that was favored by the majority significantly above chance.

Of course, if children do opt to go with the majority here it could be explained by children simply thinking the majority would get their way based on dominance or conformity. Research has demonstrated children and even young infants are sensitive to numerical superiority for dominance reasons: they believe numerically larger groups will be dominant and will win conflicts over resources (Pietraszewski & Shaw, 2015; Pun et al., 2016). Additionally, other extant work suggests that children can be influenced by majorities for conformity reasons (Corriveau & Harris, 2010; Haun & Tomasello, 2011) -- for a review of how such "copy the majority" strategies may play out in children's and chimpanzee decision making (see Kendal et al., 2018). Given these facts, it seems important to demonstrate that children do not always endorse majority rules voting.

Thus, in addition to the condition we explained above (the "group condition"), we also included an "individual condition" to rule out the possibility that children were merely deciding based on dominance or conformity. In this condition, children were again told about four children who were making a decision about what snack should be had, but the question was about what snack *one individual* (henceforth dissenter) should have. Just like in the group condition, three of the children thought that the child should have popcorn whereas the child himself thought that he should have chips. But this time, the decision only affected what the dissenter would have for snack time. If children are merely giving an answer consistent with dominance or

conformity, they should select to go with the majority preference. However, if children understand that using a majority rules vote is appropriate in some cases (e.g., where the decision affects all those involved) but not in other cases (e.g., where the vote affects only one person), then they should select to go with the individual's preference (dissenter preference). We explored this research question in a sample of American children (Study 2a) and Chinese children (Study 2b).

Study 2a

Methods

Participants. 182 4- to 9-year-olds (M_{age} = 81.96 months, SD = 19.75 months, 95 female) from the greater Chicago area were tested for Study 2. We split participants into 2-year age brackets of 30 per condition, therefore collecting sixty 4- to 5-year-olds (M_{age} = 60.41 months, SD = 7.15 months, 32 female), sixty-two 6- to 7-year-olds (M_{age} = 79.92 months, SD = 6.62 months, 33 female), and sixty 8- to 9-year-olds (M_{age} = 105.84 months, SD = 6.36 months, 30 female). In total, there were 92 participants in the Group condition (M_{age} = 81.6 months years, SD = 19.68 months, 53 female) and 90 participants in the Individual condition (M_{age} = 82.44 months, SD = 19.92 months, 42 female). Data were partially collected at the same science museum in Chicago as was Study 1a (n = 161) and were also partially collected over Zoom due to the SARS-CoV-2 pandemic (n = 21). However, the pattern of results does not change whether we exclude or include the data from the Zoom participants. Participants

tested over Zoom were from diverse areas across the United States, as the platform made remote participation possible. Most of the families participating were of middle to high SES.

Procedure. Participants were randomly assigned to either the Group condition or the Individual condition. Across conditions, participants were told a story accompanied with clip-art pictures on a tablet. Children were read the following script:

> *Today, I'm going to tell you a short story about some kids in a classroom! It is snack time and these four boys need to get one big bag of snacks for lunch. They can either get popcorn or chips. They now need to decide what snack they are all going to share for lunch. These three boys think they should have popcorn, but this one boy thinks they should have chips. Remember, they need to pick one snack for everyone to eat. Do you think they should get popcorn like these three boys want? Or do you think they should get chips like this boy wants?*

The Individual condition was similar to the script above, except that participants were told they were deciding on what the one individual who preferred chips would do (e.g., "It is snack time and these four boys each get their own snack for lunch. These three boys have already gotten their snacks and now this boy needs to pick the snack he is going to eat for lunch. He can either get popcorn or chips."). In both conditions, the primary dependent variable was whether they went with what the majority or the

individual wanted. Participant responses for both in person and online participation were a forced choice between selecting what three of the four kids wanted (majority preference) or what the individual wanted (dissenter preference) and were coded as 0 and 1. IRB approval was received by [blinded], (Study Number: IRB19-1629, Study Title: [blinded]). These studies were not preregistered. Methods, data and analyses are available to view at https://bit.ly/3xahvRT (contributors anonymized for review).

Results.

A logistic regression analysis was conducted to reveal whether children's choices between selecting the majority or selecting the dissenter changed with condition (Group or Individual) and age. Condition was set as a categorical factor, age was set as a continuous factor, and decision rule choice (majority or dissenter) as the binary dependent variable. First, we ran an interaction between the two variables. The analysis revealed that there was no interaction between condition and age. Wald $X^2(1, N = 182) = 1.46$, $p = .227$. We then ran the model without the interaction. The analysis revealed an effect of condition on choice. Children in the Group condition were significantly more likely to select going with the majority's decision (75 out of 92, 81%) than children in the Individual condition were (15 of 90, 16%), Wald $X^2(1, N = 182) = 59.57$, $p < .001$. Age was not a significant predictor of choice, Wald $X^2(1, N = 182) = .29$, $p = .587$. However, we again split children up by age (4-5, 6-7, 8-9) in order to assess their choice as compared to chance at each age group.

Group condition. Binomial sign tests demonstrated that children of all ages opted to go with the majority at above chance levels: 4- to 5-year-olds (22 out of 30, 73%, $p = .016$), 6- to 7-year-olds (27 out 32, 84%, $p < .001$), and 8- to 9-year-olds (24 out of 30, 80%, $p = .001$).

Individual condition. Binomial sign tests demonstrated that children of all ages opted to go with the majority at below chance levels: 4- to 5-year-olds (7 out of 30, 23%, $p = .005$), 6- to 7-year-olds (3 out 30, 10%, $p < .001$), and 8- to 9-year-olds (5 out of 30, 16%, $p < .001$). They instead opted to select the individual's preference. See Figure 2.

Discussion

We found that children in the United States of all ages thought that majority rules voting was a fair way to make group decisions—they opted for this choice over the seemingly less fair option of letting one individual dissenter decide for the group. This was true even in our youngest children. Importantly, U.S. children of all ages also believed that that voting is not *always* an appropriate procedure—they did not believe it was appropriate to use majority rules when deciding what an individual herself should do. In Study 2b, we again ran the same task in a Chinese sample in order to explore if these results would generalize to a different culture.

Study 2b

Methods

Participants. One hundred eighty 4- to 9-year-olds (M_{age} = 83.76 months, SD = 21.09 months, 90 female) were tested in Study 2. We split participants into 2-year age brackets of 30 per condition, therefore collecting sixty 4- to 5-year-olds (M_{age} = 59.52 months, SD = 6.44 months, 30 female), sixty 6- to 7-year-olds (M_{age} = 83.40 months, SD = 7.33 months, 33 female), and sixty 8- to 9-year-olds (M_{age} = 108.48 months, SD = 6.02 months, 26 female). In total, there were 90 participants in the Group condition (M_{age} = 81.60 months years, SD = 19.64 months, 44 female) and 90 participants in the Individual condition (M_{age} = 83.52 months, SD = 20.52 months, 46 female). The Chinese participants who were tested in person (n = 110) were recruited from a middle-class SES public elementary school in the Henan Province, China. While the school was middle SES in China, the Chinese children might have been of lower SES than their U.S. counterparts. Due to the SARS-CoV-2 pandemic, some participants across conditions were collected online via VooV Meeting (n = 70). However, the pattern of results does not change whether we exclude or include the data from these participants. The Chinese children tested over VooV were recruited online from diverse urban areas of China. They predominantly came from middle to high SES families. Most of the parents hold a bachelor's degree or a higher degree. Children all spoke Mandarin Chinese as their native language and were of the Han ethnicity.

Procedure. Participants were told the same story as in Study 2a, but translated into Chinese by a native speaker, which was then back translated to ensure correspondence between the English and Chinese scripts. IRB approval was received by [blinded], (Study Number: IRB19-1629, Study Title: [blinded]). These studies were not preregistered. Methods, data and analyses are available to view at https://bit.ly/3xahvRT (contributors anonymized for review).

Results.

A logistic regression analysis was conducted to reveal whether children's choices between selecting the majority or selecting the dissenter changed with condition (Group or Individual) and age. Condition was set as a categorical factor, age was set as a continuous factor, and decision rule choice (majority or dissenter) as the binary dependent variable. First, we ran an interaction between the two variables. The analysis revealed that there was no interaction between condition and age, Wald $X^2(1, N = 180) = 1.758$, $p = .185$. We then ran the regression without the interaction term. The analysis revealed an effect of condition on choice. Children in the Group condition were more likely to select going with the majority's decision (75 out of 90, 83%) than children in the Individual condition were (10 of 90, 10%), Wald $X^2(1, N = 180) = 67.44$, $p < .001$. Age was also a predictor of choice, Wald $X^2(1, N = 180) = 4.31$, $p = .038$, though it is important to note that this was primarily driven by the fact that children in the Group condition were more likely to select going with the

majority with age, see Figure 2. We again split children up by age group (4-5, 6-7, 8-9) in order to assess their choice as compared to chance at each age group.

Group condition. Binomial sign tests demonstrated that children at all ages opted to go with the majority at above chance levels: 4- to 5-year-olds (21 out of 30, 70%, $p = .042$), 6- to 7-year-olds (26 out 30, 87%, $p < .001$), and 8- to 9-year-olds (28 out of 30, 93%, $p < .001$).

Individual condition. Binomial sign tests demonstrated that children at all ages opted to go with the majority at below chance levels: 4- to 5-year-olds (4 out of 30, 13%, $p < .001$), 6- to 7-year-olds, (3 out 30, 10%, $p < .001$), and 8- to 9-year-olds, (3 out of 30, 10%, $p = .001$). They instead opted all to select the individual's preference. See Figure 8.

Comparison between U.S. and Chinese samples. We further examined whether there was a main effect of culture or any interactions of culture, age, and condition in children's responses. We used a logistic regression analysis to reveal whether children's choices between selecting the majority or dissenter were affected by culture or interactions between age and condition. Culture was set as a binary factor (U.S. or China), age as a continuous factor, and condition as a binary factor (Group or Individual) and choice was set as the binary dependent variable. The analysis revealed a marginal main effect of culture on choice ($\beta = 3.43$, $p = .057$) such that children in the U.S. were marginally more likely to endorse majority rules overall (the opposite of

what we found in Studies 1a and 1b). There were no interactions between culture and age ($\beta = 0.35$, $p = .996$) and culture and condition ($\beta = 1.4$, $p = .445$).

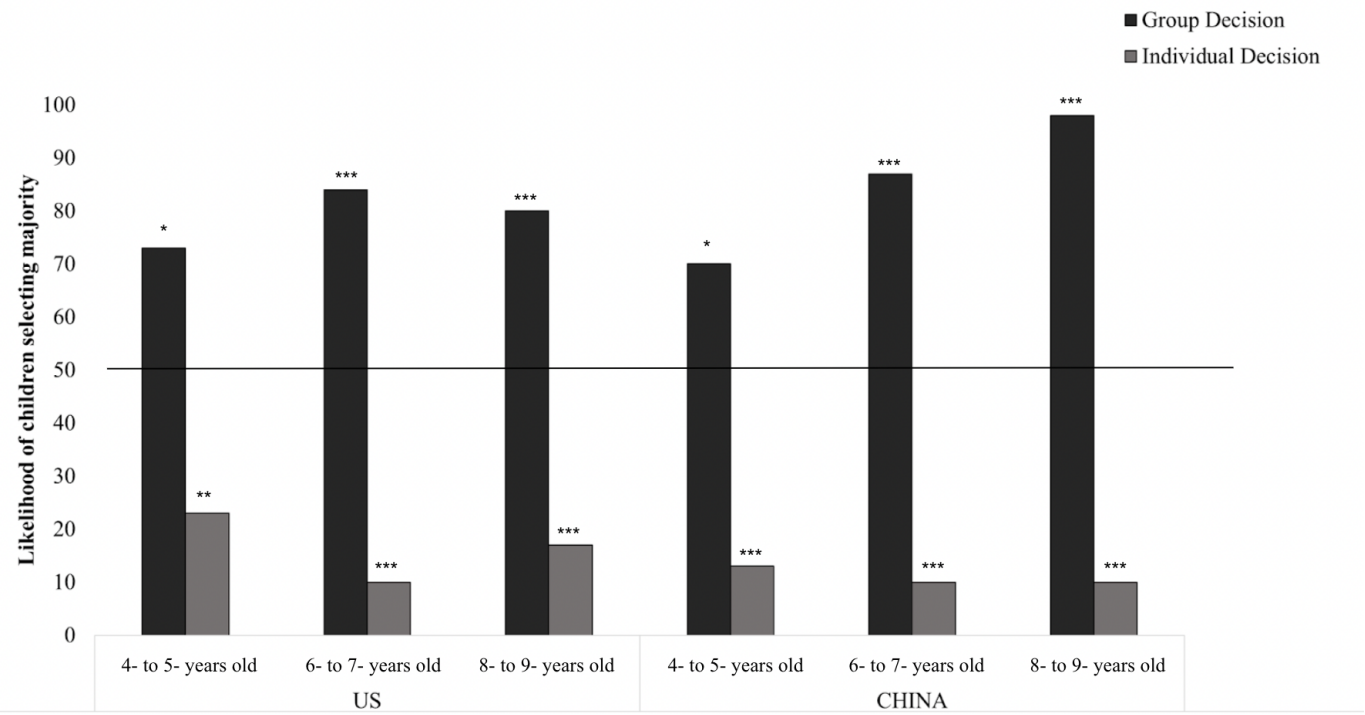

Figure 8. Study 2a & 2b results. Mean percent of children from U.S. and China selecting to go with majorities in either a group decision (a decision that would affect the entire group) or an individual decision (a decision that would affect just an individual). Data were broken down by age group (4 to 5 years old, 6 to 7 years old, and 8 to 9 years old). (= $p < .05$, ** = $p < .01$, *** = $p < .001$)*

Discussion

In Study 2b, we found that Chinese children, like U.S. children, across all age groups selected to go with majorities significantly more than individuals when it came to deciding for the group. Thus, we replicated our effect across cultures, and found that the youngest participants in both the U.S. and China sided with the majority in a group decision-making context. Further, like children in the United States, children in China also chose not to side with the majority when it came to deciding for a single individual. Thus, it seems that children in both cultures have intuitions about voting, with both believing that although majority rule should be used for group decision-making, it is not always appropriate. Unlike in Studies 1a and 1b, we did not find that children in China more strongly endorsed majority rules than children in the U.S. (we return to the issue of cultural differences in the General Discussion).

These data from Studies 2a and 2b rule out a simpler explanation for why children might have been endorsing majority rules in our tasks. As noted above, one reason that children might endorse majority rules is because they believe that people should conform to the group (Corriveau & Harris, 2010; Haun & Tomasello, 2011) or that the majority will get their way because of dominance based on numerical superiority (Pietraszewski & Shaw, 2015; Pun et al., 2016). If children were merely attending to majorities because of conformity or numerical dominance, then we would have found that children believe the majority should get their way in both

group and individual decision-making. Indeed, in both cases the lone dissenter was outnumbered by the three other children. However, children clearly considered who was affected by the decision being made; they thought the three individuals should get their way when the decision affected everyone involved (group condition) but not when the decision only affected the lone dissenter (individual condition).

Study 3

Do children always endorse majority rules for group decisions? What if the majority opinion violates what children think is morally or factually correct? Previous work has demonstrated that adults do not always think majorities should rule; adults are reluctant to allow majority rules voting for group decision-making when it conflicts with other moral principles (e.g., avoiding harm, DeScioli & Bokemper, 2019). That is, adults recognize that there are some cases in which majorities should not normatively get their way, even when making decisions for what the entire group should do. Do children also believe that there are circumstances in which group decision-making should not be guided by majority rule?

To explore this question, we presented children with vignettes similar to Study 2a, in which children are told that a group of four boys needs to make a decision about something by going with majority or dissenter preference. Critically, in a within-participant design, we varied the matter that they were voting on. In one case, it was a matter of preference (deciding what to name a pet rabbit, Preference Condition).

Here, in line with our previous studies, we predicted that children would endorse majority rules voting.

We contrasted this preference condition with two other conditions in which we hypothesized that children might endorse voting less: when a majority favored something that was immoral (feeding the pet rabbit to a snake, Moral Condition), or untrue (saying that rabbit was a hamster, Truth Condition). If children are following a simple heuristic that majority rules is appropriate for all group decision-making, then they should again endorse majority rules voting here. Alternatively, if children have a view of majority rules that incorporates other moral and epistemic principles, then they should be less likely to endorse majority rules in these conditions, saying that the characters should not be allowed to vote and that one should not listen to the majority's opinion. Here we test these possibilities and whether children's response to these questions changes as they grow older.

This experiment will also provide information that helps us further contextualize children's responding from Study 2. In that study, children at all ages clearly preferred majority over a lone dissenter for group decision making. However, it is possible that they actually thought that both of these options were inappropriate and that majority rule was merely the lesser of two evils. This Study 3 design allows us to probe if this is the case. Our preference condition is a conceptual replication of Study 2—children are asked to vote on a matter of preference and three children want

one thing and one wants another. However, before being asked if the group should favor the majority or lone dissenter (the DV from Study 2), children are first asked whether the class should be *able* to vote at all. If children believe that voting is inappropriate, then they had the option to say that the class should not be able to vote in this case. However, we predicted that children would instead say that the class should be able to vote in this case, which would suggest that they do not think it is morally inappropriate to use majority rules.

Note, this final study focuses only on children in the U.S. Given the vast amount of overlap in children's responses in the U.S. and China in our previous studies, we did not believe that there would be large cultural differences in this task. However, we acknowledge that children in the U.S. and China might respond differently on this task. We return to the issue of cultural difference and speculate about some cases in which we might expect to see larger cultural differences in the General Discussion.

Methods

Participants. Ninety 4- to 9-year-olds (M_{age} = 83.16 months, SD = 19.92 months, 38 female) were tested in Study 3. We split participants into 2-year age brackets of 30 per cell, therefore collecting thirty 4- to 5-year-olds (M_{age} = 61.5 months, SD = 7.28 months, 14 female), thirty 6- to 7-year-olds (M_{age} = 81.12 months, SD = 6.12 months, 11 female), and thirty 8- to 9-year-olds (M_{age} = 107.04 months, SD = 7.32 months, 17

female). In total, there were 90 participants. Participants tested over Zoom were from diverse areas across the United States, as the platform made remote participation possible. Most of the families participating were of middle to high SES.

Procedure. Children were shown a picture of four boys via Zoom screen-sharing. Children were told that these four boys were going to vote to decide on different things, and that the children would be asked whether it was okay to vote to decide. In each case the children in the classroom were voting on something about a classroom pet. Within participants (with the order counterbalanced) children were shown three different trials that corresponded to our three conditions: Preference Condition (deciding the name of the pet animal); Moral Condition (deciding whether it was okay to feed the pet animal to a snake); and Truth Condition (deciding whether the animal, a rabbit, was a rabbit or a hamster). Participants were read the following script alongside of clip-art images on a tablet:

> *"For this game, I'm going to tell you about some different things people can decide on, and I'm going to ask you if it's okay for people to vote on these things!*
>
> *Do you know what voting is? It's a way for some people to make decisions. When people vote to decide, they do what MOST of the group says they want to do.*
>
> *Now I'm going to tell you about some different things people can decide on, and I'm going to ask you if it's okay for people to vote on these things! You can say yes or no, okay?*
>
> *Should these boys be allowed to vote to decide X?"*

Participants made an evaluation for each of these items (e.g., "yes" or "no" for whether they thought one should be able to vote on it), henceforth called the Voteability DV. After responding to the Voteability DV, participants were told that they were now going to see what the class actually decided. In each of these cases, there was a majority (three individuals) favoring one choice and a dissenter (one individual) favoring the other choice, henceforth called the Endorsement DV. Participants were read:

> *"Now I'm going to show you what they actually voted on, okay? So, I'll show you who wanted what! It looks like these three boys wanted X and this one boy wanted Y. Well, what do you think? Should it be X like these three boys want? Or Y like this one boy wants?*

For the Moral and Truth conditions, the majority was seen favoring the immoral or false choice. That is, for the Moral condition the majority chose an immoral option (here, feeding the animal to the snake) whereas the dissenter chose a moral option (here, not feeding the animal to the snake). For the Truth condition, the majority chose the incorrect option (here, saying that a rabbit was a hamster) whereas the dissenter chose the correct option (here, saying the rabbit was a rabbit). Given that we expected there to be no inherently 'correct' decision for the preference case, we counterbalanced the choice of majority and dissenter (here, whether they preferred the name "Blossom" or "Buttons" for the rabbit). The order of conditions were

counterbalanced between participants but the two DVs were asked in a fixed order with the Voteability DV first followed by the Endorsement DV (we thought it was important to assess whether they thought one should be able to vote before asking them if they would endorse the vote). IRB approval was received by [blinded], (Study Number: IRB19-1629, Study Title: [blinded]). These studies were preregistered. Methods and data are available to view at https://bit.ly/3xahvRT (contributors anonymized for review).

Results.

Voteability. A mixed logistic regression analysis was conducted to reveal whether children's choices between selecting voting changed with condition (Preference, Moral and Truth) and age. Condition was set as a categorical factor with Preference set as the baseline. Age was set as a continuous factor and decision rule choice (yes or no) as the binary dependent variable. A random effect of participant was included as a within-subject variable. The analysis revealed an effect of condition on endorsement of voting with preference set as the reference. Children were significantly less likely to say one should be able to vote to decide in immoral cases (28 out of 90, 31%), (β = -2.58, $p < .001$) and false cases (52 of 90, 58%), (β = -1.47, $p < .001$) than preference cases (77 of 90, 86%). Age was not a significant predictor of choice, (β = -0.08, $p < .315$).

We again split children up by age groups (4-5, 6-7, 8-9) in order to assess their choice as compared to chance at each age using binomial sign tests. For preference decisions, 4- to 5-year-olds (22 of 30, 73%, $p = .016$), 6- to 7-year-olds (27 of 30, 90%, $p < .001$), and 8- to 9-year-olds (28 of 30, 93%, $p < .001$) were above chance at agreeing that one should be able to vote on such matters. For moral decisions, 6- to 7-year-olds (8 of 30, 27%, $p = .016$), and 8-to 9-year-olds (8 of 30, 27%, $p = .016$) were below chance at agreeing that one should be able to vote on such matters, whereas 4- to 5-year-olds were at chance (12 of 30, 40%, $p = .362$). Finally, for truth decisions, 4- to 5-year-olds (18 of 30, 60%, $p = .362$) and 8-to 9-year-olds (18 of 30, 60%, $p = .362$) were at chance whereas 6- to 7-year-olds were above chance at agreeing that one should be able to vote on such matters (22 of 30, 73%, $p = .016$). See Figure 9.

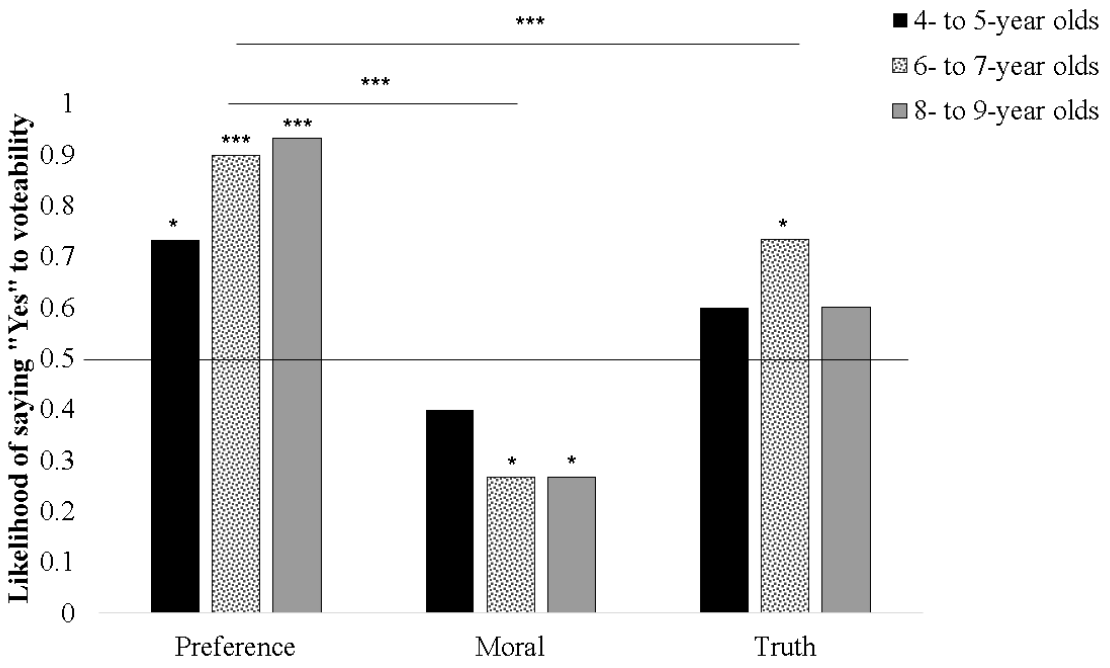

Figure 9. Study 3 results for Voteability DV. Mean percent of US children selecting to "yes" when asked if the claim type should or should not be voted on in the three conditions--Preference condition (the name of a rabbit), the Moral condition (whether they s hould feed the rabbit to a snake) or a Truth condition (whether the rabbit was a hamster). Data were broken down by age group (4 to 5 years old, 6 to 7 years old, and 8 to 9 years old). (= p < .05, ** = p < .01, *** = p < .001)*

Endorsement. A mixed logistic regression analysis was conducted to reveal whether children's choice to go with the majority changes across condition (Preference, Moral, and Truth) and age. Condition was set as a categorical factor with Preference set as the baseline. Age was set as a continuous factor and decision rule choice (majority or dissenter choice) as the binary dependent variable. A random effect of participant was included as a within subject variable. The analysis revealed an

effect of condition on endorsement of voting with preference set as the reference. Children were significantly less likely to endorse majority rules in the Moral case (9 out of 90, 10%), ($\beta = -3.09$, $p < .001$) and Truth case (8 of 90, 9%), ($\beta = -3.22$, $p < .001$) than the Preference case (64 of 90, 72%). Age was not a significant predictor of choice, ($\beta = -0.01$, $p < .916$).

We again split children up by age groups (4-5, 6-7, 8-9) in order to assess their choice as compared to chance at each age using a binomial sign test. For Preference decisions, 6- to 7-year-olds (21 of 30, 70%, $p = .042$) and 8-to 9-year-olds (26 of 30, 87%, $p < .001$) were significantly more likely than chance to go with the majority. Contrastingly, 4- to 5-year-olds were at chance (17 of 30, 56%, $p = .584$). For Moral decisions, 4- to 5-year-olds (7 of 30, 23%, $p = .005$), 6- to 7-year-olds (1 of 30, 3%, $p < .001$), and 8- to 9-year-olds (1 of 30, 3%, $p < .001$) were all significantly less likely than chance to go with the majority. Finally, for Truth decisions 4- to 5-year-olds (4 of 30, 13%, $p < .001$), 6- to 7-year-olds (2 of 30, 6%, $p < .001$), and 8- to 9-year-olds (2 of 30, 6%, $p < .001$) were all significantly less likely than chance to go with the majority.

It is interesting to note that younger children were not very high in their selection of majority rules for matters of preference. Although we did not have an a priori hypotheses about this, we conducted an exploratory analysis into 4- to 5-year-olds to examine whether seeing the majority give "incorrect" answers across the

Moral and Truth Conditions affected how they responded in the Preference Condition. That is, there may have been an order effect that dampened younger children's endorsement of the majority. If that were true, then younger children should have endorsed the majority more in the Preference Condition when they saw it first. In line with this, the exploratory analyses suggested that children were marginally more likely to go with the majority (11 of 15, 73%) in the Preference Condition when it was the first condition they saw than when they saw another condition first (6 of 15, 40%), Wald $X^2(1, N = 30) = 3.39$, $p = .065$. When they saw the Preference Condition first, 4- and 5-year-olds sided with the majority at similar rates to 4- and 5-year-olds in Study 2, which also involved a matter of preference (snack choice; 73% endorsement here and 73% endorsement in Study 2a). See Figure 10.

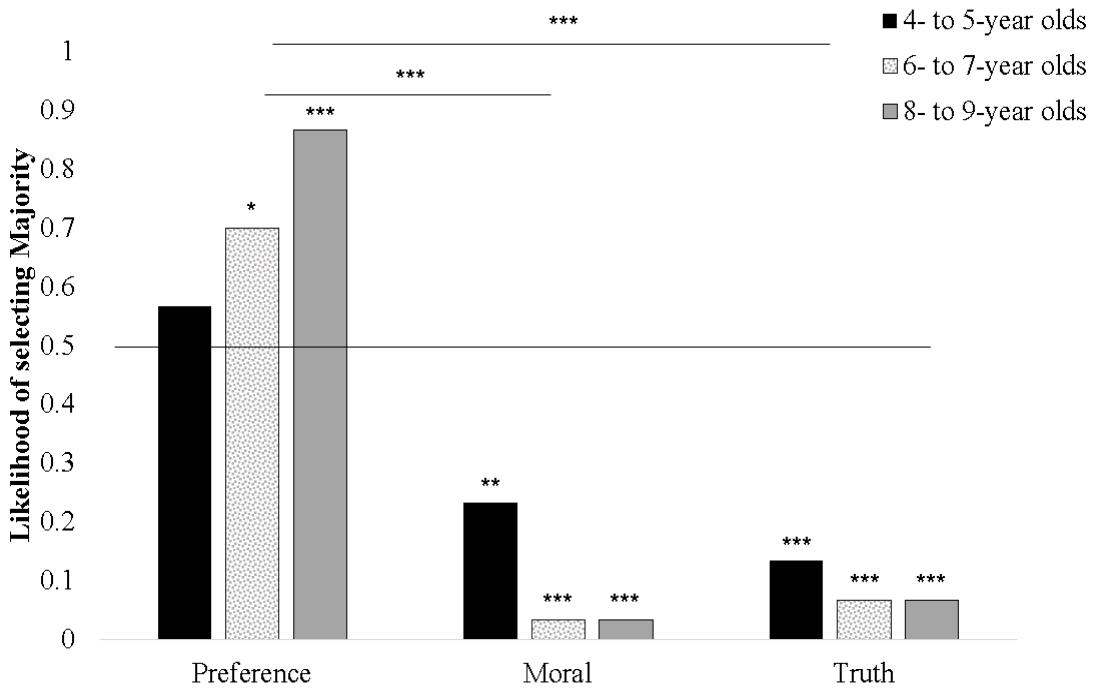

Figure 10. Study 3 results for Endorsement DV. Mean percent of US children selecting to go with the majority in a Preference claim (the name of a rabbit), a Moral claim (whether they should feed the rabbit to a snake) or a Truth claim (whether the rabbit was a hamster). Data were broken down by age group (4 to 5 years old, 6 to 7 years old, and 8 to 9 years old). (= $p < .05$, ** = $p < .01$, *** = $p < .001$)*

Discussion.

In Study 3, we found that children differentiated between types of decisions for which majority rules should and should not be used. Like previous studies, children endorsed majority rules for preference claims—that is, children believed that the name of the rabbit could (and should) be decided by majority rules voting and then said that the group should go with the majority (similarly to snack preferences in

Study 2). The former result is important because children could have said that one should not be able to vote on such matters of preference if they thought voting was inappropriate, but instead they said that it was appropriate. Importantly, we found that children do think some things should not be voted on—children at all ages were below chance in saying that one should be able to vote to do something immoral. Furthermore, children thought moral and truth claims were less "vote-able" than preference claims. Even when children said you should be able to vote on a matter of morality or truth, they did not tend to endorse the majority when they were advocating an immoral or false position—that is, most children who said you should be able to vote on a matter did not choose to go with incorrect majorities in moral and truth claims. Together, these results show that children are sophisticated decision-makers and can consider several aspects when thinking about majority-rules decision-making; that is, they have clear beliefs about when it is and is not appropriate to the use majorities to make decisions.

While these results were broadly in line with our hypotheses, we did find one unexpected result: children believed that truth claims were more "votable" than we had expected. As predicted, we found that children generally thought you should be able to vote on matters of preference and also that you should go with the majority. Relatedly, they thought that you should not be able to vote on matters of morality and that you should not go with the majority for an immoral decision in such a case.

However, the pattern was quite different when it came to matters of truth. Although very few children (9%) thought you should endorse the false majority opinion, a fair amount of them (58%) did believe that you can vote on matters of truth. This latter result is not something that we predicted and thus caution against interpreting this result too strongly. However, one could imagine that children may have thought that one can vote on truth claims because they did not expect the majority *would* give an incorrect answer. Future research should examine this further.

The results of this study importantly demonstrate earlier sophistication in children's reasoning than has previously been seen in past research. Much existent research on children's intuitions about majority rules has focused on older age groups and does demonstrate development in children's explicit reasoning about majority rules voting all the way into adolescence (Moessinger, 1981; Mann et al., 1985). For example, Kinoshita (1989) examined the justifications that 7- to 16-year-olds offer for when one should and should not use majority rules across different contexts. Kinoshita suggested that it wasn't until around 5th grade (e.g., around 11 years old) that children were able to describe when majority rules was or was not appropriate and that younger children overused the rule. However, it is important to note that Kinoshita's studies seemed to require children to explicitly understand what "majority decision" meant, and therefore may have underestimated children's ability to make decisions based on a numerical majority. Our simplified studies demonstrate that

young children do indeed have some intuitions about when majority rules is and is not appropriate.

General Discussion

Together, these results suggest that by age 4, children in both the United States and China have clear intuitions of when majority rules voting should and should not be used to make decisions. By 4 to 5 years old, children in both cultures believed that majorities should get their way when making a decision that affects the whole group (at least when it comes to matters of preference). Specifically, they believed that if three people (the majority) want one snack and a lone dissenter wants another snack, then one should go with what the majority wants (Study 2a and 2b). Importantly, children did not always adhere to the majority across all circumstances. When an individual was making a decision about what she herself should have for snack, children thought that one should go with what the individual wants, even if three others (the majority) disagree (Study 2a and 2b). That is, 4- to 9-year-olds recognize that majority rules is appropriate for a group deciding what it wants, but not necessarily for deciding what an individual wants. Furthermore, we demonstrate that children are discerning about what *types* of decisions should be made in groups—while they clearly endorsed majority rules in matters of preference for group decision-making, they did not think that majority rules should be used in matters where the majority was endorsing something that was immoral or untrue (Study 3). Taken

together these findings suggest a real sophistication in children's reasoning about majority rules. Even the youngest children we tested were not endorsing majority rules purely for dominance or conformity-based reasons; if this was the case then they should have endorsed the majority in all cases that we tested.

We think it is important to note that this work does not contradict previous work demonstrating that children strongly value consensus over majority rules (e.g., Helwig & Kim, 1999), but it does demonstrate that children also have early intuitions about majority rules as well. As stated in the introduction, consensus is a highly attractive way to resolve group decisions and one that may be desirable when possible within small group contexts. Given their similarities in process, one may argue that consensus is the greatest rival of the majority rules procedure instead of other procedures examined in this paper, such as coin flip. However, research has already demonstrated that in the eyes of young children, consensus clearly wins out when compared to majority rules (Helwig et al., 1998; Helwig & Kim, 1999). Thus, this paper does not aim to state that majority rules is more preferable than consensus decision-making, but rather that previous work may have *underestimated* children's intuitions about majority rules *because* of the presence of consensus as a more desirable option. Indeed, if one found that children consistently pick a snake as being more scary than a spider, one would not want to conclude that children are not afraid of spiders. One would want to show children spiders (in the absence of snakes) and

compare them to other stimuli that are scary and non-scary. We chose to do something analogous here. We ask, when consensus is not an option for the group, in what ways do children believe decisions should be made instead? Given that consensus is not always possible, it is key to explore children's intuitions about alternative decision procedures. Here, we find that children clearly have emerging intuitions about when majority rules is or is not an appropriate way to make decisions within groups.

Despite these early competencies we also found significant changes in children's endorsement of voting as they got older. Specifically, when children were asked to decide between two ostensibly fair procedures, flipping a coin or voting, we found very different responses for younger and older children (Study 1a and 1b). Six- to 9-year-olds overwhelmingly preferred voting to flipping a coin, but 4- to 5-year-olds showed no such preference. Taken together, these results clearly demonstrate that by the time children are 6 to 7 years old, they strongly prefer voting for resolving group decisions, which is in line with the responses of adults to similar dilemmas in several cultures (Bor et al., 2021). In the two studies in which we investigated both the U.S. and China, we found very similar patterns of results, suggesting that these effects are robust to at least some cultural differences.

Are we suggesting that children are naturally democratic? Certainly not, historical and sociological work clearly demonstrates that formal democracies were an

important cultural invention (e.g., Moore, 1966). However, we are arguing that certain features of majority rules voting seem to be an intuitive way to resolve group disagreement, which might help explain why such procedures are so commonly used. Not only is voting used frequently in modern industrialized democracies, but there is also evidence suggesting that procedures resembling majority rules voting are used in hunter-gatherer tribal societies as well (e.g., Boehm, 1999). Further, theorists like Arrow (1951) and Sen (1977) have argued that one reason for the ubiquity of voting-like procedures seems to be that they are an efficient way to partially optimize outcomes of decision-making, by aggregating preference information of a group to resolve a conflict. Here we echo this logic and suggesting that voting might be a solution that people find intuitive. There is likely no built-in system for voting in the human mind. However, the fact that conflicting preferences can create impasses, and that deferring to majority rule works as an efficient way to resolve such impasses, might make majority rules voting appear a sensible solution for resolving many group conflicts.

Children's developing intuitions about majority rules. One obvious question arises from these results: Why do 4- to 5-year-olds respond so differently from older children in Studies 1a and 1b? There are several possible reasons. First, it could be that older children are better able to understand the vignette and therefore respond more in line with adult intuitions, i.e., younger children were just not able to follow the details of

the story. However, given that younger children in subsequent studies responded similarly to older children on related questions about voting (e.g., endorsing voting when deciding for groups, but not for individuals), it does not seem likely that they were incapable of following the vignettes.

Second, children's preference for voting over coin flip could emerge as a result of formal instruction in school. At about 6- to 7-years-old is when compulsory schooling begins in both societies, and so it seems possible that children learn through schooling that voting is the fairest way to make decisions. However, we also do not think this by itself is a likely explanation. Although teachers may take votes in the classroom, we imagine that teachers also use myriad other procedures in the classroom, including flipping a coin, pulling names from hats, and unilaterally deciding what to do. It could be the case that schooling makes children more familiar with voting as a procedure, but it seems unlikely that teachers explicitly teach children that voting is better than coin flips, as both procedures are likely used in the classroom.

A third possibility is that children come to appreciate the value of majority rules voting as they have more exposure to group settings and have to resolve disagreements in groups. This is a different type of "school effect" that could similarly predict the age of onset we see here. Entering schooling may afford children more experience decision-making in groups. For example, children might take note of the fact that the most people are appeased when a decision procedure that approximates

majority rules voting is used (e.g., going with what most people want). If this account is correct, then one should expect that if young children regularly had social interactions with larger groups of children even before formal schooling, they too would come to endorse voting over coin flip as a procedure for resolving group disagreements. Such a prediction certainly seems plausible and is in line with some theories about the development of children's intuitions about fairness and respect (Engelmann & Tomasello, 2019; Shaw, 2013). For example, Shaw (2016) argues that children may come to increasing value fairness based on having three or more person interactions in which one must resolve disputes between actors with varying interests. Future work should explore how children's experiences with such group dynamics impact their endorsement of majority rules procedures.

Cultural similarities and differences. Across the first two studies, we found similar developmental trajectories in endorsement of the majority among children in China and in the United States: They both endorse majority rules over dissenter preference at age 4 (Study 2), and both clearly endorse majority rules over another impartial procedure (i.e., coin flip) by age 6 (Study 1). Despite sizable cultural differences between these two countries, we still saw a strikingly similar developmental pattern. We think this is because the present tasks focused more on simple and basic intuitions of informal majority rules systems used to resolve daily group disagreements (e.g., what to eat for lunch). In line with our previous suggestion, children across both

cultures likely experience group disagreements that they must be able to resolve and do so at similar points in development. Thus, it is perhaps unsurprising that we observed a similar developmental trajectory in these two cultures.

Despite these similarities, we note that we also found one cultural difference, that, at least in Studies 1a and 1b, children in China were *more* likely to endorse majority rule than children in the United States. We will note that we did not see the cultural difference in Study 2a and 2b and we thus urge caution in one's interpretation of this result. However, if one takes this result at face value, one might see this cultural difference as surprising, given that China has been considered "less democratic" than the United States (Economist Intelligence Unit, 2020). However, as stated in the introduction, previous research has demonstrated that people in the US and China differ in cultural values, especially in the relative importance they place on individuality versus interdependence (Markus & Kitayama, 1991). People growing up in the United States are thought to prioritize the self, whereas those in China prioritize group harmony (for a review, see Triandus & Suh, 2002). It is certainly possible that such differences in cultural values may lead Chinese children to consider the desires of the group and endorse majorities to a greater extent than children in the U.S., at least in certain contexts where individuals are being asked to make a sacrifice to the collective. However, future research will be needed to examine in what contexts these cultural values influence children's endorsement of majorities.

Limitations. One limitation of our studies is that we did not provide much information about the groups. One might imagine that different aspects of groups (e.g., composition of groups, size of groups, or status differences between groups) greatly affects the way children think groups should make decisions. For example, research suggests that children are sensitive to mutual intentions of groups and individuals in determining group membership (Noyes & Dunham, 2017). In considering how groups and individuals may make decisions, the coherency and intentions of groups may be a central concern in *who* can vote or participate in decision-making. For example, should outgroup members be allowed to participate in voting on a decision? Future work should explore how children think about majority rules voting in contexts involving several different groups.

Another limitation of our studies is that we were only able to test two cultures, and primarily one demographic group (Han Chinese) among one of these cultures. Further, both cultures were tested in urban settings. Although we found that children in these two different cultures both endorsed majority rules in our task, this does not mean that such responses are universal. If one was interested in demonstrating universality, it would be instructive to run our studies with children from small scale societies in which there is less market integration, as this variable appears to have a dramatic effect on people's basic intuitions and decision-making (Amir et al., 2019; Henrich et al., 2010). If we were to find that even children in these societies endorse

majority rules voting, this would provide stronger evidence for the claim the majority rules voting is an intuitive tool for resolving group disputes.

In conclusion, this research provides a clear demonstration that young children have intuitions about majority rules and also demonstrates that they have some sophistication in their thinking about such procedures. We also found important developments in children's intuitions about voting, with children increasingly endorsing majority rules voting as they got older. We hope that these initial studies will spark a host of new work exploring children's basic intuitions around voting.

Chapter 3: The Tyranny of the Majority.

Introduction

Many contemporary adult political systems coordinate group decisions through majority rules voting—going with what the majority of people desire. In the previous Chapter 2, we demonstrated that majority rules voting is an intuitive rule for young children: Children as young as 6 years-old across two distinct testing sites—the US and China—seem to believe that majority rules voting is a fair decision rule to use, and even prefer it to another impartial procedures (such as coin flip) when making a decision. Furthermore, we demonstrated that children are sophisticated thinkers when considering majority rules voting – they understand when it should be used, and differentiate that majority rules should be used in the context of group decision-making, but not individual decision-making. Given the results from Chapter 2, one might suggest that children (like adults) believe majority rules voting is a fair and robust decision-rule that can be applied across many group decision-making contexts.

However, even though majority rules voting often *seems* like the right decision tool, it is not without its foibles. In fact, political scholars and thinkers across history have often bumped up against concerns about it as a procedure, articulated from as early as 400 BCE by Herodotus to political scholars today – that, despite its status as a fair and legitimate rule, it can often yield unfair outcomes as a procedure via majorities

oppressing minorities. This idea, the "tyranny of the majority" articulated most famously by James Madison in Federalist Paper No. 10, refers to the possibility that the majority may abuse its power to oppress the minority. Although voting may be considered a generally fair way of making decisions, it can be unfair depending on *who* is voting for *what* outcome. As an example (that is often attributed to Ben Franklin, but without citation), consider the example of two wolves and a single sheep voting on what's for dinner. It's intuitive to imagine what the majority may decide, and intuitive to understand that it does not seem very fair. In Chapter 3, we explore if children too believe there are cases where majority rule is inappropriate by virtue of who and what is impacted by the vote in question. Chapter 3 knits together insights from both previous chapters by probing the intersection of voting and self-interested rule use, examining cases in which children become sensitive to the 'tyranny of the majority', or when majority rule is being used to advantage said majority. Before getting to these studies and relevant literature in children, I briefly discuss majority rules voting as a procedure as well as the logic of the tyranny of the majority.

Majority rules as a procedure

Political scientists have long observed that majority rules voting is generally accepted as a fair decision-making rule among adults (Sadoski, 2006) and experimental work has demonstrated that adults believe it is a fair way to make decisions across many contexts over other decision rules, such as coin-flip, consensus, or having a

single person decide (Bor et al., 2020). However, what specifically might *make* majority rules fair? There is endless work across both humanistic and social scientific disciplines attempting to answer this question, but we focus here on two distinct possibilities: majority rules is fair simply as a procedure in-and-of-itself; or majority rules is fair depending on who is in the majority, and for what they are voting.

Scholarship in procedural justice literature has suggested that, as opposed to the traditional account of distributional justice where procedures are valued because they create *outcomes* to be favorable, adults' fairness judgments are affected by the belief that a rule is fair or just in its social features (Tyler, 1989; Tyler, Rasinski & Spodick, 1985). Some theorists have posited that adults are much more likely to be satisfied with general inequality or an unfavorable outcome when the outcome was decided by a procedure considered fair or legitimate (Rawls, 1971; Folger, 1977). If so, one may imagine that the mere presence of a procedure like majority rules voting (which we know adults believe is quite fair) would be enough to consider an outcome reached by this decision-rule – and that one may not attend to the composition of voters on a given issue. Further, many extant majoritarian voting systems tend to ignore considerations relevant to, but outside of, majority rules procedures such as the *strength* of preferences when making decisions via majority rules voting (Riker, 1961). Given these findings, one possibility is that voting as a procedure may be sufficient

for a process to be considered fair—democracy might absolve even blatantly unjust outcomes of their unfairness.

If this were so, then adults should not be sensitive to the tyranny of the majority within concrete votes, given that votes (regardless of who is voting for what outcome) use the majority rules process. Indeed, research suggests that the tyranny of the majority is not an unfounded concern – in fact, in many cases the majority can and does rule—with an iron fist. Experimental studies with adults suggest that adults can be selfish when voting to the detriment of others (Descioli et al., 2020). But regardless of whether it *exists* within the voting process, a different question is whether adults recognize that such tyranny can be unfair even if it is sanctioned under the general rubric of democracy? Several theorists have suggested yes – many thinkers who have pondered the ins and outs of democracy have considered it a 'threat' that majorities can levy disproportionate costs on vulnerable minorities in majority rule decision-contexts (Sen 1977; Tullock, 1959). Further, empirical research finds that adults are highly sensitive to the 'tyranny of the majority' when evaluating the fairness of votes. For example, although adults generally endorse majority rules voting as a decision-making tool across many decision contexts, they are sensitive to the presence of vulnerable minorities and believe majority rules voting should not be used as much when a vulnerable minority will be affected by the decision (Descioli & Bokemper, 2019). Further, adults rate voting as less legitimate when policies pertaining to

sensitive groups are voted on – for example, research has found that adults believe voting is less legitimate when used to diminish women's rights. This effect was exacerbated when women themselves were not well-represented among the voters (Clayton, O'Brien, & Piscopo, 2019). Similar effects have been observed with real world racial majorities and minorities, such as White versus Black Americans (Hayes & Hibbings, 2017). This research suggests that in the real world, adults are indeed sensitive to this Madisonian concern and that it affects their relative fairness or legitimacy beliefs about voting.

Despite the fact that adults clearly have nuanced views on voting and understand the constraints on its legitimacy, we still have only a limited understanding of how these concerns develop in childhood. Do children believe that majority rules voting on matters of preference is always legitimate, or do they see some of the pitfalls of democratic tyranny? Our own research has demonstrated that children do think majority rules can be legitimate and by age 6 even prefer majority rules voting to other types of fair procedures (e.g., coin flip) in making decisions for groups (Chapter 2).

Still, even in this work we saw that children did not think that majorities should be able to get their way when the decision at hand effected only one person--we see children as young as 4- to 6-years old believe that majorities should not get to make a decision for a single individual. That is, children understand that majority rules

may be appropriate for group decisions, but not individual decisions. That work suggested that children do not believe that a group should get to vote on decisions that are only under the purview of the minority. However, being sensitive to the tyranny of the majority, in the current studies, may require even *more* nuance—here children must look at decisions that affect the whole group, where we know that children do think majority rules is generally a legitimate rule. Specifically, we will explore cases in which one must attend to an aspect of *how* the decision is being used, by focusing on the composition of voters in favor of a policy – that is, both *who* is affected and *who* is enacting a policy. Below, we briefly review literature on children's' developing understanding of the fairness of procedures, as well as work on self-advantaging and self-disadvantaging behaviors, as both literatures feel important for children's appreciation of the unfairness of the tyranny of the majority.

Children's developing understanding of fairness

As stated in previous chapters, although children are sensitive to inequality from a young age, their fairness evaluations become less focused on the inequality of outcomes per se and increasingly focused on whether the inequality is impartial (Gordon-Hackett et al., 2022; Shaw et al., 2016; Grocke, Rossano, & Tomasello, 2018). Like adults, children believe with age that inequality that leaves one person at a relative disadvantage can be fair so long as it is impartial. For example, research has demonstrated that children protest less to inequality when it is decided by procedures

such as spinning a wheel (Grocke et al., 2015), merit (Hook & Cook, 1979), or majority rules voting (Hok et al., 2023). With age, children become better at distinguishing between the types of justifications one may use to create inequalities, and specifically attend to the difference between procedures we colloquially consider legitimate or illegitimate (Schmidt et al., 2016).

When children reason about the fairness of a rule, what kind of factors might they look at to determine whether the "fair rule" in question is really fair or not? One particularly important factor that children may use in evaluating a rule is whether the rule seems to be partial or biased in the distributor's favor (Shaw, 2013, for a related account see Engelmann & Tomasello, 2019). We know that by about age 5, children do seem to care about whether inequality is created in a way that is impartial—they respond more negatively to inequality when it is created using procedures that seem to benefit one agent more than the other (Grocke et al., 2015; Shaw & Olson, 2014). We further see that children can understand this concretely in the case of rule use, in that self-serving inconsistency across time may undermine the fairness of a rule (Chapter 1).

Indeed, there may be cases in which the exact same inequality may be evaluated very differently based on who is causing the inequality, and who benefits from the inequality. For example, Shaw and colleagues (2016) found that, by age 7, children will disadvantage themselves, but will be unhappy if someone else created the same

inequality. Specifically, children were put in distribution contexts in which an inequality where they received less than someone else (disadvantageous inequity) was created. However, this inequality was either created by themselves or created by another person. Even though there was a disadvantageously unequal outcome across both conditions, children specifically disliked when this inequality was created by someone else. The authors take this as evidence that children specifically dislike *partiality* and not inequity per say.

If one is concerned with partiality or favoritism, then the exact same inequality should be seen very differently based on whether an agent disadvantaged themselves or whether they disadvantaged someone else. If someone else gives the agent less than another person, this is unfair, but if the agent decides to have less than the others, it is not necessarily unfair—the former is partial, the latter is not. That is, as children mature, they become more tolerant of self-created disadvantageous inequality (while becoming less tolerant of other types of inequality — e.g., third-party inequality). Follow up experiments (Gordon-Hecker et al., 2022) revealed that these patterns of choice are reflected in children's own satisfaction with inequality—children who agentically decide to disadvantage themselves report feeling much more satisfied with the resulting inequality than when the experimenter creates the same inequality by giving another child more than them (even within the same participant). These results

suggest who creates the inequality is a major determinant of how others will react to potential unequal treatment.

This research on self-created disadvantageous inequity might provide a rationale that could underlie children's intuitions about the tyranny of the majority. Recall, that adults believe it is wrong to have one group make decisions (even if a majority favors it) about another group, particularly when that group did not have a voice in the decision—e.g., it's particularly egregious to have a decision that affects women made by all men. That is, adults are sensitive to self-created disadvantageous inequity versus other-created disadvantageous inequity in real world group contexts. Given the above literature, it seems possible that children should be sensitive to the tyranny of the majority, specifically in that children should be sensitive to whether majorities are voting to disadvantage themselves versus disadvantage minorities. The former might be seen as fair whereas the latter would be unfair.

Examining whether children are sensitive to the tyranny of the majority knits together previous insights from Chapters 1 and 2 of this dissertation and expands the following core research questions: First, whether children are sensitive to the *function* of majority rules voting, or if they merely believe that majority rules voting is a fair rule in-and-of-itself. Second, this question adds to a body of work examining how children think and reason about self-advantaging versus self-disadvantaging behavior broadly—while previous literature has demonstrated that children engage in self-

disadvantaging behavior and report higher levels of satisfaction with such decisions (Gordon-Hecker et al., 2022), no previous work has investigated if they find such inequality to be more fair.

Current studies

In the current chapter we explore children's intuitions about majority rules voting and whether their evaluations of it differs based on whether that vote is endorsed by a group who will be disproportionately disadvantaged or advantaged by that vote. Specifically, in all cases, a majority of people (67%) will vote in favor of a policy that negatively impacts one group more than another. What will vary between conditions is whether a majority of the disaffected group voted in *favor* of the policy or not. We will then ask children to evaluate whether this is fair or unfair. We highlight two competing hypotheses about the use of majority rules voting in such a context. One possibility is that children believe that majority rules voting is a rule that is fair in-and-of-itself and that it is appropriate to obey it regardless of whether one group is more impacted by a decision. If children treat majority rules as a fair procedure because it is *procedurally* fair, then children may not be sensitive to who is voting for what, and merely attend to the fact that a vote was in fact held. This would predict that children should treat these two cases the same. Alternatively, it could be that children are sensitive to the function of voting, and therefore may be sensitive to *who* is voting for *what* outcome.

Study 1

In Study 1 we examine a circumstance in which two groups in a classroom must decide who is going to give up more of their makers. In all cases, they decide to vote on the matter. Four out of 6 people vote in favor of one of the groups giving up more than the other--that is, one group will be disadvantaged by the outcome. What we vary between conditions is whether the majority voting in favor of the outcome were from the disadvantaged group or the advantaged group. In one case, the disadvantaged voters are mostly against this (only 1 of 3 from the disadvantaged group vote in favor). In the other case, the disadvantaged voters are completely in favor of this (3 of 3 from the disadvantaged group vote in favor). If children believe that the composition of votes matters for evaluating the outcome of a vote, then they should think the former is much more unfair than the latter. Importantly, we control for the overall number of people who are in favor in both conditions. In both cases, the decision-rule as well as the proportion of voters (4 out 6 in the majority and 2 out of 6 in the minority) are identical. The only difference is *which* outcome the majority and minority are voting for.

Methods

Participants. In Study 1, 121 4- to 9-year-olds (M_{age} = 81.76 months, SD = 19.08 months, 46 female) were tested. In total, there were 60 participants in the Disadvantaged Against condition (M_{age} = 83.69 months, SD = 17.16 months, 22

female) and 61 participants in the Disadvantaged In Favor condition (M_{age} = 79.8 months, SD = 10.79 months, 24 female).

Procedure. Children were told stories about a classroom consisting of three circle kids (represented visually by anthropomorphic circles colored green) and three square kids (represented visually by anthropomorphic squares colored purple). In the story, the circle kids and square kids each have four markers. The teacher asks the class to give up three markers altogether, and the circle kids and square kids must decide, by voting, on which group must give up two markers and which group must give up one marker. Children were shown a possibility of a marker allocation where one group gives up two markers ("disadvantaged group") and one group gives up one marker ("advantaged group"). Participants are told that the class will vote on this decision. Participants were then shown, across both conditions, that there is a majority vote of four out of six characters voting yes for the decision and two out of six characters voting no for the decision. In order to make the majority salient, the majority vote is gestured to both discreetly (pointing at every individual character) and gestured to continuously (gesturing a circle around the characters). Participants are then asked for a fairness evaluation and responses are coded on a scale of 1 (Very Unfair) to 4 (Very Fair). Specifically, the participants were asked "Is that fair or unfair?" When participants answered "fair", they were asked "Is it very fair or a little fair?" and when participants answered "unfair", they were asked "Is it very unfair or a little unfair?".

Across the two conditions, the only thing that was altered was *who* voted yes or no. In the Disadvantaged Against condition, the group being disadvantaged primarily voted against the rule. That is, the majority consists of all three advantage group members and one disadvantage group member, while the other two disadvantage group members object. However, in the Disadvantaged In Favor condition, the group being disadvantaged primarily voted in favor of the rule. That is, the majority consists of all three disadvantaged group members and one advantage group member. The objecting characters are members of the group that will benefit from the decision.

The exact script is as follows:

There is one big classroom with some kids in it.

There are three circle kids and three square kids. The circle kids have four markers and the square kids have four markers.

One day, the classroom runs out of markers! The teacher asks the group to give up 3 markers as a class. They have to vote to decide how many markers each to give up for the classroom.

Someone says, "What if the circles give up 1 marker, and the squares give up 2 markers?" They decide to take a vote.

All the circles vote that they like this idea: So, this guy says yes, and this guy says yes, and this guy says yes. And only one square votes that they like this idea: this guy says yes. The other squares vote that they don't like this idea: This guy says no.

Since that was most of the people in the group, that means all the squares have to give up two markers, even though some of the group doesn't want them to.

How fair is that? Is it fair? Or Unfair?

See Figure 11.

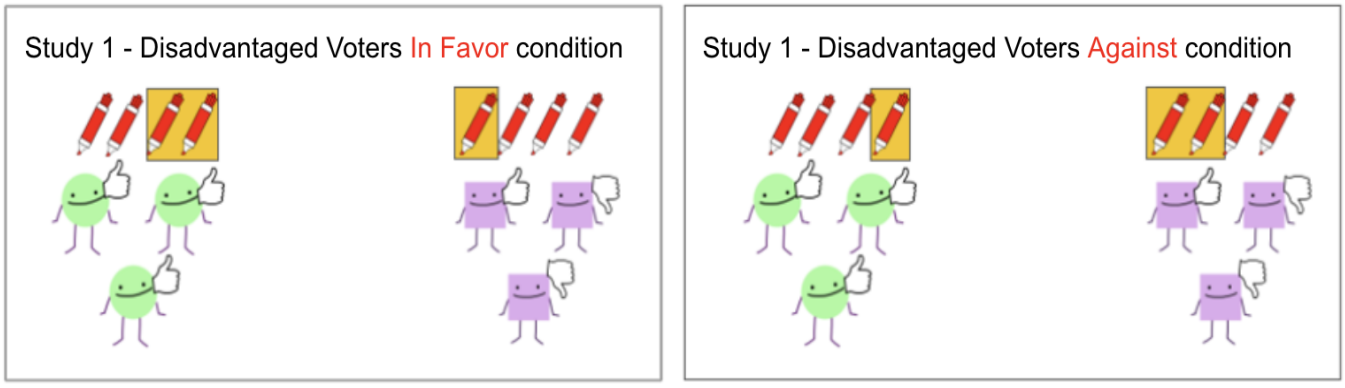

Figure 11. Visual example of study set-up of the two conditions (disadvantaged voters in favor condition and disadvantaged voters against condition) for Study 1. For exact script, refer to methods section above.

Results.

A linear regression analysis was conducted to reveal whether children's fairness evaluations changed with condition and age set as a continuous variable. In line with our prediction, the analysis revealed that children evaluated the Disadvantaged

Against condition as less fair (M= 1.98, SD= 0.88) than the Disadvantaged In Favor condition (M= 2.54, SD= 0.91) condition; (β = 1.23, SE = 0.45, t = 2.76, p = .007). That is, children's fairness evaluations were significantly affected by condition, and children thought that voting as a decision-rule was less fair when agents who were disadvantaged by a policy voted against it across age. The analysis revealed a marginal effect of age on fairness evaluation in that children generally evaluated the procedure as more fair across both conditions with age (β = 0.12, SE = 0.06, t = 1.80, p = .074).

Discussion

Across all ages in our sample, children believed that majority rules was less fair when the disadvantaged group was voting against the policy that was disadvantaging them, than when the disadvantaged group was voting in favor of the policy that was disadvantaging them. That is, children evaluated the same decision rule as differentially fair depending on *who* was voting for *what* outcome. These results are initial support for our hypothesis that children attend to the fairness of different decision rules outside of just the 'procedure' itself.

Study 2

While we believe that the results from Study 1 provide a demonstration that children care about whether a disadvantaged group is in favor of a policy or not, it is not obvious how sophisticated their intuitions are. You'll note that in Study 1, our

manipulation of the disadvantaged group being "in favor" not only included a majority of the disadvantaged group, but actually included a complete consensus—every member of this group was in favor. Previous research has demonstrated that children are sensitive to consensus and believe consensus is a favorable way to reach a decision (Helwig & Kim, 1999, Schmidt et al., 2016) or change rules (Zhao & Kushnir, 2018). It is possible that children believed this case was fair because each and every person being most negatively affected by the outcome signed off on it. That is, perhaps the Disadvantaged voters In Favor condition seemed particularly fair not because of subverting the tyranny of the majority, but rather because the disadvantaged group at hand was in consensus about disadvantaging themselves. Though this result by itself could be interesting, it would be a different mechanism from what we intended. Thus, in our next study we pursue a similar question, but in a way that does not involve the disadvantaged group having a consensus.

In Study 2, we replicate our previous result from Study 1 and additionally rule out the possibility that our result was driven due to consensus of the disadvantaged group. To do this, we replicate our task from Study 1 with a single key difference: in our Disadvantaged voters In Favor condition, we break the disadvantaged group's consensus by making the majority two disadvantaged group members, and two advantaged group members. That is, again in both cases there are a total of 4 out of 6 who vote in favor of the policy across both conditions, but here even when the

disadvantage group on average is in favor of the decision (2 out of 3 are), there is still one disadvantaged group member who is against the decision. In doing this, we attempt to conceptually replicate our Study 1 but also test to see if removing the consensus from the Disadvantaged voters condition changes children's differential fairness evaluations.

Methods

Participants. In Study 2, 122 4- to 9-year-olds (M_{age} = 78.69 months, SD = 18.96 months, 47 female) were tested. In total, there were 61 participants in the Disadvantaged Against condition (M_{age} = 77.52 months, SD = 18.64 months, 23 female) and 61 participants in the Disadvantaged In Favor condition (M_{age} = 79.78 months, SD = 19.51 months, 24 female).

Procedure. Study 2 followed a very similar procedure to Study 1. The Disadvantaged Against condition in Study 2 is identical to the Disadvantaged Against condition in Study 1: the majority consists of all three advantage group members and one disadvantage group member, while the other two disadvantaged group members object. What changed in study two was the Disadvantaged In Favor condition. Here the group being disadvantaged still primarily vote in favor of the rule. However, the majority consists of two disadvantage group members and two advantage group members so that the minority has a mixed composition. This allowed us to have the

disadvantaged group favor the policy in general (2 out of 3 voted for it), but not have a complete consensus. See Figure 12.

Figure 12. Visual representation of new version of disadvantaged voters in favor condition for Study 2.

Results

We again predicted that children would distinguish in their fairness evaluations between these conditions, even though the proportion of agreement remains the same across conditions. Specifically, we predicted again that children would see the Disadvantaged In Favor condition as more fair than the Disadvantaged Against condition. A linear regression analysis was conducted to reveal whether children's fairness evaluations changed with condition and age set as a continuous variable. The analysis revealed that children evaluated the Disadvantaged Against condition as less fair (M= 1.91, SD= 0.98) than the Disadvantaged In Favor condition (M= 2.49, SD=

1.01); (β= 0.562, SE = 0.185, t = 3.032, p = .003). That is, children's fairness evaluations were significantly affected by condition, and children thought that voting as a decision-rule was less fair when agents who were disadvantaged by a policy voted against it across age. A linear regression analysis was additionally conducted to reveal whether children's fairness evaluations changed with age entered as a continuous variable. The analysis revealed no significant effect of age on fairness evaluation, β = -0.062, SE = 0.059, t = -1.057, p = .293)

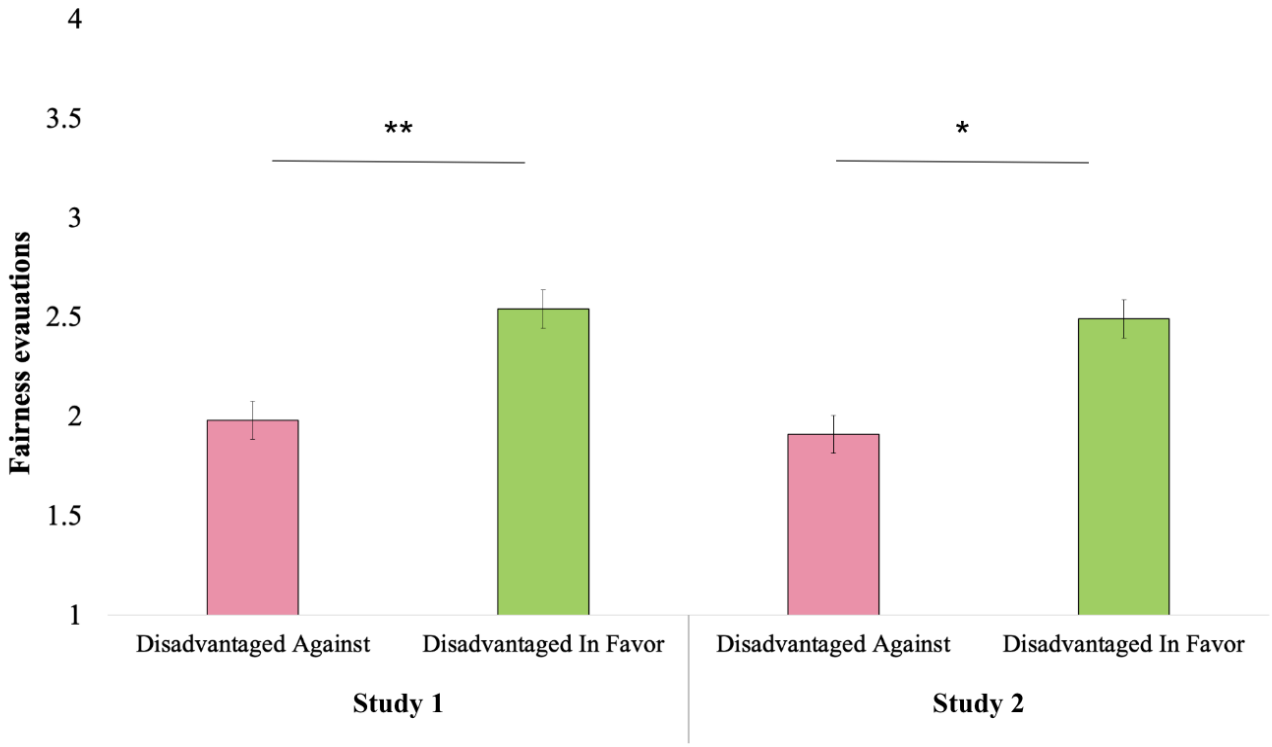

Figure 13. Results from Study 1 and 2. 4- to 9-year-old children's fairness evaluations (4 – very fair and 1 – very unfair) across conditions (disadvantaged voters against and disadvantaged voters in favor). (= p < .05, ** = p < .01, *** = p < .001)*

Discussion

We replicated our effect from Study 1 and additionally ruled out that our effect was driven by any type of consensus effect from the Disadvantaged group. Thus, this data suggests that children are indeed sensitive to not just majority rules in use itself, but by *whom* and for *what* the rule is being used.

One might notice that overall, there were lower evaluations of fairness across all conditions. This may be surprising, considering that children seem to believe that majority rules is a fair way to make decisions as according to the previous chapter (Chapter 2). However, given the context of the decision (in which one group has to give up an unequal number of resources), it may make sense that children just generally evaluate the situation as a bit unfair. Indeed, we would expect that majority rules itself would yield a high fairness rate in normal preference decisions, but this is beyond the scope of the current project.

General Discussion.

The current experiments demonstrate that even from a young age, children make sophisticated considerations about majority rules, and believe that majority rules voting may not be fair in-and-of-itself. Study 1 demonstrates that children are sensitive to the composition of a majority and differentially evaluate voting as a fair

decision-making rule depending on such. That is, when decisions seem to disadvantage a group without their consent, majority rule is seen as less fair than otherwise. Further, in Study 2 we found the same results even in a condition in which they disadvantaged group was not universally in favor of the policy—that is consensus from the disadvantaged group was not necessary. These results reveal that children can make nuanced judgments about the appropriateness of majority rules voting as a procedure and may suggest that children are attentive to the function of using majority rule preference in order to make a decision. This chapter along with Chapter 2 reveal that children have strong intuitions about how, why, and when majority rules voting may be fair. This of course does not mean that children are naturally democratic, but it is interesting to think about why such procedures might become compelling in certain situations. While outside of the scope of these studies specifically, I will briefly focus on a question that should be of interest to researchers as they continue to probe our developing intuitions about the fairness of voting: what are some of the possible reasons that majority rules voting is seen as so fair in particular?

There are several claims as to why majority rules voting is considered a fair and defensible rule for group decision-making. A classic liberal argument claims majority rule is a way to maximize the number of people who can exercise self-determination in group decisions whereas a classic utilitarian argument is that majority rules increases

the aggregate utility of a decision on the assumption that each member of a majority will gain at least as much as each member of a minority will lose (Miller, 1978). The above are broad arguments as to the *philosophy* of majority rules in the abstract, but they say little about real-world aspects of the rule that may affect people's underlying psychology about it. What are some concrete or testable reasons that people may prefer majority rules voting to other fair rules?

One compelling reason that majority rules seems fair is that it gives people a voice. Several streams of research have found that having a personal say (or voice) can give states and procedures a higher sense of legitimacy (Folger, 1977; Tyler et al., 1985). For example, in some randomized field experiments, researchers tested what types of decision-making arrangements generated the strongest legitimacy beliefs by asking high school classrooms to make a decision about how to spend a sum of money through different decision rules (including examples such as expert decision-making, consensus, and lottery-based decision-making). These researchers found that personal involvement within a decision-making process (such as having a vote) was the primary factor in generating legitimacy beliefs (Esaiasson, Gilljam, & Persson, 2012). Researchers have made similar arguments with children in that having 'voice' can give a procedure some sense of fairness despite negative outcomes. For example, if children are given the chance to assent to a justification for distributing unequally, they object less than if children do not assent (Grocke, Rossano & Tomasello, 2018).

These authors take this as evidence that having some voice within a procedure can mitigate feelings of unfairness despite unequal outcomes. Thus, one may suggest that majority rules voting can seem principally fair as a procedure because it allows this sense of personal say within the decision process. However, given that our studies included characters that were involved in making the decision across *both* the self-advantaging and self-disadvantaging conditions, it seems unlikely that personal say *entirely* drives feelings of fairness or legitimacy.

Instead, we consider another common argument within political theory as posited by scholars such as Dahl (2008) and Rawls (1971), who argue that majority rules voting is unique in that it embodies the value of political equality in particular. Specifically, they consider a procedure will be fair or legitimate in that it replaces an equality of outcomes for an equality of opportunity; indeed, one possibility is that the tyranny of the majority seems so stark because one believes that political equality is *not* present. If an equality of opportunity assumes that opportunity should be equal and present across multiple iterations of a procedure (e.g., that even if one does not get a favorable outcome at Time 1, that they may have the chance to get a favorable outcome at Time 2 through the same procedure), then the fact that majorities have some relative power to disadvantage minorities may lead people to infer that majorities may be stagnant, and that opportunities will lean to the favor of these majorities and to the detriment of minorities. We have some preliminary evidence for

this claim in adults (Hok, Heck & Shaw, in prep). Specifically, across four studies collected with adults, we found that adults are sensitive to 'shifting' majorities versus 'static' majorities. That is, when majorities block together and vote in similar ways, adults will evaluate the procedure and outcome as less fair than if they think the voting is likely to be more random and not doom one side to keep losing. Thus, perhaps children are sensitive to the tyranny of the majority presently because they are attending to the possible lack of equality of opportunity (e.g., if these majority voters tend to vote in favor of their own interest), which may be a large aspect of why voting is fair to begin with.

The current paper does not differentiate between the above possibilities, but future work should aim to do so. For example, one may test the equality of opportunity hypothesis by examining if children do in fact feel sensitive to repeated iterations of votes with similar voting compositions. Children could see vignettes of majorities and minorities who vote, in which the majority preference wins. Children could see that two conditions: one where across time, majorities vote as a block and a second where across time, the majorities shift. The outcomes of the votes can be similar across these conditions to control for a simple 'losing' heuristic. If children evaluate majority rules as unfair when blocks of voters stay constant, controlling for repeated outcomes, then this may suggest that children specifically are attending to the equality of opportunity.

Future work should additionally aim to examine whether or not children would make different or similar inferences about any type of rule as the one we presented. For example, our research from Chapter 1 generally followed a similar pattern – that children dislike when characters seem to advantage themselves (although Chapter 1 showed that this was true in cases of moral inconsistency in particular). Would this general pattern hold or be different if we ran this same test with a rule like expert-decisions versus majority rules? Consider the following example: one may believe that majority rules in particular seems unfair if there is a lack of equality of opportunity. Instead, if the decision at hand was consistently being made in line with an authority figure or an expert who was deciding on a topic, children may not believe that the same individual *making* the decision across each time would be unfair. In particular, with the case of expertise one may find an acceptable trade off of agency in decision-making based off of a more optimized outcome based on the knowledge of the decision-maker. Thus, equality of opportunity may be more specific to majority rules as a decision procedure. On the other hand, it could be that self-advantaging and self-disadvantaging as a concern may be true of most decision-rules, regardless of what they are. Future research should aim to examine what types of aspects of decisions hold and do not hold as concerns when being used.

One limitation of these current studies is that we tested novel groups, which did not have the context or associated characteristics that many groups in the real

world do. We opted to use novel groups because testing novel groups with children can demonstrate a clear and basic intuition without the confounding effects of real-world traits such as extant hierarchy or preconceived stereotypes. However, groups rarely exist in a vacuum such as ones allowed for in laboratory settings. Thus, future research should aim to examine how these intuitions may be affected by the presence of relevant characteristics that are baked into the groups themselves. For example, many majority and minority groups have real-world power dynamics associated with them regardless of their 'majority' or 'minority' status. Moreover, many of these power dynamics are not always consistent across group size – some majorities may be the groups in power (e.g., consider a racial majority in a country), whereas some minorities may be the groups in power (e.g., consider a '1%' group of wealth). Some research has demonstrated that children are sensitive to the differences of these 'types' of minorities (e.g., dominant versus prestigious or high in status), particularly with age (Heck et al., 2021). Given that children are able to track the types of relationships group size may have with power, how might powerful majorities versus less powerful majorities who get their way affect fairness evaluations? Future research should aim to expand this question by examining the rich world of real groups and how they may be evaluated in these contexts.

Finally, we note that in addition to these results being interesting for children's concept of voting in particular, they are also informative about how children evaluate

the fairness of others' self-disadvantaging decisions. This work is consistent with other research conducted in both children and adults, in which researchers found that advantageous inequity aversion (i.e., disliking inequality that advantages you – for example, if someone else was paid less than you for doing similar work) but less so disadvantageous inequity aversion (i.e., disliking inequality that disadvantages you – for example, if someone was paid more than you for doing similar work). Indeed, some researchers have posited that advantageous inequity aversion is an important aspect of inferring impartiality or fairness (Shaw & Choshen-Hillel, 2018). These authors found that when adult participants were told about a novel alien species that had advantageous inequity aversion but not disadvantageous inequity aversion, it was sufficient evidence to participants that this species cared about fairness. Indeed, the authors take this as evidence that disliking inequality that benefits yourself but not others is a strong signal for impartiality, whereas disliking inequality that benefits others may not be.

To conclude, children are sophisticated decision-makers and attend to aspects of rules such as the composition of a vote, and whether the voters in the majority will be disadvantaging themselves, versus disadvantaging the minority. These studies knit together previous insights from Chapters 1 and 2 by exploring how the broad reasoning from Chapter 1 (e.g., understanding how rules can be considered fair or

unfair depending on their usage) can extend to a novel rule that has been understudied from Chapter 2 (majority rules voting).

Conclusion

In the above chapters, I have demonstrated that children are highly flexible and sophisticated reasoners about the use of impartial decision rules; when they think the intent or effect of the rules is negative, they think that even fair rules can be unfair. I demonstrate that children can evaluate fair rules like merit and equality as *unfair* if they are applied in a morally inconsistent way to benefit the self (Chapter 1). Importantly, I find that children do not have a broadly negative view of inconsistent rule use, although they believe that selfish inconsistent rule use is bad, they do not think that selfless inconsistent rule use is bad. Indeed, if anything I find that children think that selfless inconsistent rule use designed to benefit others is particularly fair. Next, I explored a novel and important decision-making rule that has been underexplored in young children's thinking but undergirds much of adult decision-making today: going with majority rules. I establish that children understand the use of majority rules and use it across group decision-making contexts, even preferring it to another procedure that is viewed as very fair (coin flip) (Chapter 2). I further demonstrate that children are highly nuanced in how they evaluate majority rules voting. Not only do they hold beliefs about the kinds of decisions the majority rules should and should not be used for (e.g., it is totally appropriate for preference decisions, but should not be to decide what is true or moral– Chapter 2), but they even attend to who is voting and benefiting from the decision rule—when those voting against a policy are the ones

being disproportionately disadvantaged by it, it is seen as less fair than if they were in favor (Chapter 3).

Across these studies we found some interesting hints of developing sophistication as children age. For example, children seemed to be increasingly sensitive to moral inconsistency with age (Chapter 1) and they also began to more strongly endorse majority rules over other impartial procedures (such as a coin flip) as they grew older (Chapter 2). These results fit in with two lines of relevant broader research within the field of child development: First, the developing understandings of impartial procedures and that they become more in tuned with legitimate justifications over illegitimate ones (e.g., Schmidt et al, 2016; Damon, 1977; Shaw & Olson 2014). Second, children's developing understanding of reputation management and self-advantaging behavior (e.g., Good & Shaw, 2022; Hok et al, 2020; Aloise-Young, 1993; Shaw & Olson, 2015). Indeed, these two arms of research have often been treated disparately in past research, although they can be tightly related. The intent behind rule use is highly informative to the believed impartiality of the rule, which affects its fairness contextually. Given that children have a developing cognition across both these areas (e.g., research suggests that children both begin to differentiate legitimate and illegitimate procedures around 8-years old while also increasingly thinking more about others' strategic reputation-management), more research should aim to weave these two lines of research together. Doing so will allow

for a more holistic discussion of children's understanding of impartiality and fairness. Even if the development of these two processes do not ultimately depend on similar developmental mechanisms, it will still be informative to think about how they interact in children's decision making as they develop.

Further, these results provide crucial information about the computations that underlie children's reasoning about rules more broadly. Rules are essential for establishing and maintaining cooperation between individuals in a group. As social animals, humans must navigate a highly complex social world and understand how to coordinate group action, particularly at a large scale. Given that individuals often have differing goals, preferences, and beliefs, the task of coordinating actions between two individuals--let alone within groups containing a multitude of individuals--can be a feat herculean in nature and difficulty. Much research has demonstrated that children are highly social and cooperative from early on in development (Ashley & Tomasello, 1998; Brownell & Carriger, 1990; Gräfenhain, et al., 2009; Tomasello, et al., 2005; Tomasello & Hamann, 2012). But despite children's social and cooperative leanings, humans still have varied goals and perspectives that must be negotiated in order to make cooperation possible. From infancy, children seem to understand that agents have differing goals and preferences (Henderson & Woodward, 2012; Repacholi & Gopnik, 1997) and as children age, they understand how this can be used to resolve disputes through negotiation (Echelbarger, Good, & Shaw, 2020; Santhanagopalan,

Keysar, & Kinzler, 2022). Further, children are often put in more peer group contexts where they begin to have experience with these types of conflicts firsthand with age, whether it be in the classroom, with siblings, or with parents. Thus, conflict and learning to negotiate conflict cooperatively becomes a key aspect of human life even from a young age, and a problem that children must learn how to navigate.

Indeed, previous research has suggested that one way children think about negotiating conflicts and regulating the behavior of others is via the litigation of rules (Cobb, 2004). For example, one major area in which children will generate and set rules is in cases of ownership and claiming ownership in shared play (Cromdal, 2001; Cobb-Moore, Danby & Farrel, 2007). Similarly, work has examined how 5- to 8-year old children may create rules in circumstances where they had to coordinate behavior within teams. Specifically, children were put in scenarios in which they needed to coordinate (here, who would yield their toy vehicle in order to avoid a crash in game). Researchers found that rules were specifically created to coordinate dilemmas, and that children protested less at each other in the presence of created rules (Gruneisen & Tomasello, 2019). The current set of studies expand beyond how children use rules in order to coordinate conflict, and instead examine how children might think of the unfair usage of these rules themselves. It would be highly interesting to examine if and when children begin to use processes like majority rules in navigating their own self-created rules (for one such attempt, see Zhao & Kushnir, 2018). More broadly, it

seems important to examine how children's own navigation of rule contexts scaffolds their ability to evaluate when rules should and should not be used.

Altogether, these studies paint a picture of children's developing intuitions about fairness: what's "fair" is highly context dependent as well as intention dependent. Children understand the fairness of rules themselves, but there are cases in which using that same rule may be perceived as unfair depending on how and why it is utilized. Our research demonstrates that although young children have some understanding of these concepts when young, they increasingly become sensitive to these aspects of flexible rule use with age. The use of rules is a highly ubiquitous aspect of human life and sociality – ever-present but highly complex. Although we use rules to negotiate the worlds and ourselves, rules themselves can be vague and indeterminate. To a child living in a complex social world with complex social partners and considerations, children both learn to live by a variety of rules but also learn to grapple with their intricacies in application.

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