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Fairness and the Development of Inequality Acceptance

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Fairness considerations fundamentally affect human behavior, but our understanding of the nature and development of people's fairness preferences is limited. The dictator game has been the standard experimental design for studying fairness preferences, but it only captures a situation where there is broad agreement that fairness requires equality. In real life, people often disagree on what is fair because they disagree on whether individual achievements, luck, and efficiency considerations of what maximizes total benefits can justify inequalities. We modified the dictator game to capture these features and studied how inequality acceptance develops in adolescence. We found that as children enter adolescence, they increasingly view inequalities reflecting differences in individual achievements, but not luck, as fair, whereas efficiency considerations mainly play a role in late adolescence.

It is well documented that adult humans are motivated by fairness considerations and are willing to sacrifice personal gains in order to eliminate inequalities they view as unfair (1, 2). It is also evident from the political debate, surveys (3, 4), and economic experiments (5–7) that most adults view some inequalities as fair. In particular, most adults believe that differences in individual achievements (5–8) and efficiency considerations of what maximizes total benefits (9–11) may justify

an unequal distribution of income, but they disagree on whether inequalities reflecting luck are fair (7, 12).

To illustrate how efficiency and individual achievements may justify an unequal distribution of resources, consider two children, Anne and Carla, who discuss how to divide a cake. Anne appeals to efficiency when she argues that total benefits are maximized by giving her the largest share because she enjoys cake the most. Carla

appeals to individual achievements when she argues that she should have the largest share because her contribution to making the cake was the largest. The legitimacy of these, and other, fairness considerations has been extensively discussed in the philosophical literature (13–15), and such considerations are important for how people make decisions in a wide range of situations (16). For example, in the workplace, some may find it fair that a more productive colleague has a higher wage, and, in allocating public funds, some may find it fair to pay some attention to which projects produce the greatest total benefits for the population.

Disagreements over questions of fair distribution are fundamental in human life, and to get a better understanding of the sources of such disagreements, it is important to study how fairness views develop in childhood (17). The development of children's fairness views has been extensively studied in the psychological literature

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Table 1. Descriptive statistics (means ± SEM). Mean share given was calculated as the recipient's share of total income for the pair.

Share given and multiplier	Males in grade level (n)					Females in grade level (n)				
	5th (58)	7th (51)	9th (51)	11th (36)	13th (35)	5th (46)	7th (56)	9th (42)	11th (61)	13th (50)
(A) Share given in first part of experiment										
Share given	0.422	0.449	0.466	0.435	0.448	0.443	0.467	0.457	0.435	0.481
	±0.020	±0.017	±0.013	±0.027	±0.028	±0.022	±0.016	±0.014	±0.016	±0.018
(B) Share given in second part of experiment										
Share given (multiplier = 1)	0.371	0.382	0.443	0.282	0.366	0.438	0.402	0.455	0.372	0.423
	±0.031	±0.028	±0.021	±0.040	±0.038	±0.028	±0.025	±0.018	±0.024	±0.029
Share given (multiplier = 2)	0.400	0.418	0.500	0.429	0.470	0.397	0.425	0.472	0.396	0.442
	±0.035	±0.030	±0.019	±0.043	±0.033	±0.030	±0.024	±0.017	±0.025	±0.037
Share given (multiplier = 3)	0.418	0.430	0.510	0.495	0.496	0.418	0.426	0.482	0.396	0.491
	±0.037	±0.031	±0.022	±0.046	±0.047	±0.031	±0.025	±0.023	±0.032	±0.035
Share given (multiplier = 4)	0.408	0.435	0.562	0.507	0.536	0.451	0.415	0.483	0.413	0.501
	±0.037	±0.034	±0.022	±0.049	±0.046	±0.033	±0.025	±0.023	±0.032	±0.035

(18–23) and also, more recently, in the economic literature (24–28). It has been shown that, with age, young children tend to become less selfish in their reasoning (18, 19, 21, 23) and choices (20, 24, 25, 28), whereas the evidence for adolescents is more mixed (23, 25–27, 29). Furthermore, with age, children tend to move from a strict egalitarian view toward fairness views taking into account individual contributions and circumstances (17–21, 30).

There has, however, been little research on the development of two important features of adults' distributive behavior, namely that they distinguish between achievements and luck (7, 12) and take efficiency considerations into account (9–11). To study the development of these features, we conducted a computer-based experiment with children in 5th grade to 13th grade (31), where we used two versions of the dictator game. In the dictator game, the dictator is assigned an amount of money to distribute between him or herself and another person, and the total income of the two participants is unaffected by how the money is distributed. In such a situation, there is no apparent fairness argument justifying an unequal division of the money. In the first part of the experiment, we modified this design by introducing a production phase, such that the money to be distributed was earned and depended on individual achievements and luck. In the second part of the experiment, the dictator was given a number of points to distribute, and the distribution of points determined the income for each of the two participants. To introduce efficiency considerations, we made the points most valuable for the other participant, so that the dictator could maximize the total income of the two by giving away all the points.

The framework for our analysis assumes that children make a trade-off between two motives in their distributive choices, self-interest and fairness, and that they may differ both in their level of self-interest and in what they consider fair. By observing how the children chose in a series of different situations, where different fairness views to a varying degree justified giving money to the other participant, we established the importance of each of the fairness views at the different grade levels.

Before they started the first part of the experiment, the participants were given complete information about both the production phase and the distribution phase. The production phase lasted 45 min, and the participants could move between two Web sites. At a production site, the participants could collect points by ticking off every appearance of a particular number on a sequence of screens filled with different three-digit numbers. At an entertainment site, the participants could view short videos or pictures, read cartoons, or play computer games. The participants decided how much time they wanted to spend on each of the two sites. Most participants worked all the time on the production site (average time, 42 min), but this design made salient that production was the result of individual ability and choice of effort. After the production phase, the computer calculated how many points each participant had collected. The participants were then randomly assigned either a high price per point of 0.40 NOK (U.S. ~$0.08) or a low price per point of 0.20 NOK. This design introduced a distinction between two sources of inequality in earnings: production, reflecting individual achievements, and earnings, partly reflecting luck in the random draw of prices.

In the distribution phase, the participants were randomly matched in a sequence of pairs with participants at the same grade level. For each pair, the participants were given information about the time spent on the production site, the number of points collected, the price, and the earnings, and were then asked to choose how much of the total income (the sum of individual earnings for the pair) to take for themselves. Because average production increased with age, the average income to be distributed in each pair also increased with age (table S4).

The mean share given to the other participant in the first part of the experiment was very high, close to 45% for the whole sample, and there was no statistically significant difference in mean share given between 5th grade and 13th grade [(Table 1A), t test, unequal variance, $P = 0.460$ (males) and $P = 0.179$ (females)]. Hence, we did not find any evidence of a change in selfishness from mid-childhood to late adolescence (31). Moreover, we did not find any statistically significant differences in self-interest between males and females [(Table 1A), t test, unequal variance, $P = 0.481$ (5th grade), $P = 0.438$ (7th grade), $P = 0.621$ (9th grade), $P = 0.996$ (11th grade), and $P = 0.330$ (13th grade)].

We did, however, observe an increase with age in the acceptance of inequalities reflecting differences in production. The coefficient for share produced by the other participant, in a regression of share given, showed that older participants were much more likely to differentiate on the basis of individual achievements (Fig. 1A). The sharpest increase in the coefficient occurred from 5th grade to 7th grade, but there was also a further increase from 7th grade to 13th grade. There was a statistically significant difference between 5th grade and all other grades in the coefficient for share produced [multiple Wald tests of equality with Bonferroni adjustments, $P = 0.001$ (7th grade), $P = 0.001$ (9th grade), $P = 0.025$ (11th grade), and $P < 0.001$ (13th grade)], and between 7th grade and 13th grade (Wald test, $P = 0.034$). We observed the same developmental pattern for

Fig. 1. (**A**) The coefficient for the share produced by the other participant in a regression of share given on share produced. (**B**) The coefficient for the multiplier in a regression of share given on the multiplier. All regressions control for personal fixed effects (31). Confidence intervals (95%) are indicated.
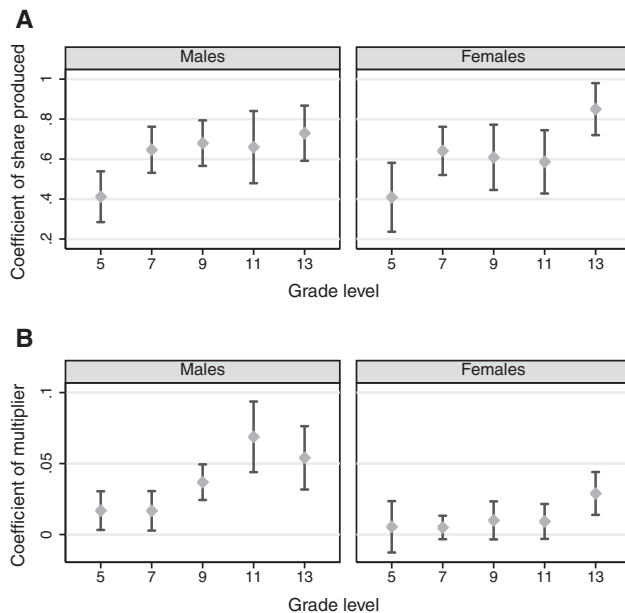

Table 2. Estimates of the choice model (estimate ± SE). The complete set of estimates is in table S3.

	Grade level					
	5th	**7th**	**9th**	**11th**	**13th**	**All**
Share of egalitarians	0.636 ±0.060	0.401 ±0.059	0.272 ±0.057	0.267 ±0.056	0.224 ±0.056	0.365 ±0.027
Share of meritocrats	0.054 ±0.037	0.220 ±0.054	0.363 ±0.063	0.396 ±0.069	0.428 ±0.075	0.287 ±0.028
Share of libertarians	0.310 ±0.057	0.379 ±0.055	0.364 ±0.061	0.337 ±0.059	0.347 ±0.069	0.348 ±0.026
Log likelihood	−827.4	−881.4	−797.6	−865.0	−790.3	−4219.7

both males and females; there were no statistically significant gender differences in the coefficient for share produced [Wald test, $P = 0.980$ (5th grade), $P = 0.949$ (7th grade), $P = 0.534$ (9th grade), $P = 0.571$ (11th grade), and $P = 0.214$ (13th grade)]. The coefficient for the relative price was also statistically significantly different from zero, but stable across grade levels and gender (31).

To further study the importance of production and price in explaining the observed behavior, we estimated a model of individual choices that captured the basic assumptions of our theoretical framework and allowed for some randomness in the participants' choices (31). Specifically, for each grade level, we estimated a distribution of the weight attached to fairness and the share of participants motivated by different fairness views. Informed by normative theory and our own previous work (7, 12), we assumed that there were three salient fairness views in this situation: strict egalitarianism (13), finding all inequalities unfair; meritocratism (32), justifying inequalities reflecting differences in production; and libertarianism (14), justifying all inequalities in earnings.

We found striking differences in the prevalence of fairness views between the grade levels (Table 2). The large majority of 5th graders were strict egalitarians, and, remarkably, there were almost no meritocrats at this grade level. In contrast, meritocratism was the dominant position in late adolescence, and the share of strict egalitarians fell dramatically. The share of libertarians was stable across grade levels. In sum, this analysis showed that, with age, individual achievements, measured by production, became increasingly important in children's fairness considerations, whereas there was no similar development in the importance of luck, measured by price.

The estimated choice model also confirmed our finding of no change in selfishness from mid-childhood to late adolescence; the estimated median weight attached to self-interest was stable across grade levels (table S3). Overall, the estimated model fit the data well for all grade levels (fig. S1).

In the second part of the experiment, we studied inequality acceptance in situations involving efficiency considerations. The participants were given the task of distributing a number of points, where total benefits (in terms of income) would be maximized by giving all the points to the other participant. Specifically, the participants were informed that they would receive 1 NOK for each point kept for themselves, whereas each point given away would earn the other participant 1 NOK scaled up by a multiplier. Each participant made choices in four distributional situations, presented in random order, where the multiplier was 1 (the baseline), 2, 3, and 4, respectively (31). Hence, efficiency considerations did not play any role in the baseline situation, but were increasingly salient in the other three situations. In each situation, the participants were randomly paired with another participant at the same grade level.

For comparability, we set the number of points to be distributed such that the average income in the baseline situation was equal to the session-specific average income in the first part of the experiment.

We observed that 5th graders and 7th graders did not assign much importance to efficiency considerations; the mean share given was only slightly higher when the points transferred were scaled up by four than in the baseline situation (Table 1B). In contrast, the effect of the multiplier was substantial for males in late adolescence and also noticeable for females in 13th grade. These patterns are reflected in the coefficient for the multiplier in a regression of share given (Fig. 1B). There was a statistically significant increase in the coefficient from 5th grade to 13th grade for both males and females [Wald test, $P = 0.003$ (males) and $P = 0.019$ (females)], which reflects that older participants were more likely to differentiate on the basis of efficiency considerations. This development, however, took place later in adolescence than the differentiation on the basis of individual achievements. Moreover, we observed a statistically significant difference between males and females from 9th grade, where efficiency considerations played a more important role for males than females [Wald test, $P = 0.316$ (5th grade), $P = 0.152$ (7th grade), $P = 0.005$ (9th grade), $P < 0.001$ (11th grade), and $P = 0.060$ (13th grade)].

Our analysis showed that children's level of self-interest was stable across adolescence, whereas their fairness views changed fundamentally in the same period. In particular, we found increased importance of the meritocratic fairness view, which requires a distinction between different sources of inequality. We did not, however, observe a uniform move away from the two less complex fairness views. Although there was a sharp decrease in the importance of the strict egalitarian fairness view, the prevalence of the libertarian fairness view was stable throughout adolescence. These findings shed some light on the role of both cognitive maturation and social experiences in shaping children's fairness preferences. The meritocratic fairness view presupposes the ability to distinguish between relevant and irrelevant information, a cognitive ability that matures during adolescence (33), which may partly explain why we observed increased prevalence of this view. The strict egalitarian and libertarian fairness views, however, are straightforward to implement, and thus, the different development for these two fairness views is hard to explain by cognitive maturation. This suggests that social experiences also play a role in shaping children's fairness preferences.

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Editor's Summary

Fairness or Equality?

Inequality in payments may be seen as inherently unfair, or as appropriate when it reflects differential achievement. Using an economic exchange game, **Almås *et al.*** (p. 1176) mapped how judgments changed from 5th-grade students to 13th graders: Fifth graders expressed a preference for equal division of rewards, whereas the 13th graders tolerated unequal outcomes, as long as they had been provided with evidence of unequal inputs. That is, the younger children were strict egalitarians, but the older ones—perhaps as a consequence of exposure to a variety of achievement-based social activities, such as sports—tended toward meritocracy.

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