The Development of Social Preferences

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1 Introduction

Human social interactions are strongly shaped by social preferences, with evidence from both the laboratory and the field suggesting that such preferences have implications in a range of settings. Previous research shows that prosocial preferences influence outcomes in social dilemmas (Fischbacher & Gächter, 2010), charitable giving (DellaVigna et al., 2012; Falk, 2007) and could even play a role in labour markets and natural competitive market places (Bellemare & Shearer, 2009; Grosskopf & Pearce, 2016; Kube et al., 2012, 2013), affecting welfare distributions and market efficiency (Dufwenberg et al., 2011).[1,2]

There is also evidence that individuals' concern for others depends on the identity of the person with whom they are interacting (Akerlof & Kranton, 2000; Chen & Li, 2009). For example, there is evidence that subjects behave more charitably (Chen & Li, 2009), cooperatively (Brañas–Garza et al., 2006; Chen et al., 2014; Drouvelis & Nosenzo, 2013) and coordinate more efficiently (Chen & Chen, 2011) when interacting with the 'in–group', i.e. someone they identify with, in comparison to the 'out–group'. Findings from natural field experiments corroborate these results, with evidence showing that individuals condition their other–regard on the ethnicity of the person they are interacting with (Grosskopf & Pearce, 2016; Mujcic & Frijters, 2013). Bernhard et al. (2006) refer to these types of group biases as *parochialism*. As it has been argued that social preferences are a 'fundamental cornerstone' of humans' ability to cooperate with genetic strangers (Fehr et al., 2013), understanding the extent to which they are contingent on the ethnicity of others and how this dependency develops, is crucial for the design of institutions and their associated incentives in increasingly diverse societies.

Using a unified framework of mini–dictator games, Fehr et al. (2008) examine how altruism, egalitarianism and spite emerge alongside parochialism in children aged 3 to 8 years old. Fehr et al. (2013) expand on this by investigating these behaviours in 8 to 17 year olds using the same experimental design. Both Fehr et al. (2008) and Fehr et al. (2013) examine parochialism using small, 'interpersonal social groups' (Brewer & Gardner, 1996) by varying the school from which the person receiving the money in the dictator games is selected. The receiver is either from the same school as the dictator (the 'in–group'), or a different school (the 'out–group'). Both studies report evidence of in–group favouritism that increases with age, with subjects behaving more altruistic and less spiteful towards in–group members in comparison to out–group members. However, defining the in–group in this way introduces a potential confound stemming from repeated interactions that could be present when people interact with those that they may be able recognise (List, 2006). Therefore, it may not be surprising that in–group favouritism is found to increase with age. It may be that each additional year of schooling increases a child's experience with the same peers, potentially resulting in long–term relationships with peers from the same school. In addition, relatively little is known about how these behaviours develop with age later in the life cycle, especially in adulthood. As perceived senses of identity can act as mechanisms that promote, or impede, coordination and cooperation in the workplace, understanding the interaction between age, social preferences and identity, is increasingly important, especially as the working population grows older and becomes more diverse. Our study addresses both of these concerns.

The purpose of this paper is twofold. First, we study how social preferences develop with age, with an extension to include the relatively understudied subject pool of adults. Second, we examine whether and how group biases are manifested in the behaviour of different age groups. This is done using an artefactual field experiment conducted in Granada, Spain, with 665 subjects aged 9 to 67. Utilising mini–dictator games we exploit the unifying framework of Fehr et al. (2008) and

[1] See Camerer & Fehr (2004) and Cooper & Kagel (2009) for comprehensive reviews of the laboratory literature.

[2] We note that there is mixed evidence on reciprocity in the field. See for example Gneezy & List (2006) and List (2006).

Fehr et al. (2013) and categorise subjects from four distinct age groups, *Children* (aged 9 to 11), *Teenagers* (aged 15 to 18), *Students* (aged 18 to 28) and *Adults* (aged 31 to 67), into one of three behavioural types: altruistic, egalitarian and spiteful. Following Fehr et al. (2008) and Fehr et al. (2013), dictators were shown a photo of a group of receivers, one of whom they would be matched with at random. We examine group biases by varying the ethnicity of the individuals in the photos: *Arab* (Morocco), *Black* (Senegal), *East–Asian* (China) and *White* (Spain). We refer to interactions between dictators and *White* receivers as in–group interactions, and interactions between dictators and receivers from other ethnic groups as out–group interactions. From the perspective of Fehr et al. (2008, 2013), all our interactions could be viewed as out–group, with the out–groups differing in geographical, cultural and economic distance. However, we refer to in–group interactions as those in which individuals share ethnic appearance characteristics, but in which individuals are still strangers. This follows what Brewer & Gardner (1996) call collective rather than interpersonal identity, and addresses the problem of potential repeated interaction effects.

We report a number of observations. First, we observe that for *Children*, *Teenagers* and *Students*, egalitarianism diminishes as they grow older, while altruism increases. In contrast, we find that for *Adults*, egalitarianism becomes more prominent with age whilst altruism diminishes. Second, following the analysis of Fehr et al. (2008), we report gender differences in egalitarianism emerging in *Children* and persisting through to adulthood, whilst this differential emerges later for altruistic types, being found in *Teenagers*. Finally, we report no evidence of favouritism towards the *White* in–group receivers. Instead, we find that all age groups are more likely to be altruistic when the receiver is *Black*, except the *Adults* who do not differentiate based on the receivers' ethnicity. For this age group, we report no evidence of group–contingent behavioural types (Chen & Li, 2009).

This paper contributes to the literature in several ways. First, through the inclusion of *Adults*, we are able to identify two relationships that had previously gone unnoticed, and appeared linear: a 'U–shaped' relationship between age and egalitarianism; and an inverse 'U–shaped' relationship between age and altruism. This complements previous work by List (2004), who finds that contributions in a one shot public goods game are increasing with age. It also provides an informative comparison with House et al. (2013), who report a U–shaped relationship between age and egalitarian choices appearing at a much younger age, i.e. in children aged 3 to 14. While these results seem different to ours, they are obtained in experimental settings where children mostly knew one another, and were incentivised with candy. Second, while previous findings mostly stemming from ultimatum and dictator games have shown that females are more generous than men, we observe that females become more egalitarian with age. Third, our use of a broader sense of identity that considers a larger geographical area to be regarded as the in–group, complements the previous research that studies a narrower sense of identity. In doing so we overcome a potential repeated interaction confound that may be present in previous work.

The remainder of this paper is organised as follows. Section 2 gives details of the experimental design and procedure. Section 3 outlines and discusses the results and Section 4 concludes.

2 Experimental design and procedure

The experiment is designed to examine how social preferences and group biases develop with age. This is done using an artefactual field experiment in which we examine behaviour in a range of mini–dictator games. To examine group biases we use a between–subject design in which we exogenously vary the ethnicity of the receivers with whom the dictators are matched.

		Receivers' Ethnicity				
Subjects' Age	*Range*	*White*	*Arab*	*E.Asian*	*Black*	*Total*
Children	*9-11*	51	47	47	33	178
Teenagers	*15-18*	52	54	48	49	203
Students	*18-28*	39	45	50	50	184
Adults	*31-67*	29	26	23	22	100
Total		171	172	168	154	665

Table I: Experimental Design Summary

2.1 Design

The experiment draws dictators from four distinct age groups: *Children* aged 9 to 11, *Teenagers* aged 15 to 18, *Students* aged 18 to 28 and *Adults* aged 31 to 67.[3] The *Children* and *Teenagers* were recruited from private, coeducational schools in Granada, Spain.[4] *Students* were recruited from the experimental subject pool of the University of Granada, and *Adults* were recruited from the professional staff at the University of Granada.[5]

Variation in the ethnic identity of the receiver was achieved by showing the dictators a photo of a group of people, one of whom they would be matched with and would act as a receiver to their choices for the duration of the experiment. The ethnicity of the people in the photo was varied by their country of residence: *Arab* (Morocco), *Black* (Senegal), *East–Asian* (China) or *White* (Spain). Dictators were not informed about the particular country in which the photo was taken, but were told that the recipients were from a foreign country.[6] The receivers in the photos were always strangers and from the same age group as the dictators.[7] The photos contained both males and females.

We selected receivers from these particular countries for a number of reasons. As all our dictators were recruited from the University of Granada, receivers from *Spain* were selected to serve as a natural 'in–group' comparison. The other countries were selected in order to vary the ethnicity of the receivers, and thus the extent to which the dictators may perceive them as out–group. Appearance differences were apparent from the photos, with the receivers from *Spain* looking most similar to the dictators. Receivers from the other countries differed in appearance to the dictators in their skin tone, hair colour, and facial features. Table I presents the number of observations obtained from each treatment for each age group. All experimental materials are given in Appendix A.

2.2 Procedure

Subjects played as dictator in three mini–dictator games taken from Fehr et al. (2008): the *Pro–social* Game, the *Envy* Game and the *Sharing* Game. As the experiments were conducted in a similar manner to the majority of studies that conduct dictator games, our methodology is comparable

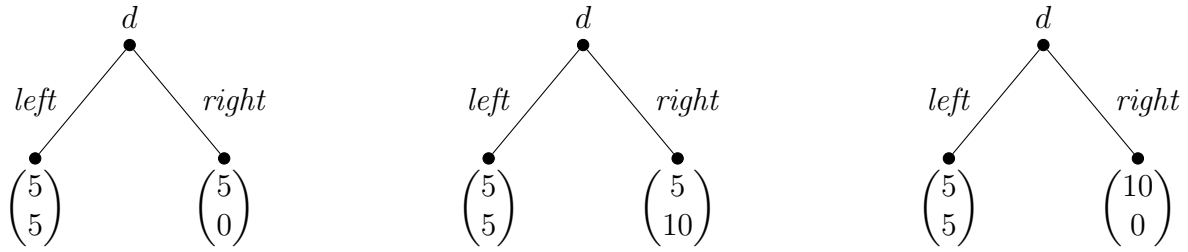
[3] Although our results are robust to the inclusion of additional control variables, we acknowledge that age has not been randomly assigned in our experiment.

[4] Consent was obtained from the children, the children's parents and the participating schools.

[5] To ensure the comparability of subjects of different age groups, we endeavoured to recruit from populations that had been educated in similar institutions. Of our sample, 66% of the *Students* and 74% of *Adults* attended a similar primary school to our sample of *Children*. Further, 81% of *Students* and 81% of *Adults* attended a secondary school similar to our *Teenagers*. 57% of *Adults* has obtained a university degree.

[6] Dictators were not told this when the receiver was from *Spain*.

[7] To ensure that no dictator potentially knew a receiver, *Children* and *Teenagers* interacted with their counterparts from different schools, *Students* interacted with other students from different subject areas and year groups, and *Adults* interacted with staff from different colleges.



(a) Pro–Social Game (b) Envy Game (c) Sharing Game

Figure 1: Dictator Games

to the previous literature (see Engel (2011) for a recent meta–analysis of previous dictator game studies). Figure 1 displays the three experimental games graphically. In each game, subjects had to choose between two possible actions: *left* and *right*. The action *left* always resulted in an egalitarian allocation of (5,5) - 5 points for the dictator and 5 points for the receiver. The allocation resulting from *right* is systematically varied between games and the order in which the games were completed was randomised.

In the Pro–social Game, the action *right* results in an allocation of (5,0) - 5 points for the dictator and 0 points for the receiver. This game allows the dictator to avoid advantageous inequality without incurring a cost, and serves to measure the dictator's willingness to avoid it. Choosing *left* could stem from a preference to avoid inequalities (Fehr & Schmidt, 1999), from efficiency concerns (Charness & Rabin, 2002) or from the desire to maximize the minimum payoff. A self–interested individual is indifferent between either choice. In the Envy Game the action *right* produces an allocation of (5,10), and serves to provide a measure of the dictator's willingness to costlessly lower the receiver's payoff, reducing disadvantageous inequality. In the Sharing Game, a choice of *right* produces an allocation of (10,0). Choosing the egalitarian choice in the Sharing Game is costly for the dictator, in contrast to the Pro–social Game, which would show a strong form of inequality aversion.

These games were chosen because the actions taken in each game, when considered collectively, can be used to determine the motives underpinning each dictator's decisions. Following the classifications of Fehr et al. (2008, 2013), each dictator can be categorised as an altruistic, egalitarian or spiteful behavioural type, with strong and weak sub–types, depending on the dictators' choice pattern. Table II outlines these classifications in detail. We acknowledge that, as with the studies of Fehr et al. (2008, 2013), a perfectly selfish individual would randomise between *left* and *right* in the Pro–social and Envy Games, but select *right* in the Sharing game, and thus may appear as Weakly Altruistic, Weakly Egalitarian or Spiteful. To address this, we have examined the data to see if we observe similar proportions of Weakly Altruistic, Weakly Egalitarian and Spiteful types. Formally testing this, we can reject the null hypothesis that these proportions are equal ($p < 0.001$, χ^2 Test, $d.f=2$).

In each game, 1 point corresponds to €1, an exchange rate that was employed for all age groups. We did not want to introduce a potential confound by varying the incentives by age (toys, stickers or sweets as incentives for the *Children*, and money for the other age groups) as there is evidence that non–monetary incentives result in significantly more pro–social behaviours (see Fehr et al. (2008) versus Fehr et al. (2013)). A similar result is also observed by Moore (2009). This is likely a consequence of sharing norms associated with food and sweets, or different responses to different reward types (House & Tomasello, 2018).[8]

[8] Although asking subjects to make multiple decisions may induce moral balancing or licensing, this should be present across all age groups and in all treatments, and as such is independent of age and the in/out–group manipulation.

Behavioural Type	*Pro–social*	*Envy*	*Sharing*
Strongly Egalitarian	(5,5)	(5,5)	(5,5)
Weakly Egalitarian	(5,5)	(5,5)	(10,0)
Strongly Altruistic	(5,5)	(5,10)	(5,5)
Weakly Altruistic	(5,5)	(5,10)	(10,0)
Spiteful	(5,0)	(5,5)	(10,0)

Note: Behavioural types are taken from Fehr et al. (2008).

Table II: Behavioural Types

3 Results

In this section, we outline the experimental results. A number of common features are present throughout. Where non–parametric tests are utilised, both the p–value and test used are presented in parentheses. All tests are two sided, unless otherwise stated. All parametric support is obtained from marginal effects estimated from Probit regressions. Tables presenting full regressions are given in Appendix B. We present the results relating to social preferences in Section 3.1 and analyse group biases in Section 3.2.

3.1 Social Preferences

The analysis focuses on each subject's choice pattern across the three games, rather than considering the subjects' choices from each game separately. This enables us to interpret each subject's behaviour within the Fehr et al. (2013) framework, and keeps the analysis concise. We first categorise subjects into each of the behavioural types, as specified in Table II. Figure 2a presents the distribution of these types, showing the percentage of subjects categorised for each age group. Pooling the weak and strong subtypes, Figure 2b plots the percentage of subjects categorised into three broad categories.

Table III presents the estimates of marginal effects from Probit regressions, where in each regression the dependent variable is a dummy that takes a value of 1 (and 0 otherwise) if the subject has been classified into one of the behavioural types - egalitarian in regression (i), altruistic in (ii) and spiteful in (iii).

In each regression we include the following variables: the subjects' age in years, the subjects' age in years squared, a dummy variable that takes a value of 1 if the subject is female, the interaction between the subjects' gender and their age, and a dummy that takes a value of 1 if the interaction is in–group (i.e. the receiver is from *Spain*). We include age squared in the regressions in order to capture any non–linear effects associated with age. The interaction between the subjects' gender and their age is included to account for gender differences that might emerge over time. Finally, we include an in–group dummy in order to account for any in–group/out–group effects that the literature has previously found to be important.[9]

Following Fehr et al. (2008), we focus the analysis on the marginal effect of the variable *Age*, which is the subjects' age in years, and then on the marginal effect of *Female*, the dummy variable that takes a value of 1 if the subject is female. We estimate the marginal effect of both these variables for each age group. The age brackets themselves are not included in the regressions. The coefficient estimates are therefore not the level effect of being in one of these age brackets, but the estimated

[9] All our estimates are robust to the inclusion of additional control variables. These estimates can be found in Table VII, Appendix B.

effect of increasing age by one year (or being female), at the empirical mean of the respective age group. Figure 3a and Figure 3b plot the estimated marginal effects of age and female graphically.

In addition to following the methodology of Fehr et al. (2008), we also estimate a multinomial logit model to examine the robustness of our results. We estimate the model using the same explanatory variables as those used in the Probit models, but allow for three unordered outcomes rather than using a binary dependent variable. The estimates of log–odds of age, age squared and the gender dummy are presented in Table IV.

Dependent Variable:	*Egalitarian Type* (*i*)	*Altruistic Type* (*ii*)	*Spiteful Type* (*iii*)
Marginal Effect of Age:			
Children	-0.037***	0.033***	-0.001
	(0.003)	(0.002)	(0.003)
Teenagers	-0.034***	0.037***	-0.001
	(0.004)	(0.004)	(0.002)
Students	-0.025***	0.029***	-0.001
	(0.003)	(0.003)	(0.001)
Adults	0.025***	-0.027***	-0.001
	(0.005)	(0.005)	(0.001)
Marginal Effect of Female:			
Children	0.096**	-0.045	-0.054*
	(0.044)	(0.037)	(0.032)
Teenagers	0.132***	-0.104**	-0.017
	(0.043)	(0.044)	(0.022)
Students	0.136***	-0.132***	0.005
	(0.039)	(0.042)	(0.022)
Adults	0.186*	-0.285***	0.077**
	(0.096)	(0.097)	(0.039)

Note: ***, **, * denote significance at the 1%, 5% and 10% levels. Standard errors in parentheses. All reported estimates are from Probit regressions. The marginal effects of *Age* and *Female* are calculated for each regression, and are evaluated at the mean of each age group. Age is the reported age of the subject, and treated as a continuous variable. The results remain quantitatively similar if additional control variables are included. The number of observations differ to those reported in Table I due to missing entries. The observations from sixteen subjects are dropped, as we were unable to categorise them into either one of the three behavioural types. Full regressions given in Table VI, Appendix B.

Table III: Marginal Effect - Determinants of Behavioural Type

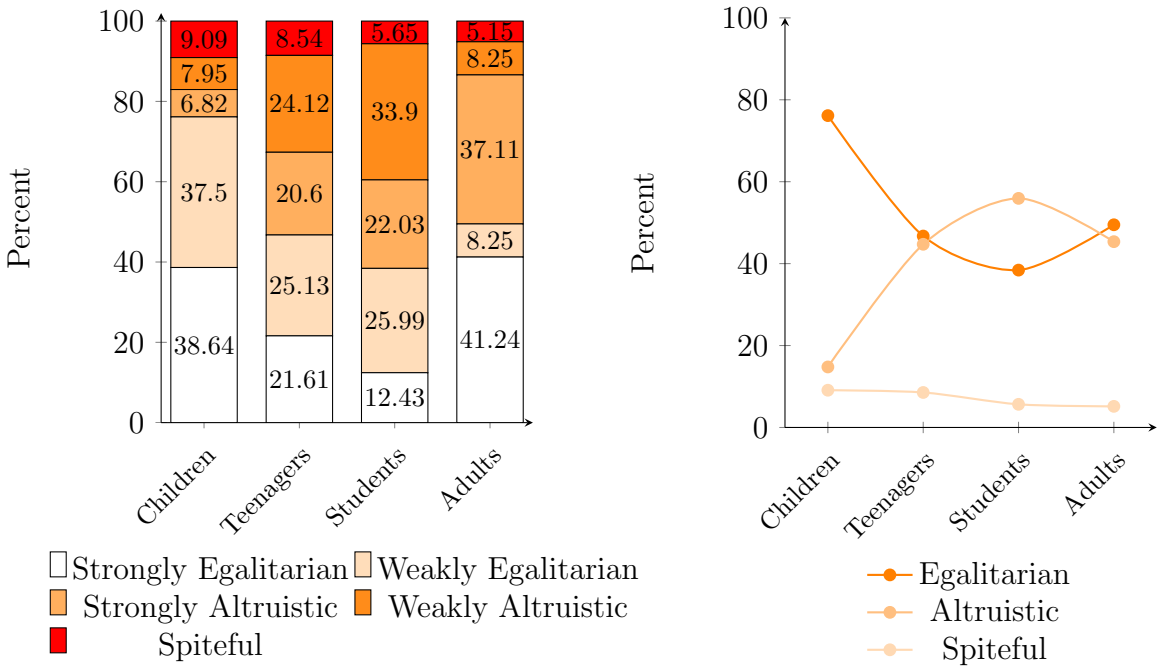
Observation 1. (Development of Behavioural Types) *There is a non–linear relationship between egalitarianism and age. Age reduces egalitarianism in Children, Teenagers and Students, but increases egalitarianism in Adults. The inverse holds for altruism.*

Support. Combining the *Weak* and *Strong* subtypes from Figure 2a, the percentage of egalitarian types is highest for *Children* (76.1%). Initially, this percentage falls with the subjects' age, being smaller in *Teenagers* and *Students*. However, it then increases in *Adults*. This indicates a 'U–Shaped' relationship, as observed in Figure 2b. In contrast, an inverse 'U–Shape' holds for altruistic types, increasing from *Children* to *Teenagers*, peaking for *Students*, before falling in *Adults*. Figure 2a also

Behavioural Type	*Explanatory Variable*	*Coefficient Estimate*	*Standard Error*
Altruistic	*Age*	0.329***	(0.042)
	Age^2	0.07	(0.064)
	Female	-0.005***	(0.001)
Spiteful	*Age*	-0.002**	(0.001)
	Age^2	-0.19	(0.373)
	Female	-1.548**	(0.805)

Note: ***, **, * denote significance at the 1%, 5% and 10% levels. Standard errors in parentheses. The results remain quantitatively similar if additional control variables are included. The observations from sixteen subjects are dropped, as we were unable to categorise them into either one of the three behavioural types. Egalitarian Types are taken as the baseline. Included variables are identical to those in Table VI.

Table IV: Multinomial Logit Estimates - Determinants of Behavioural Type

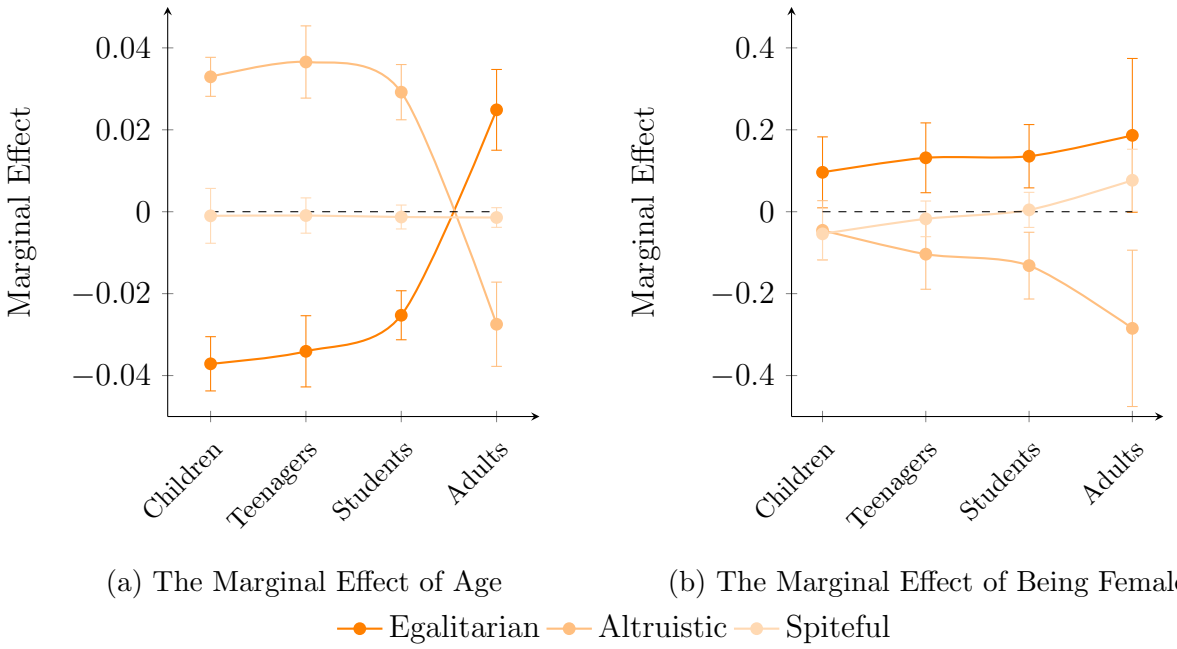


(a) Distributions of Behavioural Types

(b) Percentage of Behavioural Types

Note: For Figure 2a, we were unable to classify sixteen subjects into one of the five behavioural types. Figure 2b plots the combined percentage of weak and strong classifications for each behavioural type for each age group.

Figure 2: Behavioural Types by Age



(a) The Marginal Effect of Age

(b) The Marginal Effect of Being Female

Note: The x axis plots the age group at which the marginal effect is evaluated at. In Figure 3a, the y axis plots the marginal effect of age on the probability of being classified into each of the behavioural types. In Figure 3b, the y axis plots the effect of *Female* on the probability of being classified into each of the behavioural types. Marginal effects estimates are given in Table III. Vertical bars represent 95% confidence intervals.

Figure 3: Behavioural Types - Marginal Effects

reveals that the majority of *Adults*' preference types (78.3%) can be categorised as *Strong*. This compares to just 45.4% of *Children*, 42.2% of *Teenagers* and 34.4% of *Students*. Examining the relationship parametrically, Table III shows the estimated marginal effect of age on the probability of being classified as one of the behavioural type for each age group. It outlines how age has a negative effect on the probability that a dictator is categorised as an egalitarian type for *Children*, *Teenagers* and *Students*, but has a positive effect for *Adults*. This is shown graphically in Figure 3. The log–odds estimates in Table IV corroborate the marginal effect estimates from the Probit models.

Observation 2. (Gender Differences) *Females are more likely to be classified as egalitarian, and are less likely to be classified as altruistic, than males. Adult females are more likely to be classified as a spiteful type than Adult males.*

Support. Table III highlights the significant positive marginal effect of being female on being classified as an egalitarian type for all age groups ($p < 0.05$ for *Children*, $p < 0.01$ for *Teenagers* and *Students*, and $p < 0.1$ for *Adults*). Table III also shows that a negative female effect on altruism emerges in *Teenagers* and persists into the *Adults* ($p < 0.01$ for all age groups except *Children*). There is a weak and small negative female effect in spiteful types for *Children* ($p < 0.1$) and a positive effect in *Adults* ($p < 0.05$).

Observation 1 highlights how age negatively impacts egalitarianism, but positively impacts altruism, in *Children*, *Teenagers* and *Students*. This replicates the previous work of Fehr et al. (2013), who report identical results in children aged 8–17. However, the inverse is true for *Adults*, and through the inclusion of this age group, we are able to identify both a 'U–shaped' relationship between age

and the proportion of egalitarian types, and an inverted 'U–shaped' relationship for the proportion of altruistic types, that had previously gone unnoticed and appeared linear.

We find no evidence that age reduces spitefulness, as found by Fehr et al. (2013). This is likely due to the fact that we observe a significantly smaller proportion of *Children* to be spiteful types (9.1% compared to 30%) and in line with the findings of Fehr et al. (2013), we find no gender differential in these types. In contrast to Fehr et al. (2013), and highlighted by Observation 2, we observe a later onset of gender differences in altruistic types, as we report the differential emerging in *Teenagers* rather than in *Children*. One potential explanation for the observed behaviour is that expectations about what one ought to do (i.e., the injunctive norm) differ across age groups (see House (2018) for a recent discussion of how social norms affect prosocial behaviour). For example, it may be that the 50:50 split is the taught norm in very young children which weakens with age. However, by the time individuals reach adulthood, both egalitarian as well as altruistic behaviour could be seen as normative. An interesting avenue for further research that would solidify the U–shape relationship between age and egalitarianism is to investigate the pro–social behaviour of the elderly.

It is interesting to note that, through the use of the particular constellation of games that we study, i.e. the inclusion of a test of disadvantageous inequality (Envy Game) in addition to a test of advantageous inequality (Sharing Game), females are found to be increasingly egalitarian with age. This contrasts with the conventional finding from standard dictator games, where women are found to be more generous, i.e. they give more than men (see Croson & Gneezy (2009) for an overview of the gender differences literature, and Engel (2011) for a meta analysis of dictator game results).

3.2 Group Biases

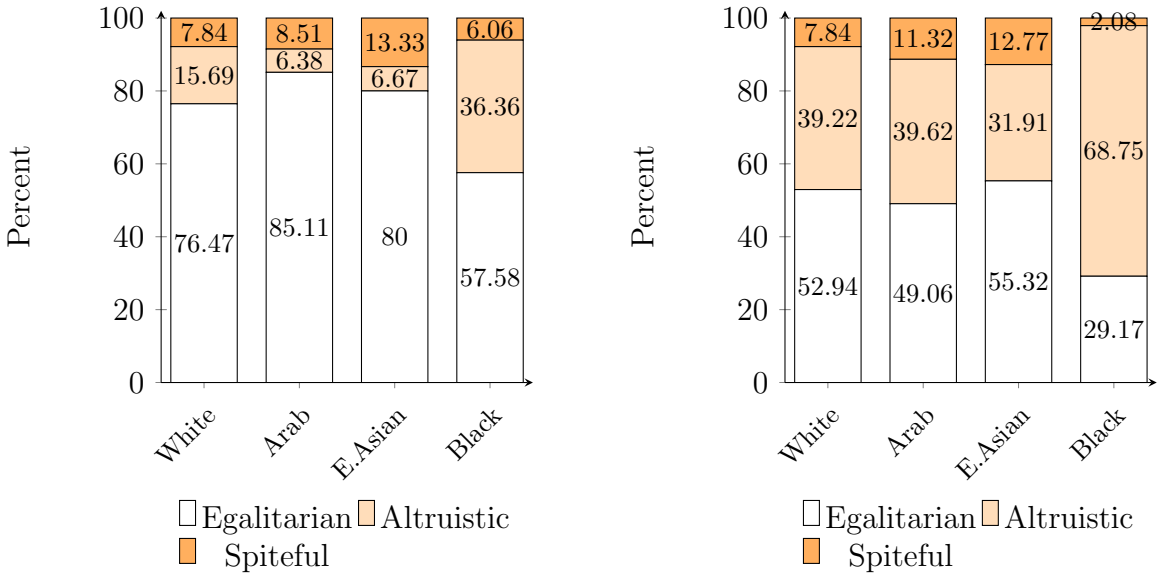
To examine if dictators condition their behaviour on the receivers' ethnicity, we conduct pairwise comparisons of the behavioural patterns of dictators matched to each of the four ethnicities: *White*, *Arab*, *Black* and *East–Asian*. As in the previous section, we focus on dictators' choice patterns across the three games, rather than considering each game individually. Figure 4 presents the distributions of the three broad behavioural types for each of the four ethnicities we study, by age group. This allows for simple within group comparisons.

Table V presents the estimates of marginal effects from Probit regressions, where in each regression the dependent variable is a dummy that takes a value of 1 if the subject has been classified into one of the behavioural types. In each regression, presented in Table IX, Appendix B, we include the same variables as those outlined in Section 3.1, along with three additional dummies, *Arab*, *Black*, *East Asian*, that take values of 1 and 0 otherwise for each of the three ethnicities we examine; *White* is taken as the baseline. We further include the interaction of these dummies with age. These are included in order to identify any ethnicity effects, and how these effects might develop with age.

From each regression we estimate the marginal effect of the ethnicity variables, *Arab*, *East–Asian* and *Black*, on the probability of being classified into each behavioural type, for each age group. As outlined above, *White* observations are taken as the baseline. The estimates are presented graphically in Figure 5.

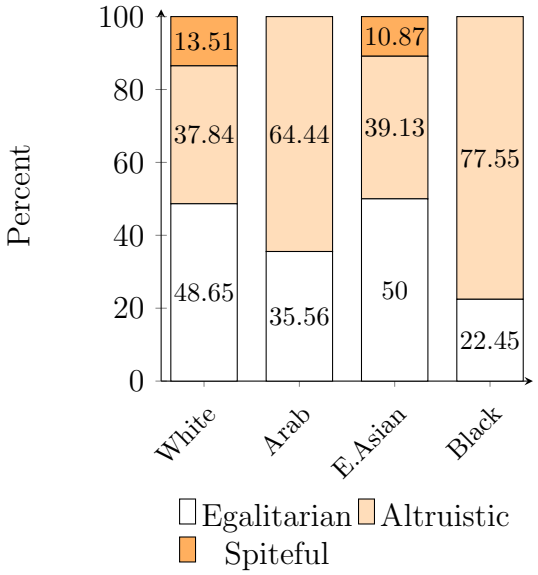
Observation 3. (**Group Dependent Behavioural Types**) *Children, Teenagers and Students are least likely to be an egalitarian and spiteful type, but most likely to be an altruistic type, when the receiver is Black. The Adults' behavioural type is unaffected by the receivers' ethnicity.*

Support. Figure 4 highlights how, for all age groups the distribution of types is relatively stable across all ethnicites. The only notable exception is when the receiver is *Black*: for all age groups, except the *Adults*, the percentage of subjects classified as being egalitarian is smallest when the re-

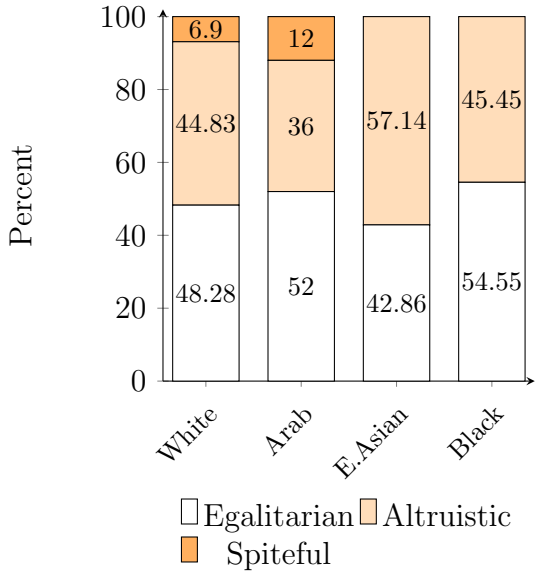


(a) Children

(b) Teenagers



(c) Students



(d) Adults

Note: We were unable to classify sixteen subjects into one of the behavioural types.

Figure 4: Behavioural Types by Age Group and the Receivers' Ethnicity

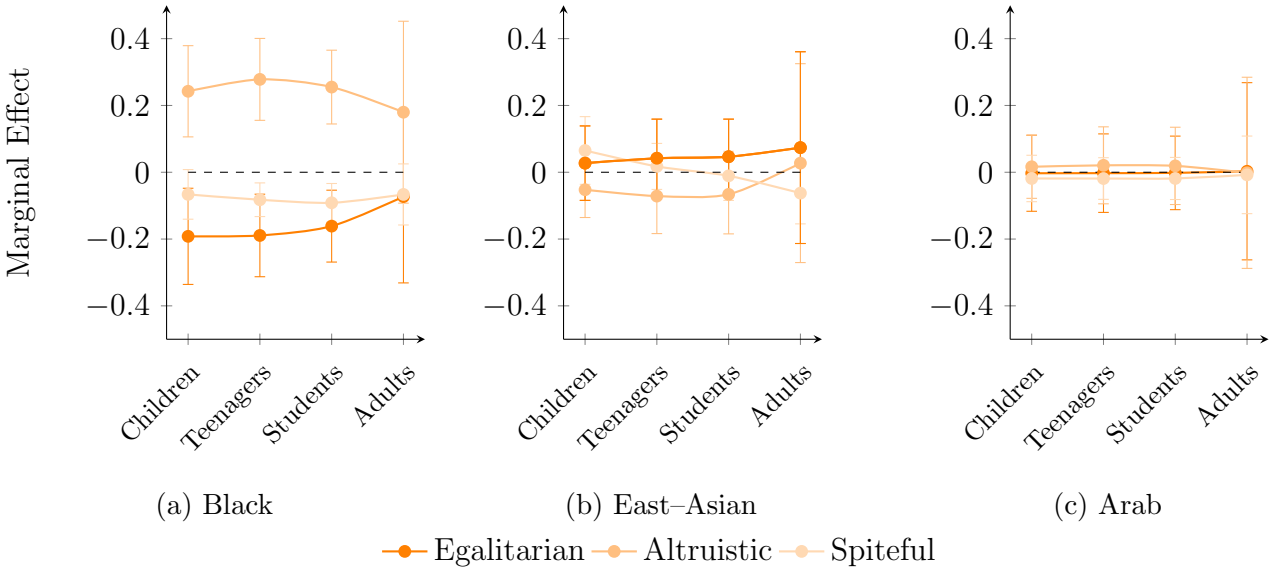
ceiver is *Black*. The inverse is true for altruism, with altruists being the most prevalent type when the receiver is *Black* for all age groups except the *Adults*.

The estimates in Table V support this observation formally: when the receiver is *Black*, the *Children*, *Teenagers* and *Students* are less likely to be egalitarian, more likely to be altruistic in comparison to when the receiver is *White*. The receivers' ethnicity has no impact on the any of the marginal effects for the *Adults*. The marginal effects of all other ethnicities are estimated not to be significant for all age groups. The marginal effects are shown graphically in Figure 5.

Dependent Variable:	*Egalitarian Type*			*Altruistic Type*			*Spiteful Type*		
Marginal Effect:	*Arab*	*E.Asian*	*Black*	*Arab*	*E.Asian*	*Black*	*Arab*	*E.Asian*	*Black*
Children	-0.003	0.027	-0.192***	0.016	-0.052	0.242***	-0.019	0.065	-0.066*
	(0.058)	(0.057)	(0.073)	(0.048)	(0.042)	(0.07)	(0.035)	(0.052)	(0.038)
Teenagers	-0.003	0.042	-0.189***	0.021	-0.071	0.278***	-0.019	0.018	-0.082***
	(0.06)	(0.06)	(0.063)	(0.059)	(0.057)	(0.063)	(0.032)	(0.035)	(0.026)
Students	-0.002	0.047	-0.161***	0.019	-0.066	0.255***	-0.019	-0.011	-0.091***
	(0.056)	(0.057)	(0.055)	(0.059)	(0.06)	(0.056)	(0.032)	(0.038)	(0.029)
Adults	0.003	0.074	-0.073	-0.002	0.027	0.18	-0.008	-0.063	-0.066
	(0.135)	(0.135)	(0.132)	(0.146)	(0.146)	(0.139)	(0.059)	(0.059)	(0.047)

Note: ***, **, * denote significance at the 1%, 5% and 10% levels. Standard errors in parentheses. The reported marginal effects are estimated from the regressions given in Table IX, Appendix B, evaluated at the mean for each age group. The results remain quantitatively similar if additional control variables are included. *White* receivers are taken as the baseline.

Table V: Marginal Effects - Identity and Behavioural Type



Note: The x axis plots the age group at which the marginal effects are evaluated. The y axis plots the marginal effect of the receivers' ethnicity on the probability of being classified into each of the behavioural types. The estimated marginal effects are given in Table V, and are evaluated at the mean. Vertical bars represent 95% confidence intervals. The *Spain* treatment is taken as the baseline.

Figure 5: Behavioural Type and the Receivers' Ethnicity - Marginal Effects

Observation 3 provides evidence of positive discrimination in *Children*, *Teenagers* and *Students* expressed uniquely towards *Black* receivers. This finding seemingly contrasts with a prevalent result

in this literature, in which we typically observe in–group favoritism and out–group discrimination.[10]

One explanation for why we do not observe in–group favouritism is that simple physical cues and references to a foreign country may not have been enough to induce a sense of identity. This explanation is consistent with the results of Brewer & Silver (2000). Further, as has been previously discussed, all our ethnicity manipulations would be considered to be an out–group by Fehr et al. (2008, 2013).[11]

Alternatively, the observed behaviour could be a result of a social desirability bias: subjects may want to be perceived as behaving in a social desirable manner, and thus behave more altruistically towards those they perceive as being the most in need. This, however, would not explain why the *Adults* do not respond altruistically to *Black* receivers in the same manner that the *Children* do. A social desirability bias is likely to be most prevalent in *Adults*, who are more likely to be sensitive to normative pressures, and least prevalent in *Children*, who are likely to be unaware of such norms. As speculated by (Baker, 2015), negative prejudices towards the out–group may not necessarily produce animosity. For example, he finds that white Americans are more positive about giving aid when the recipient is of African descent in comparison to those of Eastern–European descent, despite the individuals having similar material needs. Paternalistic behaviour, in the form of altruism towards out–group members, can emerge when subjects feel warmly toward groups they assume to be lacking in a capacity to act. However, as with the other potential explanations, this doesn't seem to be the case for *Adults*.[12]

4 Conclusion

We report evidence of a 'U–shaped' relationship between social preferences and age, with egalitarianism found first to diminish with age, but then to increase as individuals grow older. The inverse U–shaped' relationship is true for altruism. These observations contribute to the literature on the development of social preferences, as previous findings that do not include adults in the analysis had suggested egalitarianism decreases with age, whilst altruism becomes more prevalent. This is important, as altruism has been argued to be a prerequisite for 'smooth' workplace interactions (Fehr et al., 2013), being required for individuals to accept inequalities in the workplace. Therefore, our finding that altruism becomes less prevalent in adulthood may have implications for understanding what motivates different age groups in the workplace, particularly in relation to salary disparities.

The differences in behaviour across age groups could be attributed to income differences. For example, *Adults* earn more money than all other age groups and, as a consequence, payoffs earned in the experiment constitute a relatively smaller amount of the income they have available. However, such an income effect might predict that *Adults* would behave in a more altruistic way than other age groups, as the choices in all the games that make the recipient better off are relatively less costly. This is not what we observe.

By varying the receivers' ethnicity, our paper also addresses recent behavioural theories of discrimination that indicate that social preferences are group–contingent. In contrast to previous studies that examine an interpersonal sense of identity, we report evidence of paternalism towards the out–group, rather than preferential treatment of the in–group, when utilising a broader, more collective

[10] In a meta–analysis of 77 lab studies published in economics, Lane (2016) reports that 93% of these studies report evidence of in–group favouritism.

[11] It is possible that the parochialism manipulation may not have been strong enough to induce the group effects observed in some of the previous literature, and other ethnic group cues such as language might have been more effective (see for example Esseily et al. (2016))

[12] Appendix B shows that our results are robust to the potential issue of multiple hypothesis testing.

sense of identity. This is particularly strong in *Children*, *Teenagers* and *Students*. However, out–group favouritism is not ubiquitous. It is only observed in interactions with *Black* foreign receivers, but not in interactions with *East–Asian* or *Arab* foreign receivers.

That *Children* favour *Black* foreign receivers, but not the other ethnic groups, is particularly striking given that they could only infer differences through appearance. Although not biased in favour of the in–group as is typically found, the finding that children are both aware and sensitive to the ethnic appearance characteristics of others is in line with previous findings in the developmental psychology literature (Lam et al., 2011).

Our findings highlight the importance of studying social preferences from both an early age and in later life. As social preferences can enhance efficiency in many workplace interactions, understanding how they develop over the life cycle is important for understanding how socialisation can impact preferences over outcomes. With the working population growing older, and workplaces becoming more diverse, understanding the interaction between social preferences, age and identity is therefore important for the design of institutions and their associated incentives in many societies.

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A Experimental Material

A.1 Recruitment Procedures

A.1.1 Spanish Receivers

The main part of the experiment was conducted in the city of Granada, Spain. Granada is a southern city of Spain composed of predominantly people who are Caucasian (white) and catholic in their religious beliefs. There is a growing minority of Arabs and Muslims. Granada's economy is dedicated mainly to tourism, (through the attractions of the Alhambra Palace and the Sierra Nevada) and agriculture. It has a population of 236,000.

We recruited *Children* and *Teenagers* from six different schools in the city. All classes within the schools had between 20 and 35 students, both in the elementary and high schools. The *Students* were recruited from the University of Granada, which has a student body of 68,000. In our experiment, participants came from different faculties of the University: the Faculty of Economics and Business, the Faculty of Education Sciences and the Faculty of Humanities.

Half of the *Adults* were recruited from the parent body of the *Children*, with the other half being employees of the University of Granada. The average age was 45 years and 57 percent of the adult sample holds a university degree.

A.1.2 Chinese Receivers

Receivers from *China* were recruited in Changde, Hunan province, located in South Central China. The population composition of Changde is more homogeneous than that of east coast cities with similar sized populations and economies because few residents are immigrants. We chose institutions with individuals from urban as well as rural backgrounds, to control for potential Hukou differences between groups. See Afridi et al. (2015) for a discussion of the differences between Hukou groups.

Children were recruited from an elementary school located at an intersection between urban and rural districts of Changde. The school consisted of 18 classes with over 1,000 students, with 70% of the students being from a rural area. To match with Spanish participants, we recruited 50 students from a fourth grade class with an equal gender composition, and an age range from 9 to 11.

Similar to our recruiting protocol for the *Children*, we recruited 48 *Teenagers* aged 13 to 15 from a ninth grade high school class. This school included 30 senior high school classes and 24 junior high school classes with a total of over 3,000 students. *Students* were recruited from a large undergraduate class in a local college: Hunan University of Arts and Sciences. It has over 23,000 undergraduates, and most of them are local residents or from nearby areas within the Hunan province. In total, 50 *Students* participated in our study aged between 18 and 24 years old.

Lastly, we recruited 23 *Adults* (teachers) aged 35 to 59 from another elementary school. This school is considered to be the most competitive elementary school in Changde, where 86% teachers have at least a junior college degree.

A.1.3 Moroccan and Senegalese Receivers

In Morocco, the experiment took place in Tangier, the biggest city in North–Western Africa, and located on the Mediterranean coast. In Senegal the experiment took place in Dakar, the capital and largest city of the country. In the Human Development Ranking these countries are, respectively, in positions 126 (Morocco) and 170 (Senegal) of 188 countries. Residents are predominantly Muslim in both countries (Morocco 99.5%; Senegal 90%).

With respect to the field work, in both countries we had the full support of an international NGO (Alliance for Solidarity) both before and after the experiment. The NGO requested the permits required for the experiment and completed the translation of the documents (instructions, survey) into the local languages (Arabic and French). They were also in charge of recruitment (following our instructions). Subjects of equal gender composition were recruited from a homogeneous population in low income schools that require their students to wear school uniforms. School uniforms were required as we didn't want clothing to be indicative of potential income differences. The NGO also provided staff members to run the experiment.

In Tangier we recruited 47 *Children* and 54 *Teenagers* from two elementary schools situated in suburban areas. In Dakar, 33 *Children* and 49 *Teenagers* were recruited from the outskirts of Dakar. *Students* in both countries were recruited from undergraduate classes in two local colleges.

Finally, we recruited 48 *Adults*. In Tangier the adults were part of the staff of a school, as well as parents of the primary school. In Dakar, they belonged to a Neighbourhood Association in the same area of the *Children*'s school. The majority of them were women, given that in both cities they represent the majority of members at this type of association.

A.2 Experimental Instructions

A.2.1 General Comments

Welcome to this experiment. Here you will find the instructions for the tasks you have to fulfill.

There are no right or wrong answers, your identity will not be known at any time and we will use only the information you provide. The goal of this experiment is to study how people make decisions. The instructions are very easy and if you follow them carefully you can receive some money. It is very important that you understand the instructions. If you have any questions, do not hesitate to raise your hand and ask the experimenter. Besides these questions, any kind of communication is completely forbidden and you could even be expelled from the experiment.

A.2.2 Specific Instructions – Dictators

This experiment consists of one period. You will be matched with a person from the following group (see picture).

There are two types of participants: Type A and Type B. You will participate as Type A and your counterpart (somebody from the picture) will be Type B. You have to make three decisions. For each decision you have to choose between two allocations of money (Payoff A, Payoff B) with the first number indicating the payoff to you and the second number indicating the payoff to Type B. The decisions that you face are shown in the following table.

	Left	Right	
	(Payoff A, Payoff B)	(Payoff A, Payoff B)	Decision Left–Right
Decision 1	(€5,€5)	(€5,€0)	
Decision 2	(€5,€5)	(€5,€10)	
Decision 3	(€5,€5)	(€10,€0)	

Type B will not make any decisions in this task. They will only be informed about what you have chosen. Only one of the three decisions will be selected for payment. Earnings will therefore only depend on your decisions.

A.2.3 Specific Instructions – Receivers

This experiment consists of one period. You will be matched with a person from the following group (see picture).

There are two types of participants: Type A and Type B. You will participate as Type B and your counterpart (somebody from the picture) will be Type A. Type A has to make three decisions. For each decision Type A has to choose between two allocations of money (Payoff A, Payoff B) with the first number indicating the payoff to Type A and the second number indicating the payoff to you. The decisions that Type A faces are shown in the following table.

	Left	Right	
	(Payoff A, Payoff B)	(Payoff A, Payoff B)	Decision Left–Right
Decision 1	(€5,€5)	(€5,€0)	
Decision 2	(€5,€5)	(€5,€10)	
Decision 3	(€5,€5)	(€10,€0)	

You as Type B will not make any decisions in this task. You will only be informed about what Type A has chosen. Only one of the three decisions will be selected for payment. Earnings will therefore only depend on Type As decisions.

B Statistical appendix

This section presents tables of the complete Probit regression from Section 3.

B.1 Parametric Analysis

This section presents a number of tables of estimates obtained from Probit regressions, along with their corresponding marginal effects.

Dependent Variable:	*Egalitarian Type* (*i*)	*Altruistic Type* (*ii*)	*Spiteful Type* (*iii*)
Age	-0.1645***	0.187***	-0.0213
	(0.0216)	(0.0229)	(0.0302)
*Age*Age*	0.0025***	-0.0027***	-0.0002
	(0.0004)	(0.0004)	(0.0006)
*Female*Age*	0.0052	-0.0153*	0.039*
	(0.009)	(0.0093)	(0.0204)
Female	0.252	-0.0325	-0.7289*
	(0.2049)	(0.2138)	(0.3729)
In–group	0.0869	-0.1677	0.1807
	(0.1184)	(0.1222)	(0.1661)
Constant	1.8214***	-2.3301***	-1.0575***
	(0.2664)	(0.2853)	(0.3621)
Obs.	633	633	633

Note: ***, **, * denote significance at the 1%, 5% and 10% levels. Standard errors in parentheses. All reported estimates are from Probit regressions. The results remain quantitatively similar if additional control variables are included. The number of observations differ to those reported in Table I due to missing entries. The observations from sixteen subjects are dropped, as we were unable to categorise them into either one of the three behavioural types.

Table VI: Probit Estimates - Determinants of Behavioural Type

C Robustness Checks

As we examine the data for a number of treatment effects, with 60 hypothesis tests in total (24 in Table III and 36 in Table V) some of the statistical significance that we observe may be an artefact of multiple hypothesis testing (MHT). To account for this, we adjust the calculated p–values used to support Observations 1–3 using the Holm–Bonferonni (HB) correction procedure. We treat all 60 tested hypotheses as being part of the same 'family' of tests, and therefore apply the strictest possible correction. This is one of the most standard procedures used to correct for multiplicity in the sciences, and we use this procedure over the more conservative Bonferroni procedure because of its reduced false negative rate, and thus, increased power (Holm, 1979).

Table X presents the p–values that remain significant once the correction has been applied. The first column provides information on the Table the original p–value is taken from, the second column outlines which Observation the p–value is used to support. The third column shows the dependent variable and the fourth column gives information on the estimated marginal effect. The fifth column

Dependent Variable:	*Egalitarian Type* (*i*)	*Altruistic Type* (*ii*)	*Spiteful Type* (*iii*)
Marginal Effect of Age:			
Children	-0.028***	0.025***	0.000
	(0.005)	(0.004)	(0.004)
Teenagers	-0.029***	0.031***	-0.000
	(0.006)	(0.006)	(0.003)
Students	-0.021***	0.025***	-0.001
	(0.005)	(0.005)	(0.002)
Adults	0.02***	-0.022***	-0.001
	(0.006)	(0.007)	(0.002)
Marginal Effect of Female:			
Children	0.103**	-0.052	-0.057
	(0.051)	(0.043)	(0.036)
Teenagers	0.137***	-0.103**	-0.03
	(0.053)	(0.053)	(0.026)
Students	0.129***	-0.119**	-0.009
	(0.047)	(0.05)	(0.026)
Adults	0.118	-0.203	0.09
	(0.121)	(0.125)	(0.059)

Note: ***, **, * denote significance at the 1%, 5% and 10% levels. Standard errors in parentheses. All reported estimates are from Probit regressions. The marginal effects of *Age* and *Female* are calculated for each regression, and are evaluated at the mean for each age group. Age is the reported age of the subject, and treated as a continuous variable. The observations from sixteen subjects are dropped, as we were unable to categorise them into either one of the three behavioural types.

Table VII: Marginal Effects with Additional Controls - Determinants of Behavioural Type

details the age group the p–value relates to. The sixth column gives the original p–value, and the final column the Holm–Bonferonni corrected p–value.

As an example, consider the first row of Table X. The p–value is taken from Table III, relates to Observation 1, the dependent variable is the egalitarian type and the marginal effect the p–value relates to is the marginal effect of age. It was calculated for *Children*, had a value of $p < 0.001$ and once corrected is still less than 0.001, and remains highly significant.

As can be seen from the corrected p–values presented in Table X, Observation 1 can be clearly distinguished from Type 1 error, with the estimated marginal effect of age remaining statistically significant at the $p < 0.001$ level for both the egalitarian and altrustic types. However, Observation 2 is not as robust, with only a gender difference in *Students* remaining once all p–values have been corrected for. Observation 3 is also found to be robust to criticisms of multiplicity, with all age groups except *Adults* being more altruistic when the receiver is *Black*, as originally observed. Thus, we conclude that our main observations are unlikely to be the result of MHT and appear to be robust to such criticisms.

Dependent Variable:	*Egalitarian Type* (*i*)	*Altruistic Type* (*ii*)	*Spiteful Type* (*iii*)
Marginal Effect of Age:			
Children	-0.037***	0.033***	-0.002
	(0.003)	(0.002)	(0.003)
Teenagers	-0.033***	0.036***	-0.001
	(0.004)	(0.004)	(0.002)
Students	-0.025***	0.029***	-0.001
	(0.003)	(0.003)	(0.001)
Adults	0.02***	-0.02***	-0.001
	(0.003)	(0.003)	(0.002)
Marginal Effect of Female:			
Children	0.096**	-0.045	-0.054*
	(0.044)	(0.037)	(0.032)
Teenagers	0.131***	-0.103**	-0.018
	(0.043)	(0.043)	(0.022)
Students	0.135***	-0.131***	0.004
	(0.039)	(0.041)	(0.022)
Adults	0.167*	-0.245***	0.073**
	(0.086)	(0.085)	(0.037)

Note: ***, **, * denote significance at the 1%, 5% and 10% levels. Standard errors in parentheses. All reported estimates are from Probit regressions. The marginal effects of *Age* and *Female* are calculated for each regression for each age group. Age is the reported age of the subject, and treated as a continuous variable. The results remain quantitatively similar if additional control variables are included. The observations from sixteen subjects are dropped, as we were unable to categorise them into either one of the three behavioural types.

Table VIII: Average Marginal Effects - Determinants of Behavioural Type

Dependent Variable:	*Egalitarian Type* (*i*)	*Altruistic Type* (*ii*)	*Spiteful Type* (*iii*)
Age	-0.164***	0.182***	0.009
	(0.024)	(0.025)	(0.037)
Age× *Age*	0.002	-0.003	-0.001
	(0.00)	(0.00)	(0.00)
Female×	0.004	-0.013	0.041***
	(0.00)	(0.00)	(0.008)
Female	0.28***	-0.104***	-0.767
	(0.017)	(0.021)	(0.00)
Arab	-0.014	0.086**	-0.156***
	(0.04)	(0.042)	(0.054)
E.Asian	0.067*	-0.341***	0.737***
	(0.045)	(0.045)	(0.092)
Black	-0.627***	0.838***	-0.364***
	(0.028)	(0.03)	(0.098)
Arab× *Age*	0.00	-0.002	0.002
	(0.00)	(0.00)	(0.00)
E.Asian × *Age*	0.003	0.009	-0.041
	(0.00)	(0.00)	(0.00)
Black × *Age*	0.009	-0.008	-0.044
	(0.00)	(0.00)	(0.00)
Constant	1.906	-2.413	-1.249
	(0.00)	(0.00)	(0.00)
Obs.	633	633	633

Note: ***,**, * denote significance at the 1%, 5% and 10% levels. Standard errors in parentheses. All reported estimates are from Probit regressions. The results remain quantitatively similar if additional control variables are included. The number of observations differ to those reported in Table I due to missing entries. The observations from sixteen subjects are dropped, as we were unable to categorise them into one of the three types.

Table IX: Probit Estimates - Identity and Behavioural Types

Table	*Observation*	*Dep. Variable*	*Marginal Effect*	*Age Group*	p–value	Corrected p–value
Table III	*Observation 1*	*Egalitarian Type*	*Age*	*Children*	0.000	0.000
				Teenagers	0.000	0.000
				Students	0.000	0.000
				Adults	0.000	0.000
		Altruistic Type		*Children*	0.000	0.000
				Teenagers	0.000	0.000
				Students	0.000	0.000
				Adults	0.000	0.000
Table III	*Observation 2*	*Egalitarian Type*	*Female*	*Students*	0.0006	0.0288
Table V	*Observation 3*	*Altruistic Type*	*Black*	*Children*	0.0005	0.025
				Teenagers	0.000	0.0004
				Students	0.000	0.0003

Note: The first column provides information on the Table the p–value is taken from, the second column outlines which Observation the p–value is used to support, the third column the dependent variable and the fourth column gives information on the explanatory variable. The fifth column details the age group the p–value relates to. The sixth column gives the original p–value, and the final column the Holm–Bonferonni corrected p–value. All p–values are 2 sided.

Table X: Robustness Check – Holm–Bonferroni Corrected p–values