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Running Head: Economic Inequality and Prosociality

The effect of economic inequality on young children's prosocial decision making

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Key words: Economic inequality, prosocial behaviour, altruism, fairness, child development

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Author contributions

KK and MN developed the study aim, experimental paradigm and methodology. KK

collected all data. Data was analysed by KK and MN, and interpreted by JJ, MN and KK.

KK, MN and JJ drafted and edited the manuscript, with all contributing authors approving the final version of the submitted article.

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Ethical approval

All methodological procedures used in the current study have been approved by an institutional review board, in accordance with the ethical standards dictated by the World Medical Association Declaration of Helsinki.

Declaration of Interest

The authors declare no conflict of interest regarding the publication of this study. There are no financial or personal relationships with any individuals or organizations that could inappropriately influence this work. This research did not receive any specific grant from funding agencies in the public, commercial, or non-for-profit sectors.

Data availability

Data will be made fully available upon request. Any requests for de-identified raw data and analysis scripts can be sent to the lead author at kelly.kirkland@uqconnect.edu.au.

Abstract

A growing body of literature has documented negative implications of high economic inequality on prosocial behaviour. However, little research has addressed how wealth discrepancies impact the way children treat others. The current study aimed to address the implications of economic inequality on prosocial decision making in four-year-old children. Using a novel experimental paradigm, we immersed children ($N = 58$) in a series of games where they played against puppets for rewards. During this process, children were exposed to resource allocations of either high inequality or low inequality. Several dependent measures were taken including donation behaviour, resource division behaviour and fairness perceptions. As predicted, children were less altruistic when exposed to high inequality compared to low inequality. Contrary to predictions, there was no difference in resource division behaviour or fairness perceptions. This is the first study to demonstrate that young children's prosocial decision-making can be influenced by environmental inequality.

Running Head: Economic Inequality and Prosociality

The effect of economic inequality on young children's prosocial decision making

Abstract

An emerging body of literature has documented the negative implications high economic inequality can have on children's social and cognitive development. However, little experimental research has directly addressed how wealth discrepancies impact the way children treat others. The current study thus aimed to address the implications of economic inequality on prosocial decision making in children prior to commencing formal schooling. Using a novel experimental paradigm, we immersed 4-year-old children ($N = 58$) in a series of games where they played against puppets for rewards. During this process, children were exposed to resource allocations featuring either high inequality or low inequality. We subsequently measured children's donation behaviour, resource division behaviour and fairness perceptions. As predicted, children were less altruistic when exposed to high inequality compared to low inequality. Contrary to predictions, there was no difference in resource division behaviour or fairness perceptions. This study documents for the first time that exposure to environmental inequality, even if brief and in a controlled experimental setting, can influence young children's prosocial decision making.

Key words: Economic inequality, prosocial behaviour, altruism, fairness, child development

Economic inequality, a matter of increasing global concern, exists when a majority of wealth is concentrated in a minority of the population (Wilkinson & Pickett, 2009). In developed nations, high economic inequality has been shown to negatively influence a raft of social and health outcomes (e.g., Babones, 2007; Wilkinson & Pickett, 2009), as well as prosocial behaviours (Côté, House & Willer, 2015; Nishi, Shirado, Rand & Christakis, 2015;

Sands, 2017). For example, Côté et al. (2015) linked high state income inequality in the U.S. in high income respondents to reduced altruistic behaviour. Further links have been revealed between high inequality and decreased prosocial behaviour including lower support for redistribution (Sands, 2017), and reduced cooperation in economic games (Nishi et al., 2015).

Research into the impact of inequality on behaviour and attitudes to others has focused primarily on adults, with few research endeavours devoted to understanding how economic inequality might impact prosociality in children. This represents an important gap in our understanding. Childhood is a period of great neuroplasticity and many cognitive behaviours are laid down during this period (Kolb & Gibb, 2011). Notably, deprived economic environments can have marked impacts on childhood development (e.g., Rijlaarsdam et al., 2013), and these effects can impact later adult cognition. Although not yet confirmed, unequal economic environments may have similar lasting effects on children's cognition. Further, research focuses mainly on understanding the perceptions and effects of high inequality on pre-adolescents and adolescents (e.g., Arsenio & Willems, 2017; Rivenbark et al., 2019; Roy, Raver, Masucci & DeJoseph, 2019). However, Ruck, Mistry and Flanagan (2019) have noted that this focus on older children rests on an assumption that younger children do not perceive the inequality in their environment; an assumption that remains largely untested.

To date, developmental research has instead focussed on young children's developing understanding of fairness. In children and adults, perceptions about inequality are heavily influenced by notions of fairness (Starmans, Sheskin & Bloom, 2017). An accumulating body of evidence suggests that relatively complex fairness judgments surrounding merit and need begin forming at three years of age (Baumard, Mascaro & Chevallier, 2012; Malti et al., 2016). However, merit and need are not always evident in young children's resource division behaviour (Rizzo & Killen, 2016), a phenomenon referred to as the knowledge-behaviour gap (Blake, McAuliffe & Warneken, 2014). When equality is an option, preschool aged children will choose to be egalitarian (i.e., the 'equality bias'), but will distribute resources in accordance to merit when prompted (Baumard et al., 2012). Pre-schoolers also appear to be constrained by self-interest (Green, Kirby & Nielsen, 2018), and will reject situations of inequality when they are disadvantaged, but not advantaged (Blake & McAuliffe, 2011). However, as children approach the middle childhood years, they learn to prioritise merit over equality (Rizzo & Killen, 2016), as well as others over the self (Blake & McAuliffe, 2011). However, it's important to note the concern for merit appears to develop in W.E.I.R.D. (i.e.,

Western, Educated, Industrialised, Rich, Democratic) cultures only (Schäfer, Haun & Tomasello, 2015).

The limited experimental research charting how inequality influences children's perception, cognition and behaviour has mostly assessed older children's reactions to situations of dyadic inequality (e.g., Barreiro, Arsenio & Wainryb, 2019; Elenbaas, 2017; Elenbaas, 2019). However, the psychological experience of dyadic inequality is likely to be different from the contexts that are typically studied in research on economic inequality; where inequality refers to the gap between the poorest and the wealthiest individuals in a broader social context (see Wilkinson & Pickett, 2009). Prevailing paradigms also tend to emphasise children's perceptions of inequality rather than testing their behavioural responses to unequal outcomes (e.g., Barreiro et al., 2019; Elenbaas, 2019). This potentially yields an incomplete picture of development, particularly with young children where judgments frequently misalign with behaviour and relying exclusively on verbal reports can be misleading (e.g., Blake, 2018; Blake, McAuliffe & Warneken, 2014). Research efforts are thus needed that: (1) target young children (to ensure deeper understanding of the ways economic inequality impacts the developing mind); (2) move away from evaluating dyadic interactions towards contexts that better mimic societal inequality; and (3) rely on behavioural reactions rather than probing verbal perceptions of inequality (to cater for immature expression abilities). Thus, our aim in the current research was to create an experimentally controlled and minimally invasive design that could effectively immerse children in an economically unequal environment. Specifically, we aimed to chart how the experience of economic inequality influences young children's prosocial behaviour.

Understanding how inequality impacts prosocial behaviour is fundamentally important. The primary remedy to high economic inequality is through redistribution by means of welfare, tax or universal basic income. Support for redistribution can be a prosocial process, where supportive individuals often forgo their own immediate interests to contribute to the welfare of the group. However, and somewhat ironically, exposure to high inequality results in lower support for redistribution (Sands, 2017). Thus, understanding how and when inequality alters prosociality is one of many necessary steps to remedying high inequality.

To this end, we present a novel experimental paradigm designed to effectively and safely immerse children in an economic system that can be easily varied in degree of inequality. We examined children aged four- to five-years as this is a period where children first possess an implicit understanding of inequity (Baumard et al., 2012; Malti et al., 2016) and cues to wealth can guide their behaviour (Shutts, Brey, Dornbusch, Slywotzky & Olson,

2016). Children engaged in games with puppets where each accrued tokens over time. Children's absolute number of tokens and relative position amongst the puppets remained the same across conditions. That is, children are always middle earners. However, the overall distribution of tokens allocated to the puppets represented situations of either high or low inequality. After the games, children exchanged their tokens for stickers and were administered tasks measuring altruistic donations, resource division behaviour when given the option to distribute additional tokens to puppets and perceptions of how fair the game was.

We build on research findings showing that greater inequality creates a more competitive environment (Krupp & Cook, 2018; Sanchez-Rodriguez, Willis, Jetten & Rodriguez-Bailon, 2018). As children are known to be less prosocial in the face of competition (Pappert, Williams & Moore, 2017), we hypothesised that children experiencing high inequality would donate fewer resources in comparison to children exposed to low inequality. We further anticipated that a conceptual and implicit understanding of merit (Baumard et al., 2012; Blake et al., 2014; Rizzo & Killen, 2016) would result in children perceiving the game to be less fair in the high inequality condition compared to the low inequality condition. We further anticipated that children's resource division behaviour would reflect this; greater numbers of children would give tokens to low earning puppets in the high inequality condition compared to the low inequality condition.

Method

Summary

Four- to five-year-old children were told they were to play a series of games with six puppets. Children were also told they and the puppets would receive a number of tokens for playing these games which would be later exchanged for stickers. Throughout the games, children and puppets accrued tokens. Children were exposed to outcomes of the token allocation that were characterised by either 1) high inequality, or 2) low inequality. In both conditions, children were middle earners and received 14 tokens. At the conclusion of the games, children were presented with a number of questions that constituted our dependent variables. First, children were asked if they wanted to donate any of their stickers to a poor child. Second, children were asked to give six extra tokens to the puppets. Finally, children were asked about how fair they perceived the game to be.

Participants

Fifty-eight children (31 female; $M_{\text{age}} = 54.7$ months, $SD_{\text{age}} = 3.4$ months), aged between 49 and 60 months, were included in the final sample. Seven additional children

participated but did not contribute data: three were used to pilot the methodology, three for not attending to at least 75% of the games and one for displaying a lack of interest in the sticker rewards. While the current design is novel, prior research exploring related effects revealed a large effect size (i.e., Pappert et al., 2017). Thus, a power analysis revealed that a sample size of 52 was required to detect a large effect ($d = .80$) with 80% accuracy ($\alpha = 0.05$). We aimed to test this number at minimum (i.e., 52) and continued until we tested all available children whose parents indicated a willingness to participate to increase power. The data was not examined at any stage prior to the conclusion of data collection.

Demographic variables. A number of demographic variables were taken from caregivers via a questionnaire. As an objective measure of SES, primary and secondary caregiver education levels were recorded (Singh-Manoux, Adler & Marmot, 2003) and were categorised as completion of high school, a trade, undergraduate degree or postgraduate degree. The MacArthur Scale of Subjective Social Status was utilised to measure where parents perceived their family would fit into society relative to others (Adler et al., 2008), and was rated on a scale of one (worst off) to ten (best off). Further, the ethnic background of children and their caregivers was recorded. Finally, the home suburb of children was also taken to gauge the degree of inequality children were surrounded by in their day-to-day life. The suburb corresponds to Statistical Local Area (SLA) codes in Australia, and these were used to retrieve the 2011 Gini index (i.e., a common measure of inequality) of children's immediate environment (Australian Bureau of Statistics, 2013; Fleming & Measham, 2015).

All participants were recruited from a database at a large, urban university. Of all caregivers, 28% had finished high school or completed a trade, 45% had an undergraduate degree and 32% had a postgraduate degree. Sixty-seven percent of caregivers reported children's ethnicity as Australian or New Zealand, 23% were North-West European, 5% were South-East Asian and 5% as other (Southern or Eastern Europe, North-East Asian and Peoples of the Americas). Parent's subjective rating of their position in society relative to others largely fell into middle to upper class ratings ($M_{\text{subjectiveSES}} = 7.16$, $SD_{\text{subjectiveSES}} = 1.25$), with a range of inequality indices in the children's home suburb ($M_{\text{GiniIndex}} = 0.37$, $SD_{\text{GiniIndex}} = 0.03$).

Apparatus

Game phase. The experimental room contained a cushion for children to sit between two planks of wood at a 45-degree angle (see Figure 1). Each plank had three perpendicular

sticks which each held one of six different animal puppets (position relative to children was counterbalanced). Next to each puppet was a clear plastic tube, and separate small plank of wood with a clear tube sat in front of children. Behind the experimenter was a table covered with a black sheet with two different sheets of stickers on top and a laptop displaying the words ‘Ready?’. A camera was set up in the far corner to record each session. We used puppets rather than human actors for several reasons: (1) it is logistically challenging and resource intensive to use the latter; and (2) children’s social anxieties and potential prejudices are easier to manage when large numbers of adults are not present.

A wooden box with a tube attached to the lid was positioned in front of participants as well along with a wooden stick placed in the tube (see Figure 2). This box was utilised for a series of games involving: (1) placing the stick inside the tube, (2) tapping on the box with the wooden stick, (3) placing the stick inside the box and taking it out again, and (4) tracing around the edge of the box with the stick. An opaque bucket was placed to the side of the room containing 106 checker style tokens; where 100 tokens were used during the games and six tokens were left for the resource division task. A clicker was also hidden in this box and was connected via USB to the laptop, allowing the experimenter to move along pre-set PowerPoint slides displaying a number of tokens per slide. Two versions of these PowerPoint slides were created to reflect the condition differences (i.e., high and low inequality) in the number of tokens allocated.

Under the black sheet on the table were a number of hidden items. There were two small containers with each holding fourteen individual stickers from the respective sticker sheets on top of the table. For the altruistic donation task, there was an image of a ‘sad’ Caucasian child (sex-matched to participants), as well as a white box with a slot on the lid for donations and a small plastic bag labelled with children’s names (see Figure 3). Further, for the explicit fairness task, there was a piece of paper with five simple drawings of faces in the following order: very sad, slightly sad, neutral, slightly happy, and very happy (see Figure 4).

Procedure

Game phase. Prior to arrival, children were randomly allocated to the high or low inequality condition using a random number generator. Upon arrival, children played in a warm-up room with the experimenter while their caregiver completed a consent form. Once children were sufficiently comfortable with the experimenter, they and their caregivers were taken to another room where the experiment was conducted. When children were seated, they were shown two sheets of stickers and asked to choose which was their favorite. These were put aside to be used as rewards in the games. The experimenter then introduced children to

202 each puppet and stated the following:

203 “Today we are going to play some games and we are going to play it with these
 204 puppets. All of you will get to play four little games. We will start here with
 205 game one (point to first puppet) and <first puppet name> will have a go first,
 206 then <second puppet name> will go, then <third puppet name> and then it
 207 will be your turn. Then <fourth puppet name> will go, then <fifth puppet
 208 name>, then <sixth puppet name>. And then we will start again with <first
 209 puppet name> for game two. After each game, a number will show up on this
 210 computer screen here. If that screen says ‘two’, you will get two tokens in your
 211 tube. At the end of each game, you will get to swap over however many tokens
 212 you have for those stickers you liked. So if you get 10 tokens, how many stickers
 213 will you get? (Child responds). Correct! There is a judge watching through that
 214 camera and they will decide how many tokens you all get after each game and
 215 they control this computer. I am going to call them to check they can see
 216 everything. (Experimenter picks up a phone and pretends to use it). Hello? It’s
 217 <experimenter name>. Can you see <child’s name> and everyone else? Great,
 218 we’ll get started (hang up phone). Okay great – the judge can see and we’re
 219 ready to go!”

220 The games then began with the first of four games. Children were provided the following
 221 instructions (order of games counterbalanced across children):

222 “For game <game number>, we are going to use this stick and this box. You have
 223 to <specific game instructions> for five seconds (experimenter demonstrates
 224 game). I will time five seconds with my stopwatch and tell you when to start and
 225 stop. Do you know how to play? (Children respond). Okay we are going to start
 226 with <puppet one name>.”

227 In a counterbalanced order, four small games were employed with the following
 228 specific instructions: 1) “... push the stick inside this tube over and over”, 2) “... tap on
 229 top of this box with the stick over and over”, 3) “... place the stick inside the box and
 230 take it out again over and over”, and 4) “... trace around the edge of the box with this
 231 stick over and over.”

232 At the beginning of each game, the experimenter picked up Puppet 1 and played the

game acting as the puppet. After the game was played, the experimenter surreptitiously used the clicker to move along the PowerPoint in a subtle fashion to convince children the computer was controlled by ‘the judge’. The experimenter awarded the specified number of tokens (as shown on the PowerPoint slide) to each individual by placing the tokens in their designated tube. Importantly, there was no obvious relationship between puppet behaviour (i.e., degree of effort or skill) and outcome (i.e., number of tokens received). The outcome was thus causally opaque and non-meritocratic across conditions. In many developed nations, and particularly those with high economic inequality, outcomes are rarely perfectly meritocratic (e.g., Shierholz, Mishel, Bivens & Gould, 2012; Wilkinson & Pickett, 2009). Thus, we created an environment to reflect such societies. The token division was also designed to ensure children received the same absolute number of tokens (i.e., 14) and position relative to puppets (i.e., fourth place of seven) across conditions (see Figure 5). Children also received the same number of tokens per game (i.e., four, five, three, two). Children were thus middle earners across both circumstances as this provides a clear and controlled method of measuring the role of unequal environments. Thus, the conditions differed in the extent of inequality (i.e., high inequality, low inequality) between the puppets. See Appendix A for further details on the exact numbers of tokens divided per game, per condition.

At the conclusion of the games, children were told to look carefully at how many tokens each player had received. Children’s tokens were then taken out of their tube and all fourteen were counted. Fourteen of the desired stickers were retrieved from under the table and were also counted in front of the children before the dependent variables were administered.

Altruistic donation. We designed the following measure of altruism to best mirror real-world charitable giving. Children were shown the sex-matched image of a child (Sarah or Sam) as well as a white box and plastic bag. The following instructions (female version) were then given:

“This is a picture of a girl called Sarah. Sarah is from a country called Turbekistine. In her country, they don’t have any stickers at all, but Sarah really likes stickers. I was wondering if you might want to give some of your stickers to Sarah? I have a box here and this is Sarah’s sticker box. Any stickers anyone might want to give to her goes in this slot here in this box and I send those away

to Sarah. I also have a bag here with your name on it. Any stickers you want to keep and take home can go in this bag.”

The experimenter then asked caregivers to complete a demographic form while children participated to alleviate any pressure to act prosocially. The experimenter left the room and gave children 30 seconds to complete the task, followed by a further 30 seconds if necessary.

Resource division. A third-party resource division task was created as a proxy measure for redistributive behaviour. The experimenter told children:

“I’ve just found six extra tokens and I think we should give them out to the puppets but I’m not sure who we should give them to – so I was wondering if you might help me out. You could give everyone one each; you could give more tokens to just a few puppets – it’s up to you!”.

Children were then handed six tokens to complete the task.

Fairness. Previous literature suggests that fairness concerns are central to perceptions of inequality (Starmans et al., 2017). The following explicit and implicit measure were created to tap this construct. Firstly, children’s explicit understanding of fairness was measured by showing a five-point Likert scale with smiley faces measuring very fair, a little fair, unsure, a little unfair and very unfair (see Fig. 4). Children were asked “Did you think the game we played today was fair or unfair”. Children were then shown five faces i.e., very happy, slightly happy, neutral, slightly sad, and very sad, and the experimenter asked if they believed the game was “very fair, a little fair, they don’t know, a little unfair or really unfair”, while pointing to the respective faces. Likert scales have been used effectively with young children’s evaluations (Elenbaas, Rizzo, Cooley & Killen, 2016), and were an exploratory addition to the study.

Children’s implicit understandings of fairness were measured with the following question: “Which puppet do you think tried the hardest in the games today?”. This was included to evaluate whether children thought the task was based on merit; that is, do children think the outcome (i.e., tokens achieved) matched effort (i.e., how hard everyone tried)? For example, if children indicated the puppet with the highest number of tokens tried the hardest, it would suggest they believed the reward allocations of the games were meritocratic.

Coding

Children's altruistic behaviour was coded according to the number of earned stickers they donated: 0 (least altruistic) to 14 (most altruistic). Resource division behaviour was coded as: a) equal split between puppets, b) more tokens given to three puppets receiving lowest number of tokens, c) more tokens given to three puppets receiving highest number of tokens, and d) unidentifiable pattern. Explicit fairness was coded 1 (really unfair) to 5 (really fair). Implicit fairness was coded 1 (puppet receiving most tokens) to 6 (puppet receiving fewest tokens).

Results

A number of analyses were run to determine the effectiveness of random assignment to conditions. Pearson Chi-Square tests revealed no significant difference in sex ($X^2[1, N = 58] = 0.07, p = .792$) and ethnicity ($X^2[2, N = 51] = 0.34, p = .843$) between the high ($n = 28$) and low inequality ($n = 29$) conditions. Independent samples T-tests revealed no significant difference between conditions based on age ($t[56] = -0.74, p = .465$) and parent education ($t[53] = -0.76, p = .449$). However, the Gini coefficients were significantly higher in the low inequality condition ($M = 0.38, 95\% \text{ CI } [0.37, 0.39]$) compared to the high inequality condition ($M = 0.36, 95\% \text{ CI } [0.35, 0.37]$), $t(56) = -2.42, p = .019$. Further, the subjective SES ratings were significantly higher in the low inequality condition ($M = 7.55, 95\% \text{ CI } [7.07, 8.03]$) compared to the high inequality condition ($M = 6.75, 95\% \text{ CI } [6.32, 7.18]$), $t(55) = -2.53, p = .014$. Although these condition differences were small, where possible, we entered the Gini coefficient and subjective SES ratings as covariates in future test analyses.

Altruistic Donations

The focal dependent variable was donation behaviour towards the fictional child who lacked stickers (a desired resource the participating children had an excess of). To determine whether altruistic donations differed based on conditions, a univariate Analysis of Variance (ANOVA) was conducted, with subjective SES and Gini coefficient entered as covariates. The test revealed children donated significantly fewer stickers in the high inequality condition ($M = 4.25, 95\% \text{ CI } [2.88, 5.62]$) compared to the low inequality condition ($M = 6.14, 95\% \text{ CI } [4.98, 7.30]$), $F(1, 56) = 5.69, p = .021, d = 0.63$. A notable pattern can be witnessed in the raw data (see Figure 6), where the mode donation rate in the high inequality condition was zero stickers ($n = 8$), compared to seven stickers ($n = 8$) in the low inequality condition. There were no significant correlations observed for children's donation rates with Gini indices ($p = .968$), Subjective SES ($p = .807$), and caregiver education levels ($p = .666$).

Resource Division Behaviour

Due to statistical constraints, we analysed whether children's type of resource division behaviour differed per condition without accounting for subjective SES and the Gini coefficient, while acknowledging potential limitations of this. A Pearson Chi-Square analysis revealed no significant difference in resource division behaviour type per condition (see Figure 7), $X^2(3, N = 58) = 4.67, p = .198$.

Fairness Concerns

To account for the Gini coefficient and subjective SES, an ordinal logistic regression analysis was conducted on explicit fairness scores per condition. The results revealed no significant difference between conditions, $X^2(159, N = 56) = 168.58, p = .286$. An ordinal logistic regression analysis was also run on implicit fairness scores by condition, accounting for the Gini coefficient and subjective SES scores (see Figure 8). Analyses revealed no significant difference between conditions on implicit fairness scores, $X^2(267, N = 56) = 278.85, p = .297$.

Discussion

Many children are surrounded by a few who have much, and many more who have little. Do such environments heighten prosocial proclivities or dampen them? The findings of the current experiment suggest the latter. In a controlled, minimally-invasive and short-term impact environment, children were given the opportunity to donate a resource they had an excess of. As hypothesised, children who had been subjected to high inequality chose to give less stickers to a child in need than those exposed to low inequality. While there were many individual differences in children's donation behaviour, it is notable that the mode donation rate in the high inequality condition was zero stickers. In contrast, the mode donation rate in the low inequality condition was half of the stickers children earned (i.e., seven stickers).

This contrast in donation rates may be because experiencing high inequality conjures a competitive environment, which inherently inhibits cooperation. In this light, children and adults are known to be less prosocial in the face of competition (Cardador & Wrzesniewski, 2014; Pappert et al., 2017). It is also possible that children were less altruistic in the high inequality condition as a reaction to being personally, relatively disadvantaged. While children came fourth place out of seven, and earned the same amount of tokens in both conditions, there was a more distinct gap in the high inequality condition between the top three puppets and children.

Indeed, four-year-old children are sensitive to being at a relative disadvantage (Blake et al., 2014; Sheskin, Bloom & Wynn, 2014). However, the difference in relative disadvantage between conditions is a natural facet of high versus low inequality. By

definition, high inequality creates greater gaps in wealth and places a majority of individuals at a relative disadvantage. These gaps between individuals are thought to enhance upwards comparisons, and are known to influence an array of behaviours (e.g., Jetten, Mols & Postmes, 2015; Payne, Brown-Iannuzzi & Hannay, 2017; Wilkinson & Pickett, 2009). For example, high inequality makes an individual feel less wealthy in comparison to low inequality (Sanchez-Rodriguez, Jetten, Willis & Rodriguez-Bailon, 2019). Whether high inequality results in feelings of heightened competitiveness, a greater sensitivity to relative position or an interplay of both, is an empirical question. Deeper understanding of the role played by experiences of disadvantage will come from future studies that alter children's position relative to others (e.g., to be high or low earners) in high inequality environments. Future research can also manipulate the degree of competitiveness children are exposed to.

For the resource division task, contrary to hypothesis, there were no condition-based differences in children's attempts to rectify inequalities. This result is consistent with prior findings regarding young children's behavioural 'equality bias' (Rizzo & Killen, 2016), with children here largely favoring an even split of resources (i.e., one for all) irrespective of the puppets' performances. This finding is in line with the notion that meritocratic resource division is often suppressed in preschool-aged children when equality is an option (Baumard et al., 2012). This equality preference may reflect preschoolers sensitivity to novel social norms and the ways they adjust their behaviour accordingly (Rakoczy & Schmidt, 2013). In the current design, children may have inferred that, depending on condition, unequal or equal allocations of resources was the norm in this context. Due to this, children may not have seen the resource allocation in a negative light and therefore did not give to the poor puppets to adjust the outcomes. However, research suggests that cultural and social norms have the greatest degree of influence on children's prosocial behaviour (House et al., 2020; House et al., 2013; House & Tomasello, 2018) and resource allocation in the face of inequality (Blake et al., 2015) in the middle childhood period. From this, one may predict that older children, because they are more strongly influenced by societal norms than younger children, may prioritise the norms they have internalised (i.e., give to the poor) rather than those inferred from the game structure.

Similarly, children's evaluations of fairness did not differ between conditions. For the explicit measure, most children perceived the game to be 'very fair' by pointing to the happiest face. Children may indeed have thought both conditions were fair. However, anecdotally at least, such supposition is inconsistent with comments children made during the game, where they frequently protested at the discrepant rates in the high inequality condition.

We thus suspect the word ‘fair’ was misconstrued with ‘fun’. Verbal reports were in line with this explanation (e.g., many children said “I thought the game was really fun” while pointing to the happy face). For the implicit measure, children suggested the more effortful individuals were the puppets with the wealthier outcomes, despite there being no clear correlation between effort and outcome. This implies that early meritocratic judgments place greater emphasis on outcomes (i.e., the number of tokens received) over processes (i.e., effort or skill). This is consistent with findings that, while seven- to ten-year-olds prioritise effort over output, three- to six-year-olds do the opposite (Noh, 2017). It is also possible that the children we tested misremembered what had taken place or held a blind trust in authority figures, and hence perceived the reward assignment to be meritocratic. Future research is needed to test which of these explanations holds greatest validity.

The results presented here provide intriguing insights into children’s behaviour. Nonetheless, we advise some caution in interpretation as we cannot be certain whether exposure to high inequality lowers children’s altruistic behaviour, or low inequality heightens children’s donation rates. Further, due to practical constraints, the current study disproportionately represented children of parents from middle to upper class backgrounds. This is not a marked point of concern, however, as prior research suggests SES does not impact children’s donation rates until age nine (Benenson, Pascoe & Radmore, 2007). The current study also had limited ethnic diversity, consistent with a majority of developmental literature (Nielsen, Haun, Kärtner & Legare, 2017). Cross-cultural studies have revealed striking differences in the development of fairness concerns (Blake et al., 2015) and prosocial behaviour (Cowell et al., 2017), and suggest there may be cultural discrepancies in how children react to the current paradigm. This presents itself as a topic for future study.

Our novel experimental paradigm also offers considerable benefits for future research. The current design generates a salient and externally valid manipulation of environmental inequality through persistent exposure and the use of multiple individuals. Importantly, a wide variety of economic circumstances can be created in future studies in a safe and highly controlled manner. For example, the paradigm could be manipulated such that children experience meritocratic, non-meritocratic and windfall gains, more explicit information regarding the inequality or a change in their relative position vis-à-vis the puppets amongst others. Further, the current study can be extended to examine how children react to and experience inequality as they age, and this is a vital direction for future work. Finally, this design also has potential to extend beyond understanding prosocial decision-making in

environments of inequality to other key developmental domains such as empathy, theory of mind and moral development.

This research adds to studies demonstrating the detrimental effects of high wealth discrepancies on human behaviour (Wilkinson & Pickett, 2009), and is the first experimental evidence demonstrating the implications of economic inequality on children's prosocial decision-making. We document how briefly exposing four-year-old children to high economic inequality reduces their altruistic behaviour compared to situations of low economic inequality. Critically, this happened in a controlled, experimental environment in which children's experiences were short-term and devoid of any sustained emotional impact. Though a matter for future empirical concern, it can be reasonably expected that the influence of economic inequality on children's prosocial tendencies in the 'real-world' will not only reflect our findings but be more pronounced. The current findings may also inform interventions; children appear to be negatively influenced by inequality in the early pre-school years. This suggests that interventions aimed at promoting an understanding of the origins and effects of inequality may be more effective when targeting this younger age group. Income inequality within many countries has increased dramatically since the 1970s (e.g., Niño-Zarazúa, Roope & Tarp, 2017), and calls continue for sustained attempts to redress this imbalance in our communities. The research reported here highlights the importance of not only doing so, but of combatting the impact experiencing inequality can have on the developing minds of our children.

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Figure 1

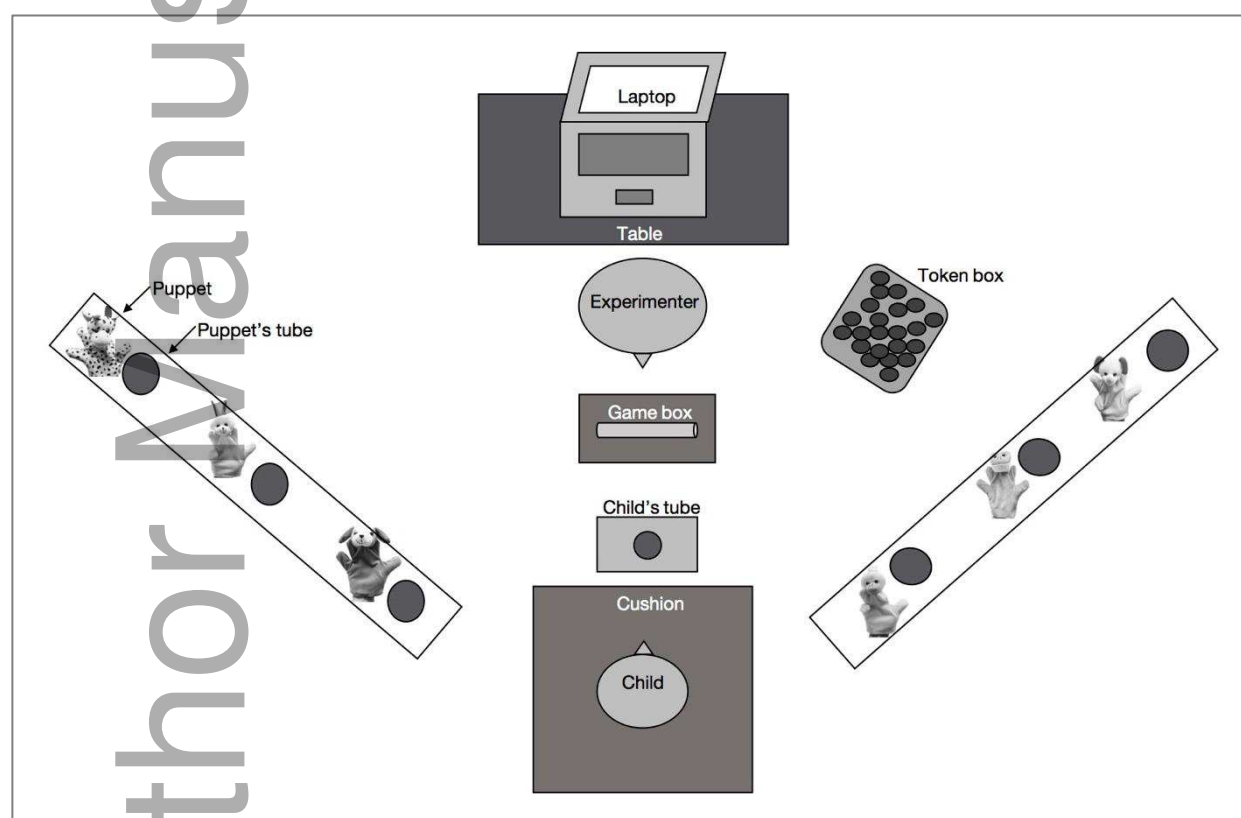


Figure 1. Bird's eye view of experimental room.

Figure 2

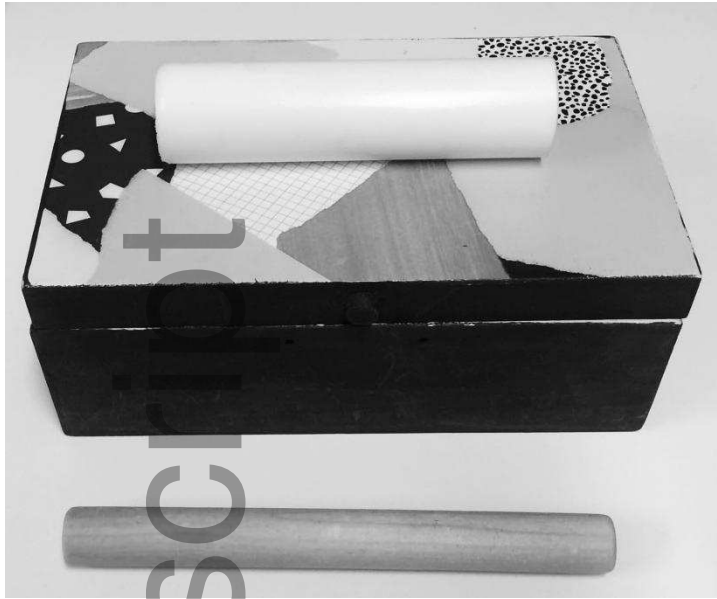


Figure 2. Game phase apparatus.

Figure 3



Figure 3. Altruistic donation materials.

Figure 4

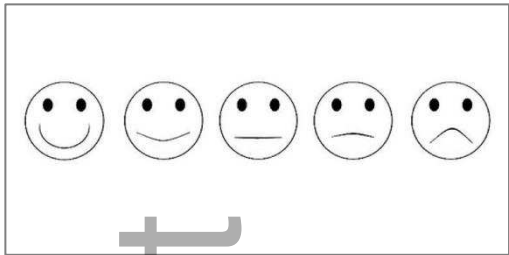


Figure 4. Explicit fairness scale.

Figure 5

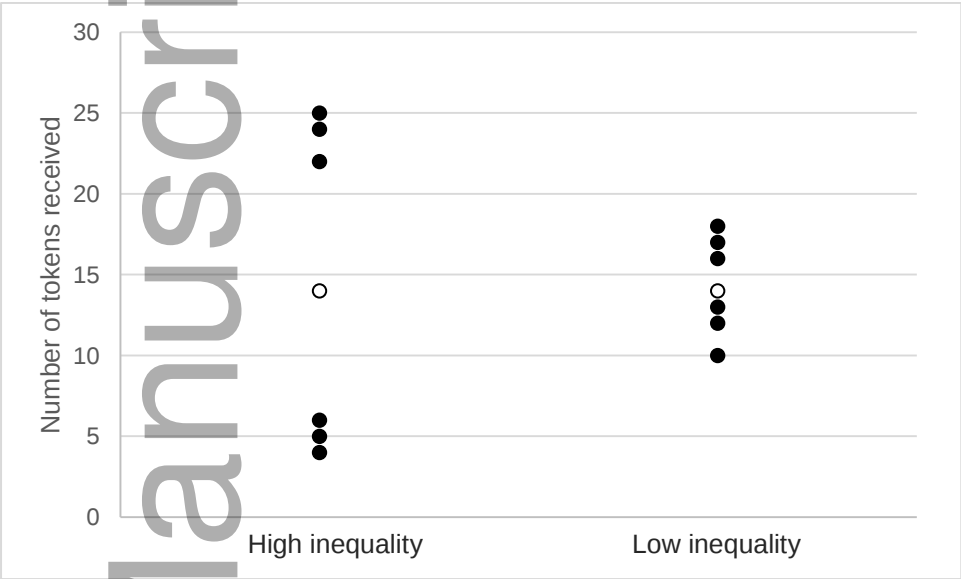


Figure 5. Number of tokens received by each player per condition (puppets: black dots, children: white dots).

Figure 6

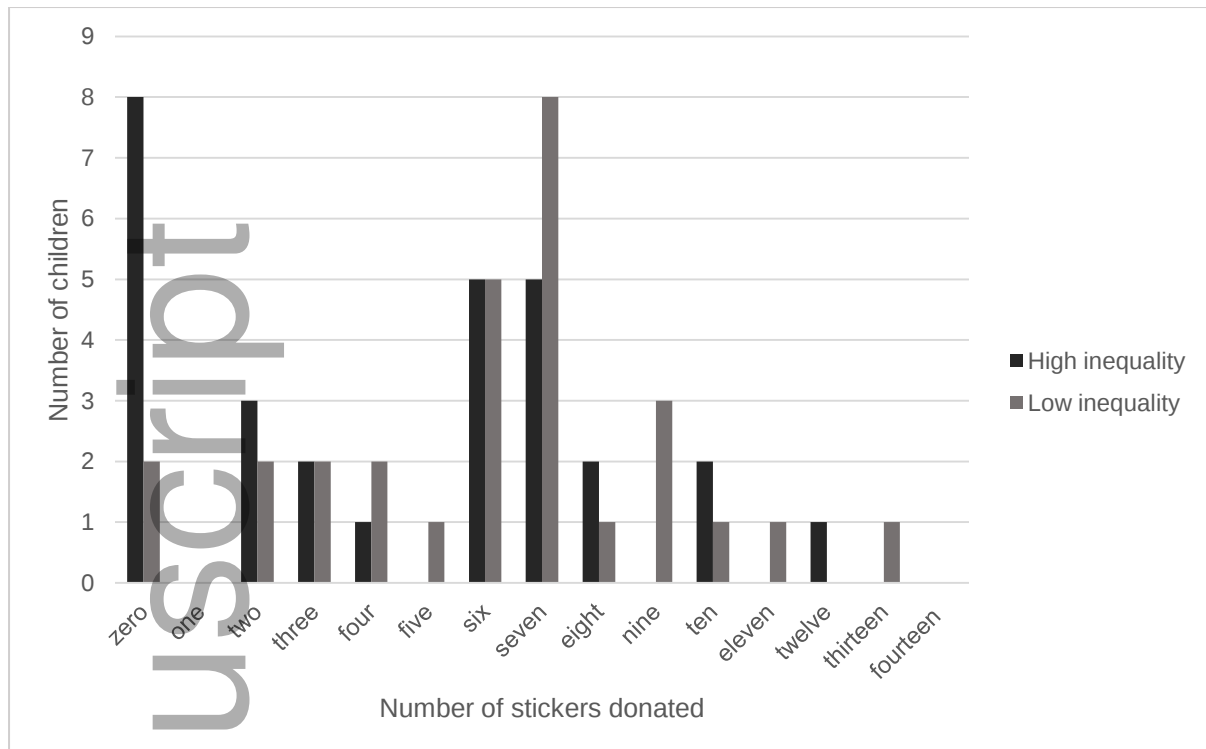


Figure 6. Children engaging in each number of donations per condition.

Figure 7

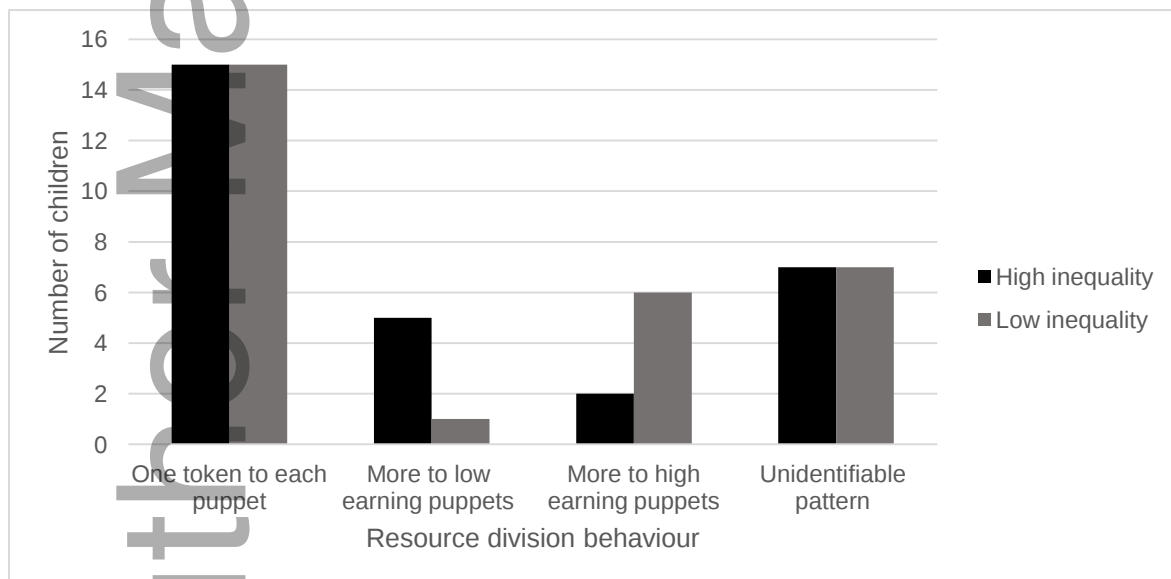


Figure 7. Number of children engaging in each category of resource division behaviour per condition.

Figure 8

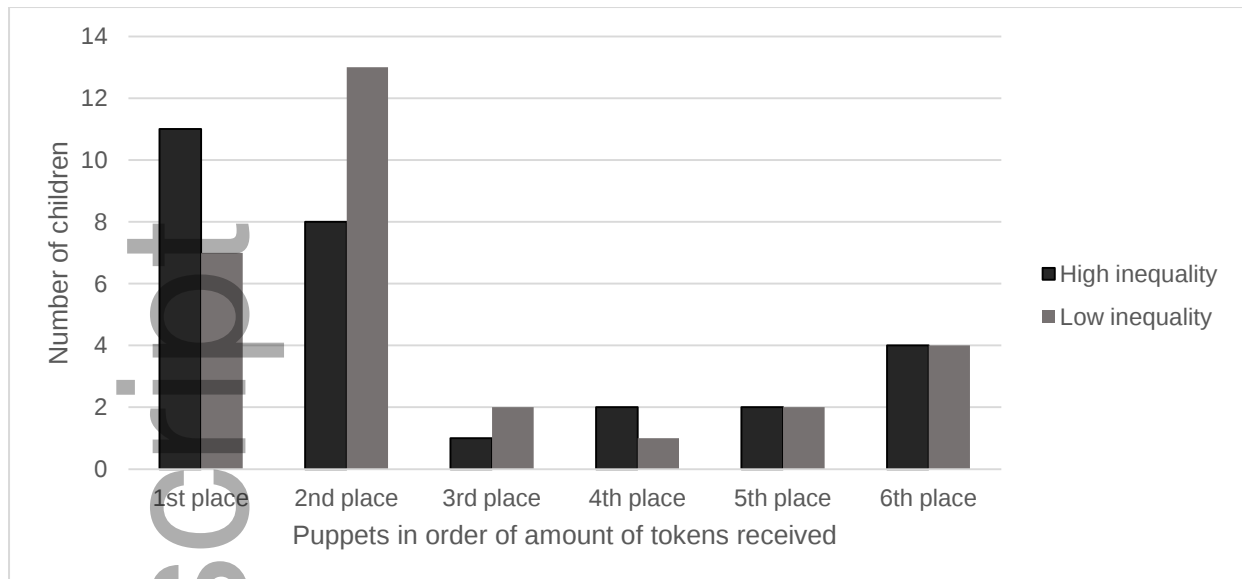


Figure 8. Children's perception of which puppet tried the hardest based on puppet outcome order per condition.