Personality and Individual Differences 226 (2024) 112703



Contents lists available at ScienceDirect

Personality and Individual Differences

journal homepage: www.elsevier.com/locate/paid



Brief Reports

Young teens at play: Girls are egalitarian, boys are generous☆



Pablo Brañas-Garza

LoyolaBehLab, Universidad Loyola, Spain

ARTICLE INFO

Keywords:
Developmental decision-making
Field experiments
mini dictator games
Economic preferences
Teenagers

ABSTRACT

Using the decisions of 2500 girls and boys in three mini dictator games, this paper investigates how the social preferences of five cohorts of students (aged 12 to 16) evolve throughout adolescence. We find that at early ages (12 years old, 7th grade), girls tend to be egalitarian, boys are more generous, and <10 % exhibit spiteful behavior - with equal representation of girls and boys. The gender gap in both strong egalitarianism (with girls showing more egalitarianism) and weak generosity (with boys being more generous) doesn't seem to fade as they grow older.

1. Introduction

Behavioral economists' study social behavior through games where subjects choose between alternatives that imply different outcomes for the participants. For example, they may choose equality, where everyone wins the same, or selfishness, where the decision-maker takes it all. From these decisions, it is inferred whether the subject is egalitarian or selfish, and it is assumed that the behavior observed in the laboratory is generalizable to their behavior in real life. There is evidence that behavior in economic games correlates with personality traits using Big Five (Ben-Ner & Kramer, 2011), HEXACO (Ruch et al., 2017), or SVO (Wei et al., 2016), among others.[1]

This study examines preferences for equality, generosity and spite of girls and adolescent boys during high school years. While most experimental literature on social preferences focuses on regular experimental subjects (self-selecting university students – see Exadaktylos et al., 2013) and exceptionally with the general adult population, in recent years, there has been considerable experimental evidence on the social preferences of children and pre-adolescents. This literature began with the seminal worksof Bettinger and Slonim (2006) and Fehr et al. (2008) – see Sutter et al. (2019) for a survey on preferences of children and adolescents.

Subsequently, a dozen studies on adolescent social preferences have been published,[2] but drawing conclusions is challenging because the studies use different tasks – for example, in Almås et al. (2017) the dictator splits overall fixed earnings, Sutter et al. (2018) analyze several games with three players, Horn et al. (2022) uses a dictator game - as in Bettinger and Slonim (2006) - while Brañas-Garza et al. (2023) uses observers in third party dictator games. An example of the above is the dictator game: a 50–50 allocation would be considered both egalitarian and generous. In contrast, in the Fehr et al., 2008, both behaviors are perfectly distinguished.

Two recent studies have replicated Fehr et al., 2008 in larger samples: *i*) Fehr et al. (2013) using a sample of 717 subjects aged 8–17 years replicates the task for in- and out-group decisions and *ii*) Cobo-Reyes et al. (2020) sampling 717 subjects aged 9–67 for several ethnic groups. Interestingly both studies find that, at teenage years, females are generous but more egalitarian than males.

These studies provide initial evidence of gender differences in the social preferences of adolescents; however, it should be noted that the sample sizes could be compromised if we restrict the sample to the relevant age range and divide it between girls and boys. And precisely the sample size is what makes it difficult to estimate the impact of age on preferences, that is, their development. For the same reasons, it is even more critical to analyze gender gaps, especially whether this gap closes during adolescence or increases.

☆ I would like to thanks Diego Jorrat for his enormous help and the field team – Pablo Montero, Monica Vasco, Paula Piña, and Emilio Nieto. I would also thank other *TeensLAB* members –Antonio Cabrales, Juan Carrillo, Jośe Cuesta, Maripaz Espinosa, Teresa Garcia, Jaromir Kovarik, Cesar Mantilla, and Anxo Śanchez– for their comments and ideas. A preliminary version of this paper was presented at Barcelona, Budapest and Cordoba. This research was supported by the Spanish Ministry of Economy and Competitiveness (PID2021-126892NB-100) and the European Union's Horizon Europe Research and Innovation Programme under Grant Agreement number 101095175 and the UK Government.

[1] PAID has published over 60 papers using economic games since 2011.

[2] There is also an emerging line of research on the strategic behavior of children and adolescents (see Brocas & Carrillo, 2020, 2022; Brocas et al., 2017 or Alfonso et al., 2023)

https://doi.org/10.1016/j.paid.2024.112703
Received 13 February 2024; Received in revised form 22 April 2024; Accepted 28 April 2024
Available online 2 May 2024
0191-8869/© 2024 Elsevier Ltd. All rights reserved.

Table 1
Sample size across gender and ages.

Age	Boys	Girls	n	MDE
12	291	319	610	0.23
13	343	377	720	0.21
14	270	256	526	0.25
15	241	212	453	0.27
16	112	104	216	0.38
N	1,257	1,268	2,525	0.11

This study examines whether the egalitarianism (strong and weak), generosity (strong and weak), and spitefulness of adolescents are shaped in high school.[3] It is well-known that adolescence is an important period because children transition from being children to becoming adults, and furthermore, the maturation process occurs diferentially for girls than for boys. This difference in maturation can impact how their preferences develop and consequently increase or decrease gender differences when they finish high school and become adults. Additionally, gender gaps in preferences could have an impact on other future outcomes in their adult lives: career orientation, intra-household decisions or human capital acquisition (Heckman, 2006).

In this research, we analyze the behavior of 2500 teenagers (50.21 % of girls) in 1st, 2nd, 3rd, or 4th year of secondary education (age 12–16, grade 7–10). To study their social preferences, we use the Fehr et al., 2008 task (as Cobo-Reyes et al., 2020), which allows us to distinguish five behavioral types: Egalitarians (strict and weak), generous (strong and weak), and spiteful.

We find that slightly more than half play egalitarian, approximately one-third play generous, and the rest, a minority, are spiteful. If we focus on gender, we find that boys are more likely to play generous, and girls are more likely to play egalitarian. Except for strong generosity in boys (that changes to weak), the frequency of other types does not substantially change throughout adolescence, and the gender gap does not seem to close.

2. Methods

2.1. Data collection

The data were collected in ten Spanish schools. To collect the data, an agreement was signed with the schools, including the experiment as part of the regular center activity. All experimental sessions were conducted during class hours and within the classroom with the assistance of a team member. The students had to sign an informed consent to participate. The entire ethical protocol was approved by the Ethics Committee of the University Loyola Andalucía.

Table 1 shows the distribution of the sample used throughout the paper. Children under 11 years old (about a dozen) and those over 16 years old (a hundred) were excluded from the sample. Those who did not reveal whether they were girls or boys[4] (including those who did not want to answer or did not identify as either) were also excluded – about 100 in total. The total sample amounts 2525 teenagers. The minimum detectable error (MDE) for each age is shown in last column. Data are fully available.[5]

2.2. Experimental tasks and behavioral types

In Dictator Games (DG), subjects are tasked with distributing money between themselves and another person, typically in continuous time. In mini Dictator Games (miniDG), subjects face binary distributions where there are only two options. In our experiment, which replicates that of Fehr et al., 2008, subjects play three miniDGs. In all of them, the option on the left is an equal split (both win 10 euros), while the one on the right varies in each game. It is important to note that only the first player has the power of distribution; that is, both subjects start with zero euros, and both end with the decision made by the dictator.

In the first game (see Fig. 1a), called Pro-Social, if the dictator chooses left, an equal split occurs, but if they choose right - (10,0) - then they keep everything, and the other receives nothing. In the second game (Fig. 1b), Envy, the option on the right is (10,20), and if the dictator chooses it, they allow their rival to win double, but if they prefer, they can choose the equal split and block that payment. In the third game (Fig. 1b), Sharing, if they choose the right option (20,0), they keep everything, but if they choose the left, they distribute it.

It is important to note that all subjects make hypothetical decisions[6] as if they were dictators. It should also be clarified that, identical to Fehr et al., 2008, the order is always the same; that is, they always play Pro-Social first, then Envy, and finally Sharing. In the Supplementary Materials (section 2) are displayed the three original screens shown to the participants.

These three miniDGs allows us to classify subjects in five categories: strong and weak egali- tarian, strong and weak generous and spiteful. It is interesting to understand the differences between strong and weak egalitarian. The decisions in the first two games are identical, and only the third one changes, where the weak egalitarian takes the entire cake. The same happens for strong and weak generous; the decisions are the same, and only the third one changes (as they take it all). And, why is this important? Because they all did the same thing in the first game (all take 10–10), and what differentiates egalitarians from the generous is the second decision, and it is precisely the third one that defines whether it is strong or weak. Table 2 summarizes the types (the last column shows the distribution of types within the sample).

Note that as stated in Fehr et al. (2008), there are a number of subjects that cannot be attributed to any of the categories and are therefore considered ambiguous and secondly, that generosity is indistinguishable from an efficiency-maximizing type.

3. Results

We divided the results into two parts. First, we study the development of social preferences among adolescents and, secondly, we focus on the drivers of social behavior.

3.1. Development of preferences

Before beginning the analysis of the results, it is important to emphasize that this paper does not study how participants' preferences change over age but rather uses different subsamples of girls and boys of different ages as a proxy for that evolution. In other words, it is not a longitudinal study but a cohort study.

To study how preferences of teenagers evolve, we estimated a regression model considering the student's *gender*, *age*, the interaction of age and gender, and two sets of controls: the first refers to the student class and includes *class size*, the number of *repeaters* in the class, the lack of completion of the experiment (*slackers*) and the number of *migrant* status; the second set includes self-reported GPA (*#A*), Cognitive Reflection Test (*CRT*), mathematical skills (*accuracy*), students

[3] In Spain, secondary education begins after 6 years of primary education. Teens start at the age of 12 and finish at the age of 16. After secondary school, students enter the"Bachillerato" (6th form), which lasts for two years. Secondary education is mandatory and free.

[4] I use the binary sex categorization (male/female) designated at birth ("sex assigned at birth") based solely on the visible external anatomy of a newborn. Note that sex was reported by the student herself.

[5] Data are available at github.com/teenslab/datateenslab. See Vasco et al., 2024.

[6] The Supplementary Material (section 3) extends the discussion about hypothetical payoffs and their reliability.

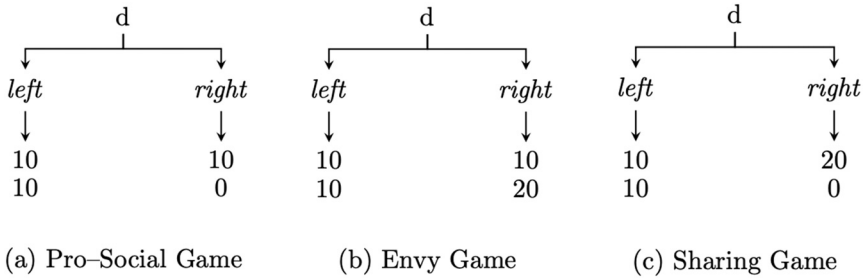


Fig. 1. The three decisions

Table 2
Behavioral types.

Behavioral types	Prosocial	Envy	Sharing	% sample size
Strongly Egalitarian	(10, 10)	(10, 10)	(10, 10)	41.19
Weakly Egalitarian	(10, 10)	(10, 10)	(20,0)	16.48
Strongly Generous	(10, 10)	(10, 20)	(10, 10)	23.46
Weakly Generous	(10, 10)	(10, 20)	(20,0)	9.54
Spiteful	(10,0)	(10, 10)	(20,0)	6.97
Ambiguous				2.26

Note: Ambiguous refers to other possible types non-defined above.

expectations, and whether the student is a *repeater* himself. Table 1 at Supplementary Materials (section 5) shows the regression models with and without controls. The figures displayed below show the estimated age effect for girls and boys separately (with a 95 % confidence interval). Table 2 at SM repeats the analysis for girls and boys separately.

First, we examine both strong and weak egalitarians. Fig. 2 shows that the proportion of strong egalitarian girls and boys slightly increase ($p > 0.1$, see Table 1-SM), and the gender gap remains constant ($p < 0.01$). Similarly, the proportion of weak egalitarian girls is larger ($p < 0.01$) but decreasing, and the gender gap only closes for the older age range, 16 years - although in the regression age is never significant ($p > 0.1$, Table 1 SM). We can conclude that girls, more than boys, continue to be egalitarian. As shown in Table 2-SM the results are the same when the analysis is done for girls and boys separately.

As seen in Fig. 3 the case of generosity is very different. The proportion of strong generous boys plummets throughout adolescence, while among girls, it remains stable. Consequently, the gender gap only closes at older ages. As shown in Table 1-SM *females* are less likely to be generous ($p < 0.01$) and generosity decreases with *age* ($p < 0.01$) however, the interaction *age x female* is positive ($p < 0.05$) implying that girls decrease weakly less than boys with age. In parallel, the proportion of weakly generous is larger among boys ($p < 0.01$) and increases throughout adolescence among both girls and boys ($p < 0.01$) and the gender gap remains constant. All in all, boys are more generous than girls.

The spiteful group is a minority at the beginning and end of the period, around 7 %, does not evolve throughout adolescence ($p > 0.1$), and there are no gender differences ($p > 0.1$, see Table 1-SM). Fig. 1-SM (SM section 1) shows these findings.

In any case, the trends shown in Figs. 2 and 3 seem to indicate that the story continues, but our data does not allow us to study beyond 16 years. For example, we are left without knowing if for the weakly egalitarian, the percentage of boys ends up surpassing that of girls, or if in the case of the strong generous, the opposite happens. Unfortunately, we cannot provide an answer to this.

3.2. Drivers

Now we study the drivers of the behavior of adolescents. As noted before, we have collected data about the student class but also about the individual student. The medium part of Table 1-SM shows the estimated effect of class variables. No any variable of the class explains egalitarian

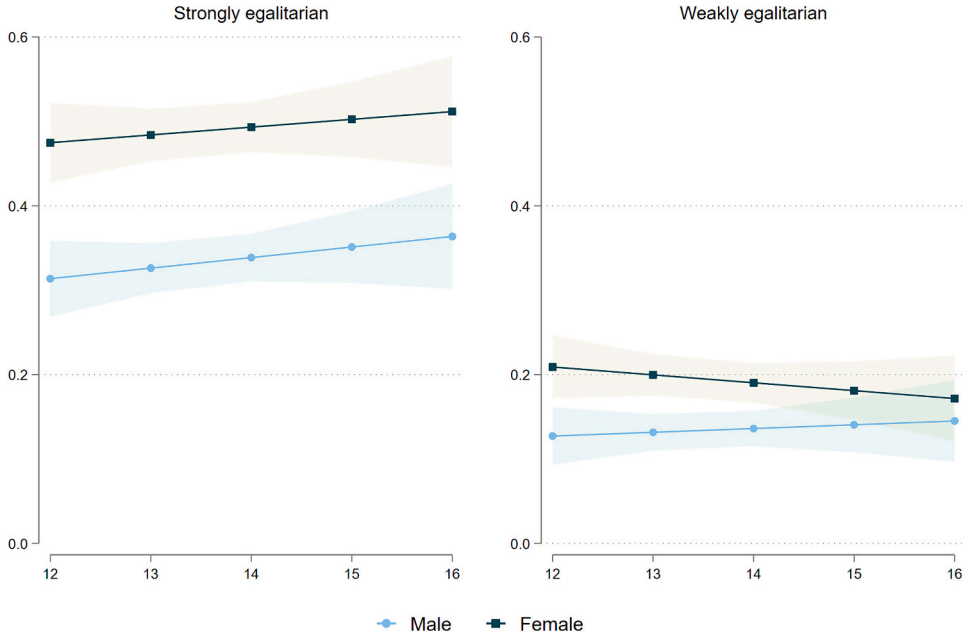


Fig. 2. Egalitarian subjects by gender and age

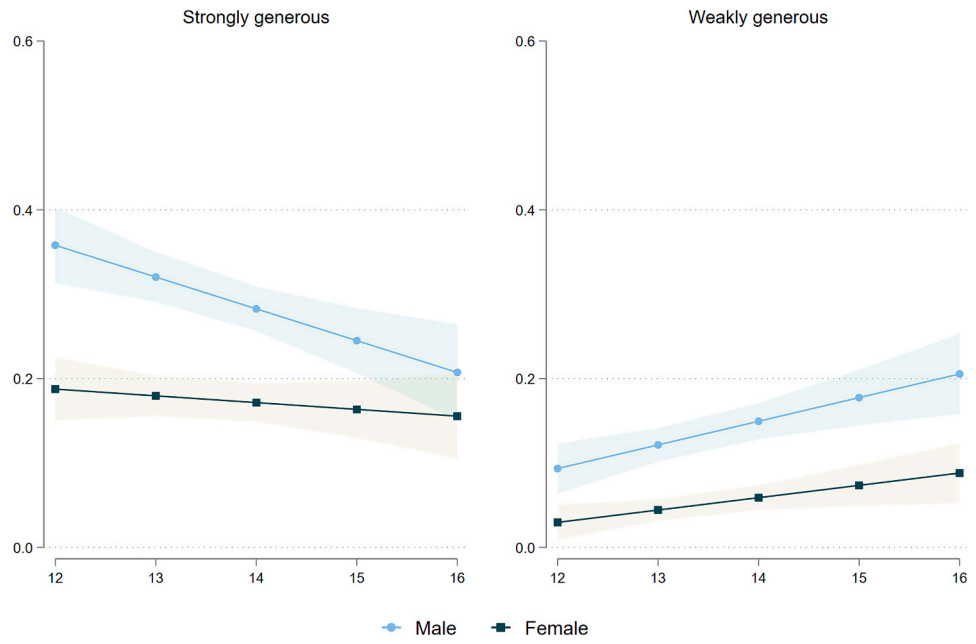


Fig. 3. Generous subjects by gender and age

behavior. There is a small impact ($p < 0.05$) of the number of repeaters on strong generosity and a strong effect of the number of slackers on weak generosity ($p < 0.01$). The simple explanation for these effects is that given that both repeaters and slackers are correlated with being male, then these variables are just indicating the number of males within the class. Table 2-SM studies these variables for girls and boys separately and shows that only boys are sensitive to these effects.

Regarding the variables that refer to the student itself we see that smart students – as defined by the *GPA* – are slightly ($p < 0.05$) less likely to be strong egalitarian. However, students with high score in the *CRT* are more likely ($p < 0.01$) to be weakly generous. Interestingly, Table 2-SM shows that the later effects are clearly driven by gender: GPA is relevant for girls and CRT for males.

No any other variable explains social preferences. Therefore, the role of the environment surrounding the student - the class - is fairly limited. Similarly, personal differences seem to be not critical on social preferences.

4. Conclusions

This study examines how the social preferences of 2500 girls and boys change throughout adolescence. To achieve this, a lab-in-the-field experiment was conducted in ten Spanish schools, where students completed the experiment during their class hours and did not receive economic incentives for their participation.

The results indicate that girls are more inclined to choose the egalitarian option, while boys tend to choose the generous one, and the percentage of spitefulness is <10 % (with an equal percentage of girls and boys). Regarding the development of preferences throughout adolescence, we highlight that the gender gap in both strong egalitarianism (with girls being more egalitarian) and weak generosity (with boys being more generous) does not seem to disappear with age.

However, it is fair to acknowledge that given the age range we have, ages 12–16, we cannot make projections about adulthood. It also important to be cautious, considering the study's narrow focus on a specific population and that it does not adopt a longitudinal approach. Furthermore, as is common in economic games, we are assuming that what we observe in the laboratory is not only context-free but also informative of the subject's behavior outside the laboratory.

CRediT authorship contribution statement

Pablo Brañas-Garza: Writing – review & editing, Writing – original draft, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization.

Declaration of competing interest

None.

Data availability

Data are available at Github (referenced in the ms).

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.paid.2024.112703.

References

Alfonso, A., Brañas-Garza, P., Brocas, I., Carrillo, J. D., González, J. B., & Vázquez, M. J. (2023). The development of rationality in games with hidden information. *Mimeo*.
Almås, I., Cappelen, A. W., Salvanes, K. G., Sørensen, E.Ø., & Tungodden, B. (2017). Fairness and family background. *Politics, Philosophy & Economics, 16*(2), 117–131.
Ben-Ner, A., & Kramer, A. (2011). Personality and altruism in the dictator game: Relationship to giving to kin, collaborators, competitors, and neutrals. *Personality and Individual Differences, 51*(3), 216–221.
Bettinger, E., & Slonim, R. (2006). Using experimental economics to measure the effects of a natural educational experiment on altruism. *Journal of Public Economics, 90*(8–9), 1625–1648.
Brañas-Garza, P., Brocas, I., & Carrillo, J. D. (2023). *Developmental meritocracy. mimeo.*
Brocas, I., & Carrillo, J. D. (2020). The development of social strategic ignorance and other regarding behavior from childhood to adulthood. *Journal of Behavioral and Experimental Economics, 85*, Article 101524.
Brocas, I., & Carrillo, J. D. (2022). The development of randomization and deceptive behavior in mixed strategy games. *Quantitative Economics, 13*(2), 825–862.
Brocas, I., Carrillo, J. D., & Kodaverdian, N. (2017). *Altruism and strategic giving in children and adolescents*. Mimeo.
Cobo-Reyes, R., Dominguez, J. J., García-Quero, F., Grosskopf, B., Lacomba, J. A., Lagos, F., … Pearce, G. (2020). The development of social preferences. *Journal of Economic Behavior & Organization, 179*, 653–666.
Exadaktylos, F., Espín, A. M., & Brañas-Garza, P. (2013). Experimental subjects are not different. *Scientific Reports, 3*, 1213.
Fehr, E., Bernhard, H., & Rockenbach, B. (2008). Egalitarianism in young children. *Nature, 454*(7208), 1079–1083.

Fehr, E., Glätzle-Rützler, D., & Sutter, M. (2013). The development of egalitarianism, altruism, spite and parochialism in childhood and adolescence. *European Economic Review, 64*, 369–383.

Heckman, J. J. (2006). Skill formation and the economics of investing in disadvantaged children. *Science, 312*(5782), 1900–1902.

Horn, D., Kiss, H. J., & Lénárd, T. (2022). Gender differences in preferences of adolescents: Evidence from a large-scale classroom experiment. *Journal of Economic Behavior & Organization, 194*, 478–522.

Ruch, W., Bruntsch, R., & Wagner, L. (2017). The role of character traits in economic games. *Personality and Individual Differences, 108*, 186–190.

Sutter, M., Feri, F., Glätzle-Rützler, D., Kocher, M. G., Martinsson, P., & Nordblom, K. (2018). Social preferences in childhood and adolescence. A large-scale experiment to estimate primary and secondary motivations. *Journal of Economic Behavior & Organization, 146*, 16–30.

Sutter, M., Zoller, C., & Glätzle-Rützler, D. (2019). Economic behavior of children and adolescents – A first survey of experimental economics results. *European Economic Review, 111*, 98–121.

Vasco, M., Alfonso, A., Arenas, A., Cabrales, A., Cuesta, J. A., Espín, A. M., … Brañaas-Garza, P. (2024). *Teenslab dataset: Economic preferences and cognitive abilities among teenagers*. Loyola Br'ujula Repository.

Wei, Z., Zhao, Z., & Zheng, Y. (2016). Moderating effects of social value orientation on the effect of social influence in prosocial decisions. *Frontiers in Psychology, 7*, Article 27445917.