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### Gender differences in allocation choices made by children aged 5 to 6

*The main aim of this article is to supplement gaps in current knowledge concerning the development of competences related to goods allocation choices. We conducted a study in which 158 children aged 5 to 6 made choices concerning allocations of goods between themselves and the other, anonymous child. The crucial findings point to boys as more selfish in their choices than girls. Furthermore, we provide evidence for the claim that young children (especially boys) are aware that their choices are egoistic. Since our study adopted a similar methodology to that of the recent Swiss study, we were able to conduct cross-cultural analysis. The comparison of children's choices in the Polish study and the Swiss one pictures Polish children as displaying a stronger egalitarian preferences and revealing egoistic preferences less frequently than the children from Switzerland.*

**Keywords:** social preferences, selfish preferences, economic decisions, children economic decisions, gender differences, cultural differences

#### Introduction

In economic psychology, we already possess quite an extensive knowledge concerning choices made by adults in allocation of goods. The main source of this knowledge consists in experiments involving anonymous economic games (see Camerer, 2003; Chaudhuri, 2009 for a review). Still, little is known about the development of competences related to goods allocation choices, and scientific reports for individual and cultural differences in economic decisions among children are scarce.

The main aim of this article is to contribute to filling-in the above-named gap. What we introduce are the results of a study in which children aged 5 to 6 made choices to distribute goods between themselves and the other, anonymous child. The most crucial findings point to boys as more selfish in their choices than girls, and to the fact that this dissimilarity is systematic, that is, it recurs in different games. Furthermore, we provide evidence for the claim that children (especially boys), in spite of their young age, are aware that their choices are egoistic. Since our study adopted a similar methodology to that of the recent study by Fehr *et al.* (Fehr, Bernhard and Rockenbach, 2008), by which it was inspired, we were able to refer our

findings directly to the ones obtained in the "Swiss study". In this way, we identified certain specific inter-cultural discrepancies between children with reference to allocation choices.

Fehr *et al.* (2008) developed three games, in which children were to distribute the real payoffs, sweets in this case, between themselves and the other, anonymous child. In the first game ("prosocial game") a child was given the choice between two options: (1,0) and (1,1), with the first numeral representing the amount of goods for the player and the second – the amount of goods for the other, anonymous child. In the second game ("envy game"), children decided between the allocations (1,1) and (1,2). Lastly, in the third game ("sharing game"), they had to choose between the options (1,1) and (2,0). The experiment results unveiled that the tendency for egalitarian choices increases with age. The lowest level of equal allocation of payoffs was noted for the children aged 3 and 4, and the highest – for the 7 and 8 year olds. Our study was focused on the intermediate age group (aged 5-6). Fehr *et al.* (2008) did not report the differences in choices made by boys and girls, therefore, we decided to include this independent variable in our research.

Seldom has the question been addressed of individual differences between people in social economic interactions

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(operationalized *via* anonymous games). However, a score of experiments have examined the dissimilarities between males and females. Because the games we adopted are most closely akin to the dictator game, the results of this game, pointing to lower prosociality level in men's choices than in women's, shall be briefly outlined below. The data collected among the adults provided the basis for formulating the present study hypotheses pertaining to gender differences among children.

In the dictator game, the proposing participant ("proposer") distributes the initial pool of resources between herself and the other, anonymous player ("responder"), the latter having no influence on the game result. Since the responder cannot reject any of the proposer's offers, the most rational choice for the proposer is to keep the entire initial pool for herself. Yet, as indicated by research (Camerer, 2003; Chaudhuri, 2009; Engel, 2010 for a review), the players tend to share goods, displaying social preferences. There have also been observed systematic differences between males and females in the frequency of occurrence of these social preferences. Generally speaking, women in the role of the proposer are more generous and allocate a bigger share of the initial pool to the responder than men do (Andreoni, Vesterlund, 2001; Bolton and Katok, 1995; Eckel and Grossman, 1998). For example, in Eckel and Grossman's (1998) study, the average percentage of the initial pool given by Player 1 amounted to 16% in women's group and 8,2% in men's group.

Comparable results were noted for the dictator game, participated by children. Gummerum, Hanoch, Keller, Parsons and Hummel (2010) analyzed the choices made by small children aged 3 to 5 in the dictator game. What they observed was that girls behave more prosocially than boys, because they grant the responder with a bigger share of the initial pool than boys. A more detailed comparison of the choices made in both gender groups unveiled that the choice of not allocating anything to the partner was more frequent in the boys' group, whereas equal distribution of goods was more often observed among girls. A slightly older age group (aged 9 to 17) was subjected to the dictator game by Gummerum, Keller, Takezawa and Mata (2008). At the intermediate level, the girls' offers were assessed as substantially more generous than the offers made by boys. Interestingly, the discrepancy tended to increase with age. What follows, socialization appears to perform a crucial role in the choices involving resource allocation.

The findings discussed so far point to the essential role of gender in the process of formation of socially oriented preferences. Having considered the direction of the presented discrepancies, we adopted the main hypothesis of our research study in the following wording:

H1: The choices made by girls in allocation games shall be characterized by higher prosociality than the choices made by boys.

In the subsequent section of the article, we discuss the methods and results of the study, verifying the above-named main hypothesis. In the study, children played three games involving goods allocation. The prosociality level was established on the basis of the type of choice made in each game. Apart from that, the children's preferences (egoistic vs. socially oriented) were analysed with regard to the structure of choices made by them in all the games.

## Method

### Participants

The experiment was participated by children aged 5 and 6, because, according to the findings of Fehr *et al.* (2008), it is at this age that children start to display social preferences when making choices involving the allocation of goods. A total of 158 children took part in the test, including 81 and 77 boys.

### Experimental procedure

The experiment was conducted in the period between November 2008 and February 2009, in ten kindergartens and elementary schools in Poland. Children participated in research tasks individually, one after the other, in a specially prepared room within the kindergarten/school premises. Before the experiment started, we asked the parents' permission for their children participation in the project. In order to measure social preferences among children, we used the three anonymous, two-player decision games, employed earlier in Fehr *et al.*'s (2008) study. The children were informed that they would have no contact with the other child, and that they would remain anonymous for themselves after the experiment as well. In this way, we eliminated the danger of the children's choices being affected by the need for social acceptance. The sole information that the children received about their game partner was her sex.

Each participant played the games (described below) in a randomized order. In each game, the participant was presented with a choice of two possible goods allocations between herself and the other, anonymous child. The role of the real payoffs was performed by stickers. In order to avoid the satiation effect of a recurring reward, different stickers were offered in each successive game. Choice options for each game were first carefully described to the child, after which the experimenter made sure that the child understood the rules of the game. Only three children had difficulties comprehending the rules of the games, and their choices were excluded from the analysis.

The first game (prosocial game) involved a choice between two options: (1,0) and (1,1), where the first number represents the amount of stickers for the child-player, and the second – the amount of stickers for the other,

Table 1

The percentage of egalitarian choices (1,1) in the prosocial game, envy game, and sharing game among the 5-6 year olds in Poland and Switzerland (Fehr et al., 2008).

	Prosocial game	Envy game	Sharing game
Poland	67.1	65.2	44.9
Switzerland	61.1	58.3	22.0

anonymous child. In the second game (envy game), the choice was between the allocation (1,1) and the allocation (1,2). Finally, in the third game (sharing game) the child was choosing between the options (1,1) and (2,0).

After the choices in all games had been made, the experimenter was asking the child a number of questions about her attitude to the kindergarten and other children. Subsequently, the experimenter was examining the child's level of awareness of the consequences resulting from her decisions. For this purpose, two questions were asked of a child: (1) Do you think that the other child will be happy? and (2) Do you think that the other child would be more happy if you had chosen otherwise? For both questions, "yes/no" answers were required. Additionally, the experimenter was checking if the child's liking for the stickers from different games was similar. After the test conclusion, each child participating in it was receiving her rewards and was being informed that the rewards for the other child will be given to her by the experimenter.

## Results

We begin the review of results first with what the proportions in stickers distribution in each of the three games were like. Subsequently, we discuss the types of preferences illustrated by the children's choices in all three games together. In the following section, we introduce the findings, on the basis of which we infer the extent to which the children were aware of their choice's consequence for the other child. Finally, we unveil the results concerning the main hypothesis of the study, pertaining to the differences between girls and boys.

### Choices in particular games

Table 1 illustrates the percentages of children who opted for the egalitarian allocation, that is (1,1), in all three successive games. Additionally, the table refers our results to the ones obtained earlier in Switzerland (see Fehr, Bernhard and Rockenbach, 2008).

In the first two games, the majority of children (*i.e.*, more than 50%) were choosing the egalitarian distribution, that is (1,1),  $\chi^2(1) = 18.46$ ;  $p < 0.001$  for the prosocial game, and  $\chi^2(1) = 14.58$ ;  $p < 0.001$  for the envy game. Only in the case of the sharing game, the proportions in choosing any of the available options was not significantly different from the 50/50 proportion,  $\chi^2(1) = 1.62$ ;  $p = 0.20$ .

Table 2

Types of preferences.

Preferences / Game	Prosocial game	Envy game	Sharing game
1. Strongly <b>egalitarian</b>	1,1	1,1	1,1
2. Weakly <b>egalitarian</b>	1,1	1,1	2,0
3. Strongly <b>generous</b>	1,1	1,2	1,1
4. Weakly <b>generous</b>	1,1	1,2	2,0
5. <b>Selfish/ Spiteful</b>	1,0	1,1	2,0
6. <b>Ambiguous</b>	1,0	1,1	1,1
	1,0	1,2	1,1
	1,0	1,2	2,0

The comparison of children's choices in the Polish study and the Swiss study pictures Polish children as displaying a stronger preference for the egalitarian option in all three games. However, the observed discrepancies were not statistically significant, save for the sharing game,  $\chi^2(1) = 46.74$ ;  $p < 0.001$ . In both the prosocial game and the envy game, the cross-national differences were statistically insignificant ( $p = 0.12$  and  $p = 0.08$ , respectively).

### Social preferences and egoistic preferences analysis

The previous section outlines the findings concerning choices in particular games. In this section, the study sample shall be analyzed with respect to its preferences structure. Preferences of individual participants might be inferred from their choices in all the games together. In other words, the choices of people whose preferences are relatively constant should be internally coherent throughout the successive games.

We began our analysis from construing a classification of the types of preferences, modeling it on the typology proposed by Fehr *et al.* (2008). Table 2 illustrates the classification in question.

Figure 1 presents the percentage distribution of particular types of preferences noted in the Polish study and the Swiss study. The category 'strongly egalitarian' is associated with the category 'weakly egalitarian,' whereas the category 'strongly generous' links with the category 'weakly generous.' As it may be observed, the two samples differ as far as the distribution of the types of preferences is concerned,  $\chi^2(3) = 9.53$ ;  $p = 0.02$ . In the Polish children sample, the dominant preference category was egalitarian. In addition, when compared with the Swiss sample, the children from Poland were noted to display egoistic preferences less frequently than the children from Switzerland.

### The awareness of the choice's consequence for the other child

After the child-participants of the game had already made their choices, they were asked two questions. First, it was inquired of the child if she thinks that the other,

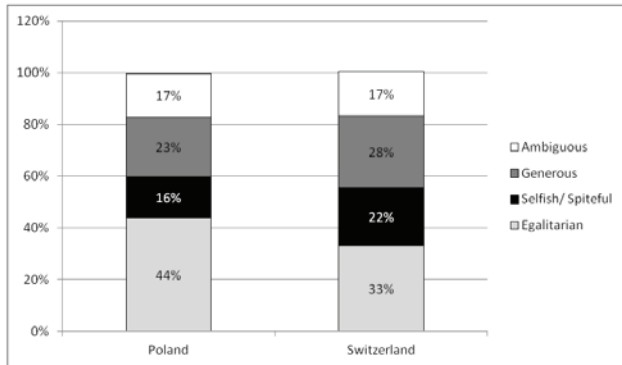


Figure 1. The percentage share of particular types of preferences in the choices made by children from the Polish and the Swiss study.

anonymous child would be happy with the number of received stickers. Next, the answer was elicited for the question of whether the tested child believes that their game partner would be more happy, if she had chosen the alternative option of goods allocation. The procedure was aimed at examining if the tested children were aware that their choices are prosocial or egoistic.

In response to the first question, most of the children (87.2%) claimed that the recipient would be happy with the number of stickers. The result most probably might be derived from the fact that in most cases the choices were non-egoistic; thus, the child-recipients received at the least one sticker, of which the children participating in the experiment were aware.

The way the second question was answered depended on the participant's choice of allocation option. In the prosocial game, 66% of the children who had chosen the egalitarian distribution of stickers denied that their partner would be happier with the alternative allocation, *i.e.* (1,0). Whereas among the children who had decided on the uneven distribution, that is (1,0), only 48% denied that their partner would be happier with the opposite option, that is (1,1). The probit regression revealed a statistically significant relation between the option chosen in the prosocial game (independent variable) and the belief that the other child would (or would not) be happy with the goods allocation (dependent variable),  $Wald \chi^2(1) = 4.26$ ;  $p = 0.04$ ;  $\phi = 0.208$ . It suggests that the children making egoistic choices were aware of the consequences of their choice.

Comparable results were obtained from the analysis of the relation between the choices in the sharing game and the assessment of the second child's satisfaction with the goods allocation. 64% of the children who had chosen the allocation (1,1) denied that the second child would be more happy with the allocation (2,0). Among the children who had opted for the ultimately unequal distribution (2,0), in turn, 43% denied that their partner would be more happy with the alternative option, that is (1,1). The probit regression proved a statistically significant dependence between the choice option (independent variable) and the assumptions of the second child's satisfaction/dissatisfaction with the

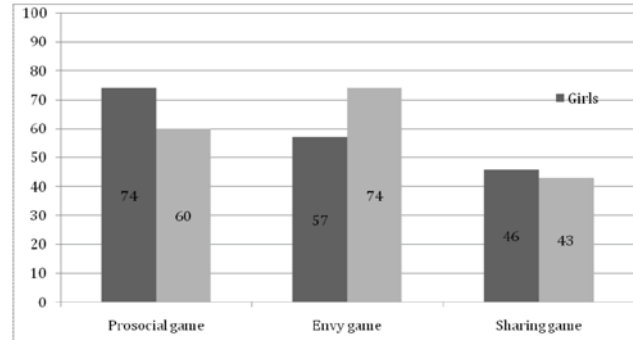


Figure 2. The percentages of children choosing the egalitarian option (1,1) in particular games, with distinction into two gender groups.

goods distribution (dependent variable),  $Wald \chi^2(1) = 5.32$ ;  $p = 0.02$ ;  $\phi = 0.213$ . The findings confirm the presumed high level of awareness of the choice's consequences for the other, anonymous child.

In the envy game, no major relation was noted between the choice option and the assumptions concerning the other child's satisfaction/dissatisfaction with the goods allocation ( $p=0.82$ ).

### Games choices and gender

The central hypothesis tested in the present study assumes that boys would be making more egoistic choices than girls. Figure 2 illustrates the percentages of children who chose the egalitarian option (1,1) in particular games with reference to the two sex groups.

In the prosocial game, the egalitarian option was chosen more frequently by girls than by boys. The probit regression for the independent variable "sex" and the dependent variable "choice option" confirmed that the discrepancy between the structures of choices in both sex groups was statistically significant,  $Wald \chi^2(1) = 18.33$ ;  $p < 0.001$ ;  $\phi = 0.179$ . In the envy game, the egalitarian option was chosen more frequently by boys, however, girls more frequently decided on the allocation (1,2), which indicates higher generosity. The dependence between the two variables in this case proved to be significant as well,  $Wald \chi^2(1) = 14.51$ ;  $p < 0.001$ ;  $\phi = -0.177$ . No gender differences were observed in the choices made in the sharing game ( $p=0.20$ ), which suggests that girls and boys were tempted to keep both stickers for themselves to an equal extent.

## Discussion

The herein above described research study was conducted with the purpose of establishing the way in which children aged 5 and 6 make choices involving goods allocation, as well as the preferences (egoistic or social) which they are usually driven by. Specifically, what was examined was the hypothesis, according to which boys tend to be more egoistic in these choices than girls. The analysis



included an additional comparison of the results of the present study (the Polish study) with the study conducted earlier in Switzerland (the Swiss study) by Fehr, Bernhard and Rockenbach (2008).

The analysis of choices made in particular games unveils that the majority of children preferred the option involving an equal (egalitarian) distribution of payoffs. Such tendency was observed both in the prosocial game and in the envy game. Children were unwilling to accept such a goods allocation that would deprive their partner of the reward, which choice was represented in the prosocial game by the option (1,0). However, for the most part they also reject the option that would reward the other child with an additional sticker for no explicit reason, which was the (1,2) allocation in envy game. Interestingly, the tendency for choosing the egalitarian option substantially diminished in the sharing game, in which there emerged a possibility of receiving two stickers by choosing the option (2,0). In this game, a marked increase in egoistic choices was observed. The structure of choices in the three games suggests that, children aged 5 to 6, making their social choices, follow the egalitarian rule, which holds until the possibility of acquiring a larger amount of attractive goods is introduced. Thus, rule is operated conditionally. What needs to be stressed, however, is that even in the sharing game, close to half of the children decided to choose an equal allocation of stickers, which explicitly contradicts the rational behaviour in its economic sense, that is, a one relying on personal profit-maximization (Rabin, 1998).

The validity of the above interpretation is supported with the findings concerning the observed types of preferences. Only 16% of the children displayed coherent egoistic preferences, whereas 70% of the children made decisions according to coherent non-egoistic preferences. A very strong non-egoistic preference (generosity preference) was observed for every fourth child. If we assume that not only simple allocation choices are driven by fixed social preferences, then we may expect the latter to influence behaviour contradicting the egoistic model in other spheres of life as well.

Since the games we employed were the same as the ones used in the earlier study in Switzerland (Fehr, Bernhard and Rockenbach, 2008), it was possible for the results obtained in both samples (Polish and Swiss) to be directly referred to one another. The comparison revealed that in the sharing game, the children participating in the Polish study were opting for an equal distribution of payoffs more often (that is, they yielded temptation less frequently) than the children tested by the Swiss study. Furthermore, egoistic preferences proved to be rarer among Polish children. The findings may indicate that in the Polish culture there is a very strong tendency for understanding justice as an equal division of resources among the economic interaction participants. What is more, it is at a very early stage (in

the developmental sense) that the process of learning such an interpretation of justice is initiated. This assumption, however, demands a separate research for verification.

Another question that was addressed was the perception of consequences resulting from the decisions made for the other, anonymous game participant. It was asserted that the consequence evaluation is dependent on the choice in payoffs allocation. The children making more egoistic choices admitted that, according to them, the second child would be happier with the alternative choice. It might be concluded, therefore, that the way in which children aged 5 and 6 make social decisions is not accidental, and that they are aware of the fact that egoistic choices adversely affect the other party. Similar line of reasoning is also visible in the qualitative analysis of the commentaries provided by the children in response to the experimenter's questions. When asked why they believe that the second child would be more happy with the non-egoistic option, the children said, for example: "because he would have more stickers, and now I have more," or "because he would have more stickers than I do." In turn, those children who claimed their choice to be satisfying for their partner said: "because I was choosing the options in which he received more stickers."

The final group of results is concerned with the discrepancies between the choices made by different sex groups. It was presumed in the study hypothesis that boys would be choosing more egoistically than girls, and this hypothesis has been confirmed. In the prosocial game, girls were opting for an equal distribution of stickers more often than boys, while in the envy game, they were more frequently choosing the (1,2) allocation, which meant providing the anonymous partner with an additional sticker without bearing any costs. It is specifically the outcomes of the second described game that imply that cross-gender differences originate primarily in the boys' attitudes which are more competitive and egoistic. The findings concerning the influence of gender on the choosing manner obtained in the present research appear to comply with the results of the children participating in the dictator game (see Introduction). They also reflect the results of meta-analyses, from which it appears that prosocial behaviour is more frequently observed among girls than among boys (Fabes and Eisenberg, 1996).

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