



HAL
open science

Patient children are less likely to share with unknown children

Gladys Barragan-Jason, Astrid Hopfensitz

► **To cite this version:**

Gladys Barragan-Jason, Astrid Hopfensitz. Patient children are less likely to share with unknown children. 2022. hal-03555644

HAL Id: hal-03555644

<https://ut3-toulouseinp.hal.science/hal-03555644>

Preprint submitted on 7 Feb 2022

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



Distributed under a Creative Commons Attribution 4.0 International License

Patient children are less likely to share with unknown children

Gladys Barragan-Jason (✉ gladou86@gmail.com)

CNRS

Astrid Hopfensitz

TSE

Research Article

Keywords: prosociality, delay of gratification, child development, dictator games, altruistic sharing, decision making

Posted Date: September 15th, 2021

DOI: <https://doi.org/10.21203/rs.3.rs-908067/v1>

License:   This work is licensed under a Creative Commons Attribution 4.0 International License.

[Read Full License](#)

Abstract

Human prosociality is a valuable but also deeply puzzling trait. While several studies suggest that prosociality is an instinctive and impulsive behavior, others argue that patience and self-control are necessary to develop prosocial behaviors. Yet, prosociality and patience in children have rarely been studied jointly. Here, we measured patience (i.e. delay-of-gratification) and prosociality (i.e. giving in a dictator game to a known or unknown partner) in 250 4- to 6-year-old French schoolchildren. We found that sharing with an unknown partner was negatively linked to patience in children but observed no relationship between patience and sharing with a familiar partner. Taken together, our results support the hypothesis that children are intuitively prosocial independent of strategic concerns and that patience is therefore not necessary to act prosocially during early childhood. Future studies investigating whether and why prosociality show a non-linear developmental trajectory across the lifespan are warranted.

Significance Statement

While humans are often considered as instinctively selfish agents who need patience and social norms to exert prosocial behaviors, indirect evidence from social science to biological studies indicate that prosociality could represent a natural “impulse”. Here, we show that impatient 4-to 6-year-old schoolchildren gave more to an unknown child than patient children in a realistic situation supporting the vision that pure prosociality (i.e., anonymous donation) might reflect an automatic and impulsive behavior.

Introduction

From biological to social sciences, the origins of prosociality such as sharing, cooperating and helping (1, 2) fascinated researchers due to its key role in the functioning of advanced human societies (3). While several developmental studies suggest that patience (4) and social norms are necessary to exert prosocial behaviors (5) others argue that prosociality is an instinctive and impulsive behavior (6, 7). We might thus wonder how prosociality can be the result of both impulsivity and rationality.

Patience (i.e. self-control) and age are positively correlated with prosocial actions. Children who perform better on inhibitory control tasks are more prosocial in cooperative play tasks with peers (8) and give more in sharing games (9). And more generally younger children (3- to 4-year-old), that usually have lower self-control, display more selfish behaviors than older children (7- to 8-year-old) in sharing games (10, 11). In addition, children better in inhibition as evaluated by parents, are more able to follow a norm with respect to altruistic giving in a dictator game (5) and display more in-group favoritism and egalitarian tendencies (10). Thus, prosociality shaped by norms and social structure seems to increase with age as with cognitive development including greater patience (12).

Importantly however, young children engage spontaneously in prosocial actions such as spontaneous helping (13–15) before the development of patience or the internalization of social norms. Furthermore,

both children (16) and adults (6) are more prosocial in social dilemmas when given less time to respond and prompted to act “intuitively” suggesting that intuition supports prosocial impulse but that rational thought can hinder them. The development of certain cognitive abilities related to strategic thinking and reduced temporal discounting might thus have a negative impact on such prosocial impulses. Consequently, while engaging more and more in rational cognitive processes, prosociality could be reduced (17).

Studying the relationship between prosociality and patience in children will allow us to better understand the impulsive and rational components of prosociality. One important rational competence, developing between ages 4 to 6, is patience (18–20). Patience in children is traditionally evaluated with delay of gratification tasks, i.e. a trade-off between a small immediate reward vs. a larger future reward (21–23). While the investigation of the development of patience and prosociality is not new, there is a lack of studies that link the development of delay of gratification to the development of prosocial sharing. Only a limited number of studies looked at how delay of gratification is related to children’s prosocial sharing. A positive relationship between delay of gratification and reciprocal sharing was reported by Moore & Macgillivray (24) and Koomen et al. (25) in a modified delay of gratification task in which children could wait to provide benefits to a familiar third party and by Sebastián-Enesco & Warneken (26) where resources obtained in a delay of gratification task could be shared with a puppet. To our knowledge, no study has yet measured delay of gratification and prosocial sharing using two independent tasks where decisions regarding delay are independent from sharing decisions, and involving “real” same-age children as partners testing in a realistic environment (i.e. school).

Here, we evaluate whether a relationship can be observed between patience and prosocial sharing in 4- to 6-year-old children. Specifically, we tested 250 4- to 6-year-old children in a quiet room of their school in three different tasks: 1) a delay of gratification task involving a choice between one candy now vs. two candies at the end of the testing session, 2) a dictator game with an unknown child from another school, and 3) a dictator game with their self-reported “best-friend”. The two dictator games allow us to disentangle whether prosociality is influenced by strategic considerations.

Giving to unknown individuals can be interpreted as “pure” prosociality and has been extensively evaluated using dictator games (10, 27, 28). The fact that partners are unknown and the giving anonymous distinguishes these situations from situations involving reciprocal prosociality, where strategic concerns might influence behavior. Indeed, what might seem to be a prosocial behavior might be motivated by selfish motives if future benefits can be expected from the partner. In practice reciprocal prosociality might happen when interacting with known, familiar partners for the sake of future benefits (11). Our results provide evidence that patience in 4- to 6-year-old children is negatively linked to pure prosociality, however we observed no relationship between patience and reciprocal prosociality.

Results

Overall, 72% of children (180 out of 250) chose to wait for the larger reward in the delay of gratification task. In line with previous studies, older children delayed more often than younger ones ($\chi^2 = 11.8$; $P < 0.005$) with 59 % of the 4-year-old (47 out of 79), 73% of the 5-year-old (80 out of 109) and 85% of the 6-year-old (53 out of 62) delaying gratification. Since recent papers suggest that delay of gratification performance can be affected by the motivation for the reward (29, 30), motivation for the larger reward was explicitly measured (30) in asking children whether they preferred a small or a large reward when no delay was applied. Motivated children delayed more often than non-motivated children ($\chi^2 = 21.3$; $P < 0.0001$); 85% of children (212 out of 248) selected the larger reward in the motivation task and among the motivated children, 78 % chose to wait (167 out of 215) whereas only 39 % of the non-motivated children (14 out of 36).

In the dictator games, participants gave significantly more stickers to the familiar partner (median = 2; SD = 0.91; range: [0–4]) compared to the unknown partner (median = 1; SD = 0.97; range: [0–4]; Wilcoxon paired-test: $V = 880$; $P < 0.0001$).

For individuals who chose the larger reward in the motivation task (i.e. motivated children: $N = 212$), we found that the number of stickers given was significantly impacted by performance in delay gratification task (patient vs. impatient) and partner status (unfamiliar vs. familiar partner) while controlling for parents' income, number of siblings, age in months, sex and protocol order (ordered logistic regression analysis, see Methods and Table 1). Specifically, patient children gave significantly less stickers to unknown partners than impatient children did (Fig. 1).

Table 1
Results from the ordered Logistic model showing the impact of DoG and Partner status on altruistic sharing while controlling for Age, Gender, income, number of siblings and protocol order.

	t values	P values
DoG	-2.5	0.01
Partner status	3.6	0.003
Age in months	1.5	0.1
Gender	0.06	0.9
Income	0.7	0.4
Number of siblings	0.9	0.3
Protocol order	1.4	0.2

Discussion

In the present study, we examined the relationship between delay of gratification and prosociality in 4- to 6-year-old children. Our findings provide experimental evidence of a negative relationship between patience and the number of stickers given in a dictator game with an unknown partner (i.e. pure prosociality). These findings corroborate the hypothesis that rather than requiring patience and social norms, pure prosociality is an impulsive response (6) and fit with previous findings reporting that infants are naturally altruistic (31), prosocial responses are more rapid than selfish ones in adults (6, 25) and prosocial responses do not activate brain regions associated with cognitive control (32).

Importantly however, the negative relationship between patience and prosociality was only found in situations in which children donate stickers to an unknown partner (i.e., pure prosociality) and not with respect to reciprocal prosociality (i.e., giving to a familiar partner). This suggests that the negative relationship between giving to an unknown partner and patience might be linked to strategic and rational considerations. A strategic agent might indeed both decide to wait for the larger reward to maximize the payoff (i.e. be patient) and might also decide to donate some of his/her stickers to a familiar partner (i.e. reciprocal prosociality) but not to an unknown partner (i.e. pure prosociality) to elicit reciprocity from the recipient (10, 33).

Indeed, the ability to delay gratification has been shown to be a rational behavior (18, 19). Rational thinking starts to develop at 5- to 6-year-old and is consistently observed in children over 7 (10, 17) who are able to internalize social norms (5) including parochialism (10). Likewise, a recent study reports that preschoolers (4-year-old) were more egalitarian than older children (9-year-old) because older children tend to be more selective depending on the recipient (17). The authors conclude that “with cognitive maturation [...] children become less generous as they age” (17) or in other terms, they become more rational and select the partners according to their probability to reciprocate. Our findings go beyond such results and suggest that children who are developing rational thinking, exert patience and favor reciprocal prosociality (give more to familiar and potentially reciprocal partners than unknown ones) at the expense of pure prosociality (Fig. 1).

Taking the above together suggests an answer to the question of how prosociality can be the result of both impulsivity and rationality. While some cognitive abilities follow a linear developmental trajectory (34), others show non-linear developmental changes (35). These transitions might be driven in the case of prosociality by the development of other abilities, for example patience, rational thinking and social norm internalization.

In conclusion, our findings provide experimental evidence of a negative link between pure prosociality and patience in children. Developing patience is therefore not necessary to act prosocially but is somehow hindering pure prosociality which might allow parochialism to develop.

This study provides an important and crucial input towards future studies focusing on whether, how and why shifts in prosociality develops across the lifespan and is surely important to consider with respect to educational policies aimed at improving patience (Alan & Ertac, 2018) and social skills in children

(Catalano, Berglund, Ryan, Lonczak, & Hawkins, 2004; Durlak, Weissberg, Dymnicki, Taylor, & Schellinger, 2011).

Materials And Methods

Participants

We recruited 250 children from 18 kindergartens and elementary schools in the region of “Occitanie” in southwestern France. The sample consisted of 79 4-year-old (37 female, 42 male), 109 5-year-old (61 female, 48 male) and 62 6-year-old (27 female, 35 male) children. We obtained the approval of an appropriate ethics committee to conduct the research.

All parents signed an informed consent form for their children and only children who gave their verbal assent were included. Among the 250 questionnaires sent to parents, 238 were returned allowing us to obtain information about parents’ income, number of siblings and native language. Forty-five percent of children were from low and middle-income backgrounds (0 to 30,000 euros/year). Participants had 1.1 siblings on average: 23% were an only child, 55% had only one sibling, 15% had two siblings and 7% had more than 2 siblings. All children (except one) were native French, and all children were French speaking. Two trained female experimenters tested children individually in a single video-recorded session in an available room at their schools.

Experimental session

The experimenter told children that they would play some games together. The child and the experimenter then entered the testing room (i.e., an available room at their school). Participants completed a series of tasks including a delay of gratification task and two dictator games in one single 15-min long session.

Participants performed the delay of gratification task with candies. They had to choose between one candy immediately and two candies available at the end of the testing session. After this, participants performed two dictator games with stickers, one with respect to an unknown child and one with respect to a familiar child. The order of the two dictator games was counterbalanced across participants. After this, children who chose to delay in the delay of gratification task received their reward. Finally, children were given a single choice between receiving the small versus the large candy reward “now” to evaluate their motivation for the larger versus the smaller reward. In the following we will discuss each task in detail.

Delay of gratification

For the delay of gratification task, a cup containing one candy and another one containing two candies, were presented to the child. The experimenter said: “Do you want to have one candy now or do you want to wait until the end of the games to get two candies?” If the child chose the one candy option, he/she received one candy immediately. If the child chose to wait, the experimenter put the two cups away and continued the testing session.

Dictator games

The children engaged in two dictator games. The order of the two conditions was counterbalanced across children. Before the dictator games, the experimenter asked the child to name the child he/she liked the most to play with. The named child was the “familiar recipient” in the dictator game with a familiar partner.

In both games, four very attractive stickers were presented to the child. The experimenter asked the child whether he/she liked the stickers, if not the stickers were changed until the child said that he/she liked all the stickers. After this, the experimenter explained to the child that he/she could give some of the stickers to another child. The experimenter explained to the child that this decision would not be observed by the experimenter and demonstrated this by closing her eyes while the child allocated the stickers to two different envelopes.

In the game with an unknown partner, the experimenter explained that the recipient child would be a child from another school, randomly selected and would receive the stickers from another experimenter. It was made explicit that the child would not know who would receive the stickers.

In the game with a familiar partner, the experimenter explained to the child that the recipient would be his/her best friend and that the participating child would hand over the stickers in person. It was made explicit that the recipient was the best friend and that the recipient would know who donated the stickers. Again however, the experimenter explained that she would not know about the decision and demonstrated this by closing her eyes while the child allocated the stickers to the two different envelopes.

Motivation task

Motivation for the larger reward was explicitly measured. For the motivation task, the experimenter said: “If you could have one candy now or two candies now, what would you choose?”

Statistical analyses

All analyses were performed in the R environment for statistical computing version 3.3.6 (Coreteam, 2018).

The variable of interest from the delay of gratification task was binary, namely either “wait” or “don’t wait”. Similarly, motivation was evaluated through a single choice between the larger and smaller reward used in the delay of gratification task. In the dictator games, we observe donations between 0 and 4.

For individuals who chose the larger reward in the motivation task (N = 212), we investigate the relationship between delay of gratification and prosociality using an ordered linear model (LM; ‘polr’ function in R). We asked whether the number of stickers given was related to performance (patient vs. impatient) and partner status (familiar vs. unknown) in the delay gratification task while controlling for parents’ income, number of siblings, age in months, sex, and protocol order.

For each fixed effect, statistical significance was evaluated by likelihood ratio tests of the full model against the same model without the tested fixed effect. We report likelihood ratio t-values and P-values.

Regarding sample size, the recommended ratio is 20:1, i.e., 20 observations per independent variables (IVs; Brink & Wood, 1998; Tabachnick & Fidell, 1989). Our models involve a maximum of 7 IVs, suggesting that our minimal sample size should be 140. Our sample is 212 participants.

Declarations

Author Contributions: GBJ and AC designed research, GBJ conducted research and experiments, GJB wrote the first draft and GBJ and AC wrote the paper.

Competing Interest Statement: We declare no competing interests.

Classification: Social Sciences/Economic sciences; Biological Sciences/Psychological and Cognitive Sciences

Acknowledgments

We thank Anne Regnier for her help with data collection. We thank parents of participants, directors, teachers, OCCE, and inspectors of the schools for permission to work in schools and children who participated in the study.

References

1. C. D. Batson, A. A. Powell, Altruism and prosocial behavior. (2003).
2. N. Eisenberg, R. A. Fabes, T. L. Spinrad, *Handbook of child psychology* (John Wiley & Sons NJ, 2006).
3. R. Boyd, P. J. Richerson, Culture and the evolution of human cooperation. *Philosophical Transactions of the Royal Society of London B: Biological Sciences* 364, 3281–3288 (2009).
4. J. R. Stevens, E. V. Hallinan, M. D. Hauser, The ecology and evolution of patience in two New World monkeys. *Biology Letters* 1, 223–226 (2005).
5. P. R. Blake, M. Piovesan, N. Montinari, F. Warneken, F. Gino, Prosocial norms in the classroom: The role of self-regulation in following norms of giving. *Journal of Economic Behavior & Organization* 115, 18–29 (2015).
6. D. G. Rand, J. D. Greene, M. A. Nowak, Spontaneous giving and calculated greed. *Nature* 489, 427–430 (2012).
7. L. Uziel, U. R. I. Hefetz, The Selfish Side of Self–Control. *European Journal of Personality* 28, 449–458 (2014).
8. F. Giannotta, W. J. Burk, S. Ciairano, The role of inhibitory control in children’s cooperative behaviors during a structured puzzle task. *Journal of experimental child psychology* 110, 287–298 (2011).
9. D. Aguilar-Pardo, R. Martínez-Arias, F. Colmenares, The role of inhibition in young children’s altruistic behaviour. *Cognitive processing* 14, 301–307 (2013).

10. E. Fehr, H. Bernhard, B. Rockenbach, Egalitarianism in young children. *Nature* 454, 1079–1083 (2008).
11. J. Yu, L. Zhu, A. M. Leslie, Children's sharing behavior in mini-dictator games: The role of in-group favoritism and theory of mind. *Child Development* 87, 1747–1757 (2016).
12. M. R. Rueda, *et al.*, Development of attentional networks in childhood. *Neuropsychologia* 42, 1029–1040 (2004).
13. H. L. Rheingold, D. F. Hay, Prosocial behavior of the very young. *Morality as a biological phenomenon*, 93–108 (1980).
14. S. Sloane, R. Baillargeon, D. Premack, Do infants have a sense of fairness? *Psychological science* 23, 196–204 (2012).
15. J. A. Sommerville, M. F. Schmidt, J. Yun, M. Burns, The development of fairness expectations and prosocial behavior in the second year of life. *Infancy* 18, 40–66 (2013).
16. M. Plötner, R. Hepach, H. Over, M. Carpenter, M. Tomasello, Young children share more under time pressure than after a delay. *PloS one* 16, e0248121 (2021).
17. L. Flook, C. Zahn-Waxler, R. J. Davidson, Developmental differences in prosocial behavior between preschool and late elementary school. *Frontiers in psychology* 10, 876 (2019).
18. C. Kidd, H. Palmeri, R. N. Aslin, Rational snacking: Young children's decision-making on the marshmallow task is moderated by beliefs about environmental reliability. *Cognition* 126, 109–114 (2013).
19. L. Moffett, C. Flannagan, P. Shah, The influence of environmental reliability in the marshmallow task: An extension study. *Journal of experimental child psychology* 194, 104821 (2020).
20. W. Mischel, Y. Shoda, M. I. Rodriguez, Delay of gratification in children. *Science* 244, 933–938 (1989).
21. J. P. Newman, D. S. Kosson, C. M. Patterson, Delay of gratification in psychopathic and nonpsychopathic offenders. *Journal of abnormal Psychology* 101, 630 (1992).
22. H. N. Mischel, W. Mischel, "The development of children's knowledge of self-control strategies" in *Motivation, Intention, and Volition*, (Springer, 1987), pp. 321–336.
23. A. Prencipe, *et al.*, Development of hot and cool executive function during the transition to adolescence. *Journal of Experimental Child Psychology* 108, 621–637 (2011).
24. C. Moore, S. Macgillivray, Altruism, prudence, and theory of mind in preschoolers. *New Directions for Child and Adolescent Development* 2004, 51–62 (2004).
25. R. Koomen, S. Grueneisen, E. Herrmann, Children delay gratification for cooperative ends. *Psychological science* 31, 139–148 (2020).
26. C. Sebastián-Enesco, F. Warneken, The shadow of the future: 5-year-olds, but not 3-year-olds, adjust their sharing in anticipation of reciprocation. *Journal of experimental child psychology* 129, 40–54 (2015).
27. J. F. Benenson, J. Pascoe, N. Radmore, Children's altruistic behavior in the dictator game. *Evolution and human Behavior* 28, 168–175 (2007).

28. M. Gummerum, Y. Hanoch, M. Keller, K. Parsons, A. Hummel, Preschoolers' allocations in the dictator game: The role of moral emotions. *Journal of Economic Psychology* 31, 25–34 (2010).
29. G. Barragan-Jason, C. Atance, L. Kopp, A. Hopfensitz, Two facets of patience in young children: Waiting with and without an explicit reward. *Journal of Experimental Child Psychology* 171, 14–30 (2018).
30. F. Paglieri, E. Addessi, A. Sbaffi, M. I. Tasselli, A. Delfino, Is it patience or motivation? On motivational confounds in intertemporal choice tasks. *Journal of the experimental analysis of behavior* 103, 196–217 (2015).
31. F. Warneken, Tomasello M.(2009a). *Varieties of altruism in children and chimpanzees. Trends Cogn. Sci* 13, 397–402.
32. M. D. Lieberman, Social cognitive neuroscience: a review of core processes. *Annu. Rev. Psychol.* 58, 259–289 (2007).
33. E. Fehr, U. Fischbacher, The nature of human altruism. *Nature* 425, 785–791 (2003).
34. L. Steinberg, *et al.*, Around the world, adolescence is a time of heightened sensation seeking and immature self-regulation. *Developmental science* 21, e12532 (2018).
35. A. Gopnik, *et al.*, Changes in cognitive flexibility and hypothesis search across human life history from childhood to adolescence to adulthood. *Proceedings of the National Academy of Sciences* 114, 7892–7899 (2017).

Figures

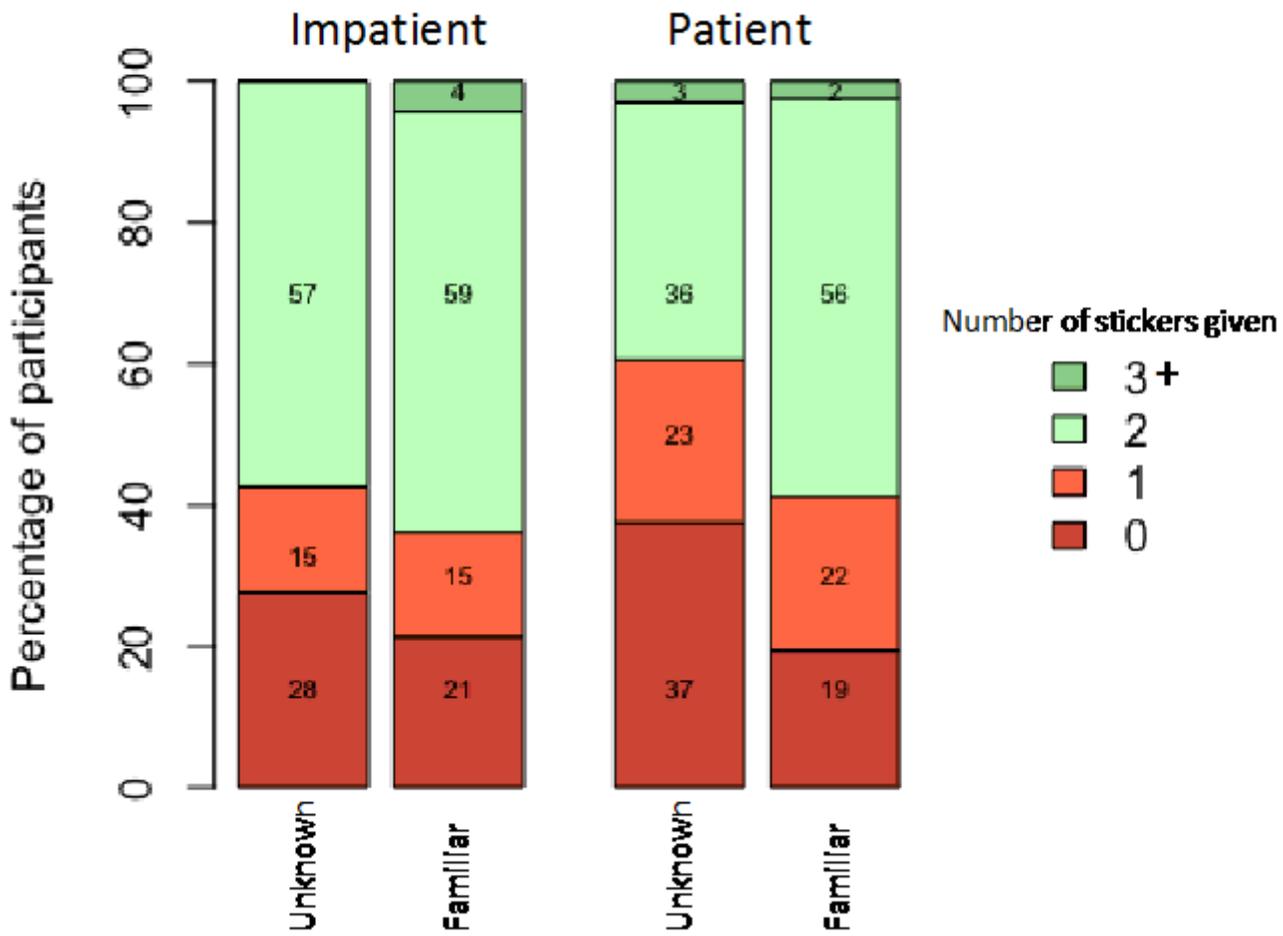


Figure 1

Results from the relationship between dictator game and delay of gratification tasks. We plot the percentage percentage of impatient (N=47) and patient (N=165) children who gave stickers (0 , 1, 2, 3-4) to an unknown partner and a familiar partner. While patient children tend to favor familiar partners, impatient children gave equally to both categories.