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Case Report

The developmental origins and behavioral consequences of attributions for inequality☆

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ABSTRACT

Attributions, or lay explanations for inequality, have been linked to inequality-relevant behavior. In adults and children, attributing inequality to an individual rather than contextual or structural causes is linked to greater support for economic inequality and less equitable giving. However, few studies have directly examined the relationship between parent and child attributions for inequality. Additionally, it remains unclear whether attributing inequality to individually controllable sources such as effort might lead children to allocate resources more inequitably than individually uncontrollable sources like innate ability. Across three studies ($N = 698$), we examine the developmental origins and behavioral consequences of inequality beliefs by exploring parent and children's (7–14 years old) attributions for unequal situations. In Study 1, parents, recruited through MTurk, preferred to explain inequality to their children by attributing disparities to effort rather than uncontrollable causes such as ability or luck. In Study 2, in a sample of affluent and mostly white families in Vancouver and Boston, parent attributions for inequality predicted children's attributions, such that children were more than two times as likely to attribute inequality to effort when their parents did. In Study 3, when a convenience sample of children from Washington state were brought to the laboratory and told that an inequality between two groups was due to effort, they were more likely to perpetuate the inequality by giving to the individual who already had more resources. This research documents a cycle of inequality perpetuation by demonstrating that parent attributions for inequality predict their children's attributions and that these attributions affect children's equitable giving. This work highlights the importance of examining the perceived controllability of inequality.

Inequality has dramatically increased around the world (Alvaredo, Chancel, Piketty, Saez, & Zucman, 2018; Piketty & Saez, 2014), with negative consequences for individual and societal wellbeing (see Buttrick & Oishi, 2017; Wilkinson & Pickett, 2017). Despite the harmful consequences of inequality, people still prefer some level of inequality over complete equality (Kuziemko, Norton, Saez, & Stantcheva, 2015). For example, in a nationally representative sample of Americans, respondents were asked to design wealth distributions by deciding what percentage of wealth should be owned by the top, middle, and bottom economic quintiles (Norton & Ariely, 2011). Though participants envisioned a more egalitarian distribution than the status quo, they did not distribute wealth equally across all quintiles and believed that the wealthiest quintile should have more than all the quintiles below.

While this preference appears paradoxical, it can be explained by a general preference for "fair inequality," or inequality based on perceived merit (Starmans, Sheskin, & Bloom, 2017). Specifically, within Western capitalist cultures, there is a tendency to believe that one's economic position is a product of individual effort, which provides justification for the unequal distribution of wealth (Federico & Sidanius, 2002; Henry & Sears, 2002; Jost, Pelham, Sheldon, & Sullivan, 2003; Son Hing et al., 2011). Attributing societal inequality to personal effort has also been linked to behaviors in support of economic inequality, such as reduced support for economic redistribution and increased support for restrictive welfare policies (Bullock, Williams, & Limbert, 2003; Piff et al., 2020). Thus, in order to better understand how to promote egalitarian behavior, it is critical to investigate the origins of attributions for inequality. In the current research, we explore the development of attributions for inequality by examining how parents and children explain

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inequality and the consequences of these beliefs for children's giving behavior.

1. The development of attributions for inequality

Generally, attributions can be conceptualized along two key dimensions: locus of causality and controllability. Locus of causality refers to whether someone attributes the cause of a situation to an individual (referred to as an individual or dispositional attribution) or the context (referred to as a situational or structural attribution). The other key dimension is controllability, which is whether an individual perceives a situation or behavior as controllable or uncontrollable (Weiner, 1985). These dimensions are not necessarily orthogonal, with structural and situational factors usually perceived as uncontrollable. Research shows that these different types of attributions influence behavior across a wide range of domains; from whether people donate to charity (Whillans, Caruso, & Dunn, 2017; Whillans & Dunn, 2018) to whether they persist at personally important goals (Donovan & Williams, 2003).

In the context of inequality, research has shown that Americans tend to attribute inequality to controllable, dispositional causes (Cozzarelli, Wilkinson, & Tagler, 2001; Kluegel & Smith, 1986), potentially due to capitalism and the resulting cultural emphasis on individualism and meritocracy (Levy, West, Ramirez, & Karafantis, 2006; McCall, 2013). Accordingly, American adults make fewer situational and structural attributions for inequality than individuals from other countries (Piff et al., 2020), but this tendency is moderated by social identity and context. Specifically, adults from lower socioeconomic status are more likely to endorse situational or structural explanations for economic inequality (Kraus, Piff, & Keltner, 2009). Racial identity has also been shown to affect perceptions of inequality, with Black Americans believing that racism is more of a structural issue than White Americans, potentially due to having more knowledge of historical racism (Nelson, Adams, & Salter, 2013; Rucker, Duker, & Richeson, 2019). Taken together, this work indicates that attributions for inequality can vary even within the United States.

A number of studies have examined these attributions and their contextual influences early in development. American children and adolescents tend to attribute inequality to controllable, dispositional sources such as hard work and effort (Flanagan et al., 2014; Leahy, 1981; Leahy, 1983), and these dispositional attributions are linked to preferences for inequality (Hussak & Cimpian, 2015). In a recent study with children ages 4 to 12, researchers found that when children were provided with dispositional (vs. situational) explanations, they were more likely to display preferences for the high-status group and to report that inequality was fair (Hussak & Cimpian, 2015). However, like adults, children's attribution styles vary based on race, gender, and socioeconomic status (Chafel & Neitzel, 2005; Kornbluh, Pykett, & Flanagan, 2019), as well as social factors such as conversations about current events with parents and classmates (Flanagan et al., 2014). Attributions for inequality can also change with age, with individuals producing more structural, uncontrollable explanations for inequality as they age (Leahy, 1981; Mistry, Brown, Chow, & Collins, 2012; Peretz-Lange, Perry, & Muentener, 2021; Seider et al., 2019; Vasilyeva, Gopnik, & Lombrozo, 2018).

Much of the aforementioned research has focused on the dimension of locus of causality, comparing the effects of attributing inequality to individual/dispositional vs. situational/structural causes. Yet, the dimension of controllability is also important to independently consider, as the consequences of these beliefs should critically depend on whether the behavior is perceived as personally controllable. For example, adolescents view academic failure as a more punishable offense when it is perceived to be due to effort (a controllable dispositional attribution) compared to innate ability (an uncontrollable dispositional attribution; Weiner, 1994). Knowing the controllability of inequality attributions is essential to understanding *when* dispositional attributions will lead to inequality perpetuation, as individuals may be more likely to perpetuate inequality and "punish" those who have less *only* if the inequality is perceived as controllable. The current research therefore examines the development of attributions for inequality by isolating the role of controllability.

2. Distributive justice across development

In addition to examining the content of attributions for inequality in children of different ages, the current research tests the relationship between these attributions and giving behavior in childhood. A number of studies have examined children's use of effort (a controllable, dispositional attribution) as a guiding principle for distributing resources. In general, children have an aversion to unequal distributions and choose to allocate resources equally (e.g., Li, Spitzer, & Olson, 2014; LoBue, Nishida, Chiong, DeLoache, & Haidt, 2011; Shaw & Olson, 2012). However, children are more accepting of inequality when individual effort is involved. Children as young as three years of age allocate resources based on perceived effort when sharing with others and during third-party resource distribution (Baumard, Mascaro, & Chevallier, 2012; Chevallier, Xu, Adachi, van der Henst, & Baumard, 2015; Kanngiesser & Warneken, 2012). Further, infants as young as seventeen months expect the distribution of resources to match individual effort (Sloane, Baillargeon, & Premack, 2012; Surian & Franchin, 2017; Wang & Henderson, 2018). Though this work indicates that meritocratic beliefs emerge early in development, they appear to guide distributive justice more strongly as children approach adolescence (Almas, Cappelen, Sorensen, & Tungodden, 2010; Schmidt, Svetlova, Johe, & Tomasello, 2016). Specifically, as children get older, they view unequal distributions based on merit as fair, and are more likely to allocate resources to someone who has worked hard.

Critically, children's use of effort as a guiding principle for resource allocation varies cross-culturally. For example, in a comparison between children from the United States and the Phillipines, researchers found that while American children preferred merit-based distributions, Filipino children preferred need-based distributions, and attributed this decision to concern for interpersonal harmony (Carson & Banuazizi, 2008). In another study, researchers found that children from a forager society in Namibia, where accumulation of wealth is discouraged, and sharing is emphasized, distributed resources more equally after an unequal work task (Schäfer, Haun, & Tomasello, 2015). In this same research, children from a pastoralist society, where elders held most of the wealth and made resource allocation decisions, did not use effort as a cue for distribution at all. These behaviors contrasted with children from Germany, who allocated rewards based on effort.

While these studies provide important insight into the pervasiveness of the use of effort as a guiding principle for distributive justice in Western capitalist cultures, and specifically, American culture, these studies do not directly compare children's resource allocation across various dimensions of attribution theory such as by comparing children's allocations in response to uncontrollable vs. controllable attributions or dispositional vs. situational attributions. To our knowledge, only a handful of studies have directly examined the relationship between controllability and generosity.

In one such study, researchers found that when 3 to 8-year-old children were provided with a personally controllable explanation for inequality (i.e., effort) they tended to perpetuate inequality by giving more prizes to the person who already had more resources (Rizzo, Elenbaas, & Vanderbilt, 2020). In contrast, when they were provided with an uncontrollable, structural explanation (i.e., gender discrimination), they were more likely to give equally or to rectify the inequality by giving to the person with less. In a recent correlational study with adolescents ages 12–19, researchers found that participants who attributed societal inequality to structural causes such as discrimination or societal practices were more likely to distribute resources to individuals based on need rather than merit, while adolescents who attributed inequality to individual causes used merit as a guiding principle (Kornbluh et al.,

2019). Taken together, these two papers suggest that attributions for inequality related to controllability are linked to giving behavior early in development, though there is notably a dearth of work on children between the ages of 8–12 years old showing this direct link. Furthermore, neither of these studies directly examined the role of controllability, as they did not examine uncontrollable dispositional attributions such as ability, or uncontrollable situational attributions that are non-structural, such as luck.

As childhood is a formative developmental period in which many prosocial habits, values, and tendencies are developed, it is critical to better understand the trajectory of attributions for inequality and their impact on giving behavior (see Eisenberg, Eggum-Wilkens, & Spinrad, 2015; Schnitker, King, & Houltberg, 2019). The values that people acquire in early life (e.g., character, generosity, fairness) are likely to have strong implications for behavior in adulthood (see Killen & Smetana, 2015; Rooney, Wang, & Ottoni-Wilhelm, 2018). Thus, if we want to develop effective and appropriate interventions *before* inequality-perpetuating behavior is enacted in adulthood, we need to better understand how these beliefs are acquired in childhood.

3. The current research

The current research examines the developmental origins and behavioral consequences of attributions for inequality across three studies. In our first study, we examine preferred explanations for inequality by asking parents how they would explain a number of inequality scenarios to their children (methods adapted from Hussak & Cimpian, 2015). In our second study, we explore whether parents' attributions for inequality predict their children's. In our final study, we explore the behavioral consequences of children's inequality attributions by examining children's tendencies to rectify or perpetuate inequality based on attributions of controllability. Our first two studies focus on parents, in order to examine a potential source of children's beliefs about inequality. Past work in other domains has shown that parent beliefs about social groups (e.g., race, gender) often predict their children's (see Degner & Dalege, 2013 for a review). For example, studies have shown that parent beliefs about race and gender, particularly those of mothers, are linked to their children's attitudes and stereotypes (Castelli, Carraro, Tomelleri, & Amari, 2007; Sinclair, Dunn, & Lowery, 2005; Tomasetto, Alparone, & Cadinu, 2011). Additionally, parent beliefs about gender are linked to their children's career aspirations and choices (Bleeker & Jacobs, 2004; Croft, Schmader, Block, & Baron, 2014). In the domain of inequality, studies have shown that parents can pass inequality-related beliefs to their children through cultural transmission (e.g., Calarco, 2014); our studies build on this work by examining and further clarifying relationships between parent attributions for inequality and the attributions of their children. As such, our study sought to investigate a) the attributions for inequality that parents wish to transmit to their children and b) whether parents and children would have corresponding beliefs about the causes of inequality.

The current research also examines which attributions are linked to the perpetuation of inequality in childhood. Prior research has not separated locus of control from dispositional attributions, and as such, it remains unclear how uncontrollable dispositional attributions affect children's inequality-relevant behavior. To overcome these limitations, the current research conceptualizes parent and child inequality attributions in terms of locus of causality *and* controllability. As such, we extend prior theorizing on children's inequality attributions by isolating the role of controllability in the consequences of dispositional attributions (Weiner, 1985). Across three studies ($N = 698$), we examine three different types of inequality attributions: controllable dispositional (i.e., effort), uncontrollable dispositional (i.e., innate ability), and situational (i.e., luck) attributions.

These studies focus on children ages 7–14, as age seven is the youngest age that children reliably attend to equity in their resource allocations over equality (Rizzo & Killen, 2016). Furthermore, there is a lack of literature directly demonstrating the relationship between different attributions for inequality and giving behavior in this age range. In our first two studies, we sought to capture a broad age range to examine any potential developmental differences in the relationship between parent and child beliefs. In our third study, after finding that age was not a significant predictor of children's attributions for inequality, we chose to focus on the younger age range of 7–10 years old to examine whether attributions for inequality affect giving behavior in children as young as 7 years old.

4. Study 1

4.1. Method

4.1.1. Open practices statement

Preregistrations and de-identified datasets for all three studies can be found in our Open Science Framework repository (https://osf.io/8c4dv/). Complete materials are available in the Supplementary Material. For Study 1, the Boston sample of Study 2, and Study 3, we report all measures, manipulations, and exclusions. For the Vancouver sample of Study 2, additional unrelated measures were collected for a separate study on children's happiness and prosocial giving, which we do not report here. Sample size for all studies were determined before data analysis.

4.1.2. Participants

We recruited a total of 200 Americans from Amazon Mechanical Turk in March 2020, which was our preregistered sample size. We chose this sample size based on a preliminary power analysis which indicated that this sample size would give us greater than 95% power to detect a medium-size effect ($f^2 = 0.15$) for a single regression coefficient. An additional 390 participants were recruited but as per our preregistration, they were immediately excluded before participating in the study because they did not have at least one child between 7 and 14 years old living with them. Another 90 participants were excluded for getting two or more comprehension checks wrong and 10 who did not fully complete our main measures were also excluded. Thus, our final sample consisted of 200 respondents, 73 mothers and 123 fathers (ages 18–64, $M = 25$–34, $SD = 0.88$). Our study protocol received ethics approval from Harvard Business School, [DUA20–0071#], ["Attributions Study"]. The average household income was $70,000–$79,999 per year. See Table S.1 in the Supplementary Material for full study demographics and participants' regional information.

4.1.3. Procedure

Our study was preregistered on the Open Science Framework (see https://osf.io/tzpye/). Participants completed a series of demographic questions and were told that their responses would qualify them for participation in the full study. Participants only completed the survey if they passed the initial screening requirement of having at least one child between the ages of 7–14 who was currently living with them. The study was estimated to take between 5 and 10 min, and at the end, participants were paid $1.00.

4.1.4. Measures

Attribution Measure. We adapted our attribution measures from prior research (Hussak & Cimpian, 2015). First, participants read four different stories about imaginary groups of people who lived on far away planets depicting different types of inequality (e.g., Blarks and Orps). Each story represented a different type of inequality: wealth (i.e., one group having more wealth than the other), academic success (i.e., one group getting better grades than the other), job hierarchy (i.e., one group being bosses, the other group being workers), and job status (i.e., one group having white collar jobs, one group having blue collar jobs). The presentation of stories was randomized for each participant.

Participants imagined that they were reading the story with their children and considered how they would explain the story.

Parents were presented with three potential explanations: one controllable dispositional explanation (i.e., effort: one group worked harder than the other group), one uncontrollable dispositional explanation (i.e., innate ability: one group was smarter than the other group), and one uncontrollable situational explanation (i.e., luck: one group found gold a long time ago). The order of presented explanations was randomized for each story. After each story was presented, there was a comprehension check where parents were asked which group was in a higher status position. Then, for each story, parents were asked to select which inequality attribution they would use to explain the disparity to their children. The order of these explanations was randomized for every participant (See S.1 in the Supplementary Material for the complete text of all stories). These hypothetical scenarios avoid socially desirable responding (Fisher, 1993) and are at an appropriate comprehension level so that children can understand the content of the scenarios (see also Hussak & Cimpian, 2015).

4.1.5. Statistical method

We appended the four attribution measures to each other in order to preserve the data from each individual question, but allowing us to create one single measure of parent's explanations for unequal situations.[1] We conducted a Pearson's Chi-Squared (X^2) goodness-of-fit test to examine whether the pattern of parents' responses differed from chance (i.e., 33% per answer category; see S.2 in the Supplementary Material for additional analyses). All data is accessible through the Open Science Framework (see Open Practices Statement). The analysis had 80% power to detect a minimum effect of $X^2 = 12.59$.

4.2. Results

Attribution Prevalence. Across the four questions (wealth, academic success, job hierarchy, and job status), when parents were asked to explain an unequal situation to their children, they were more likely to use effort (controllable dispositional) attributions (41.12% of responses) as compared to ability (uncontrollable dispositional) attributions (24.88%) or luck (uncontrollable situational) attributions (34.00%), $X^2(6, N = 200) = 33.51$, $p < .001$. Overall, parents' inequality attribution choices differed significantly from chance levels (33%), $X^2(2, N = 200) = 32.25$, $p < .001$. Effort attributions were higher than chance levels whereas ability attributions were lower than chance levels. See Fig. 1.

5. Study 2

In Study 1, parents chose controllable dispositional attributions (i.e., effort) significantly more often than uncontrollable dispositional (i.e., innate ability) or uncontrollable situational attributions (i.e., luck) when asked to explain inequality to their children. Though replication is required to further substantiate these findings, these results are consistent with research showing that adults prefer controllable dispositional attributions (e.g., Piff et al., 2020). These results also contribute beyond previous work by demonstrating not only that adults make these attributions, but also that parents actually *prefer* to use these explanations when discussing inequality with their children. Based on these results, we hypothesized that parents could transmit their beliefs that inequality is controllable and dispositional to their children through these types of explanations. Thus, in Study 2, we directly examined the prevalence of controllable dispositional attributions when parents and children made their own judgments about inequality, as well as whether the types of inequality attributions parents made directly predicted their children's.

5.1. Method

5.1.1. Participants

We recruited a total of 326 parent-child dyads using two separate methods; 267 dyads were recruited from middle schools in Vancouver, BC between September 2017–June 2018 and 59 dyads were recruited from the Museum of Science in Boston, Massachusetts between September 2018 and August 2019. We included as many dyads as we could from eight middle schools contacted in the Vancouver area and we preregistered collecting as many dyads as possible from the Boston area in a prespecified timeframe (between September 2018 and August 2019). In line with our pre-registration, we excluded a total of 100 cases: 59 cases across both samples due to missing values on the attribution and demographic measures and 41 cases due to answering one or more comprehension question incorrectly.[2] The final sample consisted of 226 parents (166 mothers and 60 fathers; ages 18–64, M = 35–44, SD = 0.76) and 226 children (111 girls and 115 boys; ages 7–14, $M = 11.50$, $SD = 1.56$).

Our study protocol received ethics approval from Harvard Business School, [IRB17–2019: Classroom Discussions and Helping Behavior]. Parents provided consent and children provided assent for study participation. The average household income for families in our sample was $100,000–$149,999 per year. See Table S.7 in the Supplementary Material for other demographic information.

5.1.2. Procedure

Our analyses were preregistered on the Open Science Framework (see https://osf.io/s7twj/). The Vancouver sample was recruited as part of a larger study that assessed the generosity of students attending various elementary schools. This sample was recruited by research assistants who visited various classes and asked teachers to request students to complete the surveys during class time as part of this larger ongoing project. Parents completed their portion of the survey independently on personal computers or other electronic devices.

Dyads in the Boston sample were recruited by research assistants on the weekends at a local Science Museum. During the Boston data collection, all participants were tested in a small area of the museum allocated for research. An experimenter walked parents through the consent process, and gave them an iPad to complete their portion of the study. After parents provided consent, the experimenter brought children into a private testing area with an iPad while parents filled out the survey of interest in a separate testing area that was not visible to children. Experimenters gave children a brief overview of the study and received explicit child assent before proceeding with the study. The entirety of the study was read aloud to the child by the experimenter, who guided children through each question. At the end of the study, children were given a sticker as a token of appreciation for their participation, and parents were given a $15 Amazon gift card.

For both samples, participants were told that they were going to hear stories about people who lived on far-away planets and that they had to choose an explanation for the situation depicted in the story. After listening to the same stories, both parents and children made attributions for the four different types of inequality represented in each of the four stories (wealth, academic success, job status, job hierarchy; see Study 1). The order in which these different types of inequality were presented was counterbalanced for each participant.

[1] Specifically, question 1 was appended to questions 2, these were appended to question 3, and then these were appended to question 4. While the sample size is 200 different people, the appending of measures creates multiple measures per person, allowing us to conduct our regression analysis accounting for individual questions.

[2] 39 parents and 20 children had missing values on the attribution and demographic measures. 16 parents and 25 children answered one or more comprehension questions incorrectly.

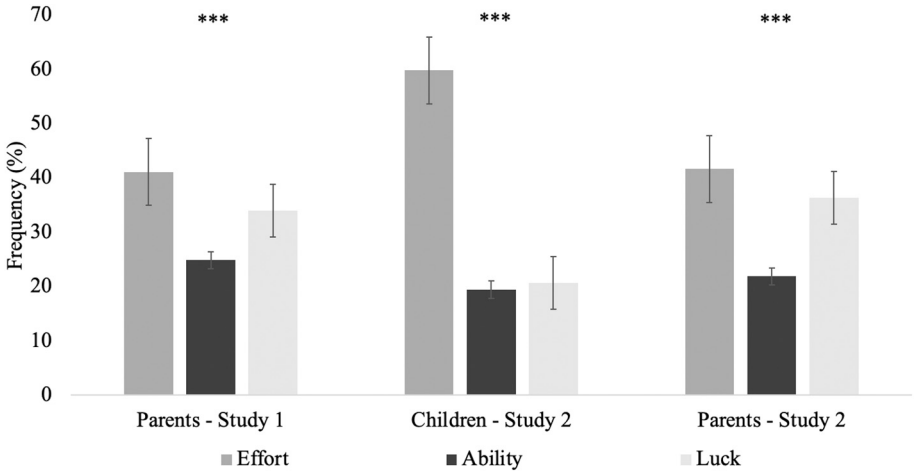

Fig. 1. Frequency of attributions across studies 1 and 2. Error bars represent +/− 1 standard error. ***$p < .001$. Note: In Study 1, parents were asked how they would explain the story to their child. In study 2, parents and children were simply asked to explain the story themselves.

5.1.3. Measures

Inequality Attributions. The attribution measure was identical to the one used in Study 1, with the exception of the instruction wording. Participants—both parents and their children—read four different stories (wealth, academic success, job hierarchy, job status), considered why the inequality existed between the two groups, answered a comprehension check, and chose which out of three explanations for that inequality seemed most likely (e.g., controllable dispositional, uncontrollable dispositional, uncontrollable situational; see Study 1). See Supplementary Material for the complete text of all stories.

5.1.4. Statistical method

To examine whether children and parents made controllable dispositional attributions more often, we conducted a Pearson's Chi-Squared (X^2) goodness-of-fit test to examine whether the pattern of responses differed from chance (33% per answer category). The analysis had 80% power to detect a minimum effect of $X^2 = 12.59$. To explore whether parents' attributions predicted children's, we conducted multinomial logistic regressions. We used clustered standard errors by study ID to account for nesting of scores within parent and child dyads. In the models presented, we report the measures with and without covariates including models that control for parents' and children's age, gender, household income and parents' hours worked (See S.3 in the Supplementary Material for additional analyses). All data is accessible through the Open Science Framework (see Open Practices Statement). The analysis had 80% power to detect an effect size of RRR = 2.23.[3]

5.2. Results

5.2.1. Parents' attribution prevalence

To conceptually replicate the results from Study 1, we examined whether parents typically believed that inequality was a product of effort. Across studies, we found that across all four questions, parents' status attribution choices differed from chance levels (33%) $X^2(2, N = 226) = 57.64$, $p < .001$ and that parents made status attributions based on effort (controllable dispositional; 41.70% of responses) more often than attributions based on ability (uncontrollable dispositional; 21.90%) or luck (uncontrollable situational; 36.39%) $X^2(6, N = 226) = 340.59$, $p < .001$. These results replicate our findings from Study 1, showing that parents made status attributions based on effort more than ability or luck.

5.2.2. Children's attribution prevalence

We then explored whether children believed that inequality was a product of effort. Across the four questions, children's inequality attributions differed from chance (33%), $X^2(2, N = 226) = 289.11$, $p < .001$. In this study, children made inequality attributions based on effort (59.85% of responses) more often than attributions based on ability (19.47%) or luck (20.69%), $X^2(6, N = 226) = 117.48$, $p < .001$. See Fig. 1.

5.2.3. Parents' attributions predicting children's attributions

We then examined whether parents' attributions were a significant predictor of children's attributions. Children were more likely to attribute inequality to effort when their parents attributed inequality more to effort relative to ability, $b = 0.96$, $p < .001$, 95% CI [0.54, 1.38]; $RRR = 2.61$ and luck, $b = 0.83$, $p < .001$, 95% CI [0.43, 1.24]; $RRR = 2.30$. Consequently, children were also more likely to attribute inequality to ability when their parents attributed inequality more to ability relative to both effort, $b = 0.96$, $p < .001$, 95% CI [0.54, 1.38]; $RRR = 2.61$ and luck, $b = 1.12$, $p < .001$, 95% CI [0.52, 1.72]; $RRR = 3.06$. Children were more likely to attribute inequality to luck when their parents attributed inequality more to luck relative to ability, $b = 1.12$, $p < .001$, 95% CI [0.52, 1.72]; $RRR = 3.06$ and effort, $b = 0.83$, $p < .001$, 95% CI [0.43, 1.24]; $RRR = 2.30$. Results held with and without covariates. Importantly, age was not found to be a significant predictor of children's inequality attributions (see Tables S.8 and S.9 in the Supplementary Material).

5.2.4. Mother-father's attributions predicting daughter-son's attributions

We also explored whether the transmission of attributions was more likely to occur from mothers or fathers to daughters or sons. Daughters were more likely to attribute inequality to effort when their mother attributed inequality more to effort relative to ability, $b = 1.39$, $p < .001$, 95% CI [0.65, 2.12]; $RRR = 4.00$ and luck, $b = 1.13$, $p = .001$, 95% CI [0.48, 1.78]; $RRR = 3.10$ ($N_{dyads} = 85$). Daughters were also more likely to attribute inequality to ability when their mother attributed inequality more to ability relative to both effort, $b = 1.39$, $p < .001$, 95% CI [0.65, 2.19]; $RRR = 4.00$ and luck, $b = 1.629$, $p = .003$, 95% CI [0.55, 2.71]; $RRR = 5.10$. Finally, daughters were more likely to attribute inequality to luck when their mother attributed inequality more to luck relative to both ability, $b = 1.63$, $p = .003$, 95% CI [0.55, 2.71]; $RRR = 5.10$ and effort, $b = 1.13$, $p = .001$, 95% CI [0.48, 1.78]; $RRR = 3.10$.

[3] Risk Relative Ratio is a measure of effect size and represents the probability of an outcome in a reference group to the probability of an outcome in a comparison group (see Tenny & Hoffman, 2020). For example, in this case, parents are 2.64 times more likely to attribute inequality to effort than to ability.

We also explored whether mother's attributions predicted son's attributions ($N_{dyads} = 81$) and found similar results. Sons were more likely to attribute inequality to effort when their mother attributed inequality more to effort relative to ability, $b = 1.22$, $p = .001$, 95% CI [0.50, 1.94]; $RRR = 3.39$ and luck, albeit marginally, $b = 0.69$, $p = .05$, 95% CI [−0.004, 1.39]; $RRR = 2.00$. Sons were also more likely to attribute inequality to ability when their mother attributed inequality more to ability relative to both effort, $b = 1.22$, $p = .001$, 95% CI [0.50, 1.94]; $RRR = 3.39$ and luck, $b = 1.46$, $p = .007$, 95% CI [0.39, 2.53]; $RRR = 4.29$. Finally, sons were more likely to attribute inequality more to luck when their mother attributed inequality more to luck relative to both ability, $b = 1.46$, $p = .007$, 95% CI [0.39, 2.53]; $RRR = 4.29$ and effort, albeit marginally, $b = 0.69$, $p = .052$, 95% CI [−0.004, 1.39]; $RRR = 2.00$. Overall, our data did not provide consistent evidence of fathers' transmission of attributions to daughters ($N_{dyads} = 26$) or sons ($N_{dyads} = 34$). It is possible that our sample may be underpowered to detect an effect of fathers' transmission of attributions. Future research should test this possibility using a larger sample size. All results held with and without covariates (see Tables S.14 to S.17 in the Supplementary Material).

6. Study 3

Study 2 indicates that parents and children tend to make controllable dispositional attributions (i.e., effort) for inequality more than uncontrollable dispositional attributions (i.e., innate ability) or uncontrollable situational attributions (i.e., luck). Parents' attributions were predictive of their children's such that parents—and in particular mothers—who made more controllable dispositional attributions were more likely to have children who made these attributions. Together with the results of Study 1, this research provides preliminary evidence that parents could be passing their beliefs about inequality on to their children, in a similar fashion as political and religious beliefs are often transmitted intergenerationally (e.g., Flor & Knapp, 2001; Jennings, Stoker, & Bowers, 2009). Though this research does not directly examine the causality of this relationship, and these results should be replicated in future work, these studies highlight a potential pathway of transmission.

Given the pervasiveness of these beliefs among parents and children, we then sought to examine the consequences of these inequality attributions for children's behavior. Though research with adults has demonstrated a link between controllable dispositional attributions and inequality-perpetuating behavior, few studies have examined this relationship in children, and none thus far have directly examined the effect of uncontrollable dispositional attributions for inequality on children's giving behavior. We examined whether specific types of attributions were linked to higher rates of inequality-perpetuating behaviors in children. We hypothesized that when children were presented with a wealth disparity between two individuals, they would be more likely to perpetuate inequality (i.e., give to the wealthier individual) if they were given a controllable dispositional attribution for the disparity as compared to an uncontrollable dispositional or uncontrollable situational attribution.

6.1. Method

6.1.1. Participants

A total of 48 children (18 girls, 30 boys, ages 7–10, $M = 8.00$, $SD = 1.10$) were recruited using a lab database comprised of local families in a community in the Pacific Northwest region of the United States. This sample size was preregistered and determined to provide 80% power to detect an effect size of $f = 0.16$ (using the highest correlation between measures, $r = 0.61$, Erdfelder, Faul, & Buchner, 1996). We did not exclude any participants from our sample, as all children recruited completed all measures.

Children were tested in a lab on campus dedicated to research with children and families between July and November of 2019. We received ethics approval from Western Washington University, #19–031, "Children's Reasoning about Inequality." Parents provided consent and children provided assent for study participation. The average household income for families in our sample was $80,000 - $89,000 per year. See Supplementary Material for other demographic information.

6.1.2. Procedure

Analyses were preregistered on the Open Science Framework (see https://osf.io/9yd57/). We preregistered collecting data from 48 participants and stopped data collection when we had run all participants. All participants in the study met the eligibility criteria (no language barriers, no disclosed developmental delays, no technology errors or interruptions, no failures to complete the study), and none were excluded from analyses.

Families were brought into the lab, and children were able to play with toys in the main lab space while an experimenter walked parents through the consent process. After consent, the experimenter brought children into a private testing room with a computer while parents filled out our survey in the main lab space, out of view of their children. Experimenters gave children a brief overview of the study and received explicit assent before proceeding with the study. The entirety of the study was read aloud to the child by the experimenter, who also guided children through each question. During the study, children would first read one of three stories.

Each story provided an inequality scenario and one of three explanations for the disparity: controllable dispositional (i.e., effort: one group worked hard than the other), uncontrollable dispositional (i.e., ability: one group was smarter than the other), or uncontrollable situational (i.e., luck: one group found gold a long time ago). Participants were given two separate comprehension checks: one after learning about the inequality to verify which group had more, and one after learning about the explanation for the inequality to verify why there was an inequality between the two groups. After reading the story and completing the comprehension checks, children would complete the corresponding resource allocation task. This procedure was repeated three times and each subsequent story corresponded with a different condition of our study, such that every child was in every condition of the study (controllable dispositional, uncontrollable dispositional, and uncontrollable situational conditions). At the end of the study, children were given a small toy as a prize, and parents were given a $15 Amazon gift card.

6.1.3. Measures

Inequality Explanations. Our inequality explanations were identical to explanations provided for the wealth disparity question in Study 1 and 2, with the addition of images and attention check questions to aid children's understanding. The order of stories was randomized, but all participants read all three types of stories. See Supplementary Material for the complete text of all stories.

Resource Allocation. After reading the stories, children were told to pretend they were visiting the imaginary planet they heard about and learned about the form of currency used on that planet in child-friendly terms and shown a picture of a coin. They were then presented with two members of the imaginary groups they had read about and shown pictures of the individuals with corresponding amounts of coins. The individual from the group with more money was shown with two coins and the individual from the group with less money was shown with one coin. Children were asked to decide which of the two characters should receive an additional coin and reminded of the reason for the disparity presented in the story. Children pointed on the screen to which character they wanted to give the additional coin to. The results of this measure were coded as a dichotomous variable, with 0 indicating that children rectified inequality by giving the coin to the character with one coin, and 1 indicating that children perpetuated inequality by giving the coin to the character with two coins.

6.1.4. Statistical method

First, we conducted a Pearson's Chi-Squared (X^2) goodness-of-fit test to examine whether the pattern of responses differed from chance (50% per answer category) and whether children rectified (give a coin to the individual with less) or perpetuated (give a coin to the individual with more) inequality more often in each condition. Additionally, to examine whether children distributed resources differently based on condition, we conducted a binomial logistic regression with condition (controllable dispositional, uncontrollable dispositional, uncontrollable situational) entered as a predictor and resource allocation (perpetuation = 1) as our outcome. We used clustered standard errors by study ID to account for nesting of scores within children's choices across conditions. All data is accessible through the Open Science Framework (see Open Practices Statement).

6.2. Results

6.2.1. Resource allocation preferences

In each condition, we tested whether children's responses differed from chance (50.00%). When children were presented with an effort (controllable dispositional) explanation, they perpetuated inequality (64.58% of responses) more often than rectified it (35.42%) $X^2(1, N = 48) = 4.08$, $p = .043$. When children were presented with an ability (uncontrollable dispositional) explanation, there was no difference in children's perpetuation (37.50%) or rectification (62.50%) of inequality $X^2(1, N = 48) = 3.00$, $p = .08$. When children were presented with a luck (uncontrollable situational) explanation, they perpetuated (25.00%) less often than rectified inequality (75.00%) $X^2(1, N = 48) = 12.00$, $p = .001$. See Fig. 2.

6.2.2. Inequality explanation predicting resource allocation

When children were provided with an effort explanation for inequality as compared to an ability, $b = 1.11$, $p = .009$, 95% CI [1.32, 7.00], $RRR = 3.04$ or luck explanation, $b = 1.70$, $p < .001$, 95% CI [0.82, 2.58], $RRR = 5.47$, they were more likely to perpetuate inequality by giving a coin to the wealthier individual. When children were provided with a luck explanation for inequality as compared to an ability explanation, childrens' likelihood of perpetuating inequality was not statistically significant, $b = -0.59$, $p = .19$, 95% CI [−1.47, 0.29], $RRR = 0.55$. These results held including children's age, gender, and race as well as parent's age, gender, race, and income as covariates (see Tables S.20 and S.21 in the Supplementary Material).

6.3. Discussion

Across three studies, we investigated the cycle of inequality perpetuation by examining parent to child transmission of inequality attributions and the effect of these attributions on children's behavior. In Study 1, when parents were asked how they would explain an inequality scenario to their children, they were more likely to choose a controllable dispositional (i.e., effort) attribution than uncontrollable dispositional (i.e., ability) or uncontrollable situational (i.e., luck) attributions. This finding is consistent with research showing that adults prefer controllable dispositional attributions (Starmans et al., 2017). However, these results also highlight that parents in our sample not only preferred these explanations for inequality, but wished to transmit them to their children. This is consistent with a recent emphasis on controllable factors such as effort and hard work in achieving success in school settings (Haimovitz & Dweck, 2017).

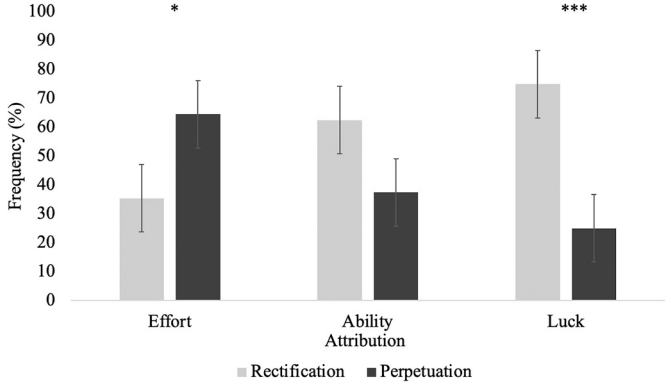

Fig. 2. Frequency of attributions across conditions of study 3. Error bars represent +/− 1 standard error. *$p < .05$, ***$p < .001$.

In Study 2, parents *and* their children were more likely to select controllable dispositional attributions for inequality than other types of attributions presented to them. Furthermore, parents' inequality attribution choices predicted their children's, suggesting that these inequality attributions may be transmitted from parents to children regardless of parents' wealth or political background. Interestingly, the relationship between parent and child inequality attributions was strongest between mothers and children, and particularly, strongest between mothers and daughters. It is possible that mothers, based on gender roles, unequal division of unpaid labor like childcare, or a combination, might engage in conversations about inequality more often with their children. As controllable dispositional attributions are linked to perpetuation of inequality in adulthood (Bullock et al., 2003; Piff et al., 2020), the early establishment of these attributions for inequality is particularly concerning. Similar to early-emerging beliefs about race and gender, these inequality attributions could meaningfully shape behavior beginning in childhood (e.g., Bian, Leslie, & Cimpian, 2017; Rae & Olson, 2018).

We tested this possibility in Study 3 and found, consistent with previous research (Rizzo et al., 2020), that these attributions were indeed linked to children's giving behavior. When children were provided with a controllable dispositional explanation for an inequality between two imaginary groups, they were significantly more likely to perpetuate inequality than when they were provided with an uncontrollable dispositional or uncontrollable situational explanation. In contrast, in the uncontrollable situational condition, children tended to rectify inequality. These results indicate that children may have viewed inequality as justifiable when considering effort, but not when considering ability or luck. This is particularly interesting in light of work indicating that young children generally prefer individuals who demonstrate more competence as well as preferring lucky individuals to unlucky individuals (e.g., Brosseau-Liard & Birch, 2010; Olson, Banaji, Dweck, & Spelke, 2006). As such, while children might have an underlying preference for advantaged individuals (Li et al., 2014), by ages 7–10, they consider the reason for an individual's advantage and discern among controllable and uncontrollable causes.

As such, these results indicate that when children think inequality is due to individually controlled factors, they may be more likely to reward the individual that they perceive as putting in more effort, even if that individual already has more resources. Future research should investigate whether perceptions of the morality of these different types of attributions might differ based on the resulting resource allocation. Importantly, these results also suggest that in terms of inequality attributions, the dimension of controllability is important to consider in conjunction with the dimension of locus of causality (dispositional vs. situational), which has been the focus of previous research (e.g., Hussak & Cimpian, 2015).

Taken together, this work provides preliminary evidence that parents could play a role in children's acquisition of beliefs about the causes of inequality. Parents explicitly preferred to explain inequality in terms of controllable dispositional attributions, and their beliefs were predictive of their children's. One explanation for this preference is that parents may wish to emphasize controllable dispositional factors like effort in order to motivate their children to work harder. The potential for this early socialization of attributions for inequality is particularly important

in light of our findings that these attributions were directly linked to children's perpetuation of inequality. Importantly, as these results are correlational, it is possible that there may be alternative explanations for the relationship between parent and child attributions. For example, there might be inherited dispositional factors that influence attributions style, or shared environmental or cultural factors influencing both individuals. In order to disentangle these possibilities, and conceptually replicate the results presented here, future research should longitudinally examine transmission of inequality attributions from parents to children, and potential consequences for children's giving behavior across development.

Additionally, while our work conceptualizes the presented attributions based on luck, ability, and effort based on dimensions of locus of causality and controllability, it is possible that these are not the only ways to interpret these types of explanations for inequality. For example, while ability has traditionally been classified as an uncontrollable dispositional attribution (Weiner, 1985), some individuals might view ability as a more controllable quality that can be improved upon. Additionally, effort could potentially be perceived as a form of ability (such as the ability to apply effort in a sustained manner). We focus mainly on the traditional classifications of these attributions, but acknowledge that there may be some variation in perceptions of controllability surrounding these explanations that are worthy of future research.

It is important to consider our findings in the context of recent discussions surrounding 'fixed' vs. 'growth' mindsets in education (Haimovitz & Dweck, 2017). Recently, educators have begun to emphasize dispositional determinants of success that are under students' control, such as effort, in order to promote a growth mindset that is linked to higher levels of academic achievement. In contrast, 'fixed' mindsets are discouraged, as they emphasize that dispositional determinants of success are not under one's control (e.g., innate ability). Though the focus of these mindset interventions is on attributions for one's own behavior, our results suggest that when generalized to others they could lead children to assume that others' academic failure is due to a lack of effort. As such, conversations around "growth mindsets" may need to consider potential negative consequences and adapt interventions accordingly (see Alan & Ertac, 2017).

A limitation of this work is that our samples primarily consisted of wealthy children (average household income across studies was $70,000–$149,999). Previous research suggests that when children in lower socioeconomic brackets describe the causes of inequality, they often acknowledge situational causes of wealth, but also do focus on effort to some degree (Heberle, Kaplan-Levy, Neuspiel, & Carter, 2018). Future research should examine the stability of these attributions across the socioeconomic spectrum. Additionally, future research should seek to replicate these results with more diverse samples, as our research was conducted with majority White participants, and research suggests that race may play a role in adults attributions for inequality (Nelson et al., 2013). Furthermore, while Study 1 included a more representative sample of people from across the United States, Study 2 and 3 were both constrained to particular locations (i.e. Vancouver, Canada and Boston, USA, respectively). As such, the pattern of results that we observed here are constrained to these specific locations and may not generalize to locations or samples with more racial/ethnic diversity or different cultural beliefs.

Another limitation is that our age range was restricted to children above the age of seven; as such, it remains unclear how these results might generalize to younger children. Additionally, while we did not find any significant age differences among children, our sample in Study 2 had a wide age range (7–14 years old). Future research may therefore seek to examine potential age differences in attribution style with a larger sample. Furthermore, future research should consider a longitudinal investigation of attribution patterns across development. An exploratory comparison of parent and child attributions patterns indicated that the percentage of children who made attributions based on effort (59.85%) was significantly larger than the percentage of parents who made attributions based on effort (41.70%; see Supplementary Materials). As previous research suggests that structural and uncontrollable attributions become more common with age (e.g., Seider et al., 2019), it could be worthwhile to investigate these patterns longitudinally, and assess whether some individuals use less individualistic and controllable attributions as they get older.

The current research documents the cycle of inequality perpetuation through the parental transmission of inequality attributions. Across studies, controllable dispositional attributions were prevalent among parents and children, and led to higher rates of inequality perpetuation in children. Along the lines of previous research indicating that exposure to structural attributions can increase inequality-reducing behavior in adults, it may be prudent for researchers to consider implementing attribution interventions with both parents and children. If we encourage children to consider these types of explanations for inequality, we might be able to reduce inequality-perpetuating behavior and encourage children to pass on these beliefs when they become parents themselves.

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Appendix A. Supplementary data

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