RBTCC Revista Brasileira de Terapia Comportamental e Cognitiva
e-ISSN: 1982-3541

2021, v. 23, pp. 1—20, e211528
Seção Especial Análise do Comportamento Teoria dos Jogos e Economia Comportamental

Distributive behavior, cooperation and gender differences: evidence from Dictator experiments

Comportamento distributivo, cooperação e diferenças de gênero: evidências a partir de experimentos com o Jogo Ditatorial

Comportamiento distributivo, cooperación y diferencias de género: evidencias a partir de experimentos con el juego dictatorial

Saulo Barreto Cunha[1], Leonardo Rodrigues Sampaio[2], Guilherme Ribeiro Eulalio Cabral[2]

1 Faculdade Maurício de Nassau, 2 Universidade Federal do Vale do São Francisco

Histórico do Artigo

Recebido: 02/11/2020.
1ª Decisão: 19/09/2021.
Aprovado: 25/10/2021.

DOI

10.31505/rbtcc.v23i1.1528

Correspondência

Saulo Barreto Cunha
saulobarreto90@gmail.com

Rua Cícero Amorim, 110
Apartamento 01, Vila Eduardo.
Petrolina/PE
56328-175

Editor Responsável

Pedro Bordini Faleiros

Como citar este documento

Cunha, S. B., Sampaio, L. R., & Cabral, G. R. E. (2021). Distributive behavior, cooperation and gender differences: evidence from Dictator experiments. *Revista Brasileira de Terapia Comportamental e Cognitiva*, *23*, 1-20. https://doi.org/10.31505/rbtcc.v23i1.1528

Abstract

The goal of this study was to assess whether men and women significantly differ in the way they distribute goods in a context of dictatorial game, after participating in a cooperative task, interacting directly with each other (Study 1), and when interaction is mediated by the researcher (Study 2). The experimental task consisted of assembling a jigsaw puzzle, and then distributing vouchers cards, in the model of a Dictatorial Game. 120 undergraduates (80 in Study 1, and 40 in Study 2) were arranged into three types of pairs: men only, women only, or mixed. The distribution and expectation of receiving cards were not influenced by gender and, in general, participants were egalitarian in all experimental conditions. Results suggest that participants valued the work of their partners and tried to reward them, thus contributing to egalitarianism and prosociality, even in the context of a Dictator Game.

Key words: cooperation; reciprocity; dictator game; equality; prosociality.

Resumo

O objetivo deste trabalho foi avaliar se homens e mulheres diferem significativamente na forma como distribuem bens em um contexto de jogo ditatorial, após realização de um trabalho cooperativo, quando estão interagindo diretamente entre si (Estudo 1) e quando a interação é intermediada pelo pesquisador (Estudo 2). A tarefa experimental consistia na montagem de um quebra-cabeças e na posterior distribuição de fichas de vale-cópia, no modelo de um Jogo Ditatorial. 120 graduandos (80 no Estudo 1 e 40 no Estudo 2) foram organizados em três tipos de duplas: apenas homens, apenas mulheres ou mistas. A distribuição e a expectativa de receber fichas não foram influenciadas pelo sexo e, de forma geral, os participantes foram igualitários em todas as condições experimentais. Sugere-se que os participantes valorizaram o trabalho de seus parceiros e que tentaram recompensá-los, o que contribuiu para o igualitarismo e prosocialidade, mesmo em um contexto de jogo ditatorial.

Palavras-chave: cooperação; reciprocidade; jogo do ditador; igualitarismo; prosocialidade.

Resumen

Este trabajo buscó evaluar si hombres y mujeres difieren significativamente en la forma en que distribuyen los bienes en un contexto de juego dictatorial, luego de realizar un trabajo cooperativo, cuando están interactuando directamente entre sí (Estudio 1) y cuando la interacción es intermediada por el investigador (Estudio 2). La tarea experimental consistió en armar un rompecabezas y distribuir tarjetas-vale copia, en el modelo de un Juego Dictatorial. Se organizaron 120 graduados (80 en el Estudio 1 y 40 en el Estudio 2) en tres tipos de pares: solo hombres, solo mujeres o mixtos. La distribución y expectativa de recibir tokens no estuvo influenciada por el género y, en general, los participantes fueron igualitarios en todas las condiciones experimentales. Se sugiere que los participantes valoraron el trabajo de sus socios y trataron de premiarlos, lo que contribuyó al igualitarismo y prosocialidad, incluso en un contexto de juego dictatorial.

Palabras clave: cooperación; reciprocidad; juego del dictador; igualitarismo; prosocialidad.

Distributive behavior, cooperation and gender differences: evidence from Dictator experiments

Saulo Barreto Cunha[1], Leonardo Rodrigues Sampaio[2], Guilherme Ribeiro Eulalio Cabral[2]

1 Faculdade Maurício de Nassau, 2 Universidade Federal do Vale do São Francisco

The goal of this study was to assess whether men and women significantly differ in the way they distribute goods in a context of dictatorial game, after participating in a cooperative task, interacting directly with each other (Study 1), and when interaction is mediated by the researcher (Study 2). The experimental task consisted of assembling a jigsaw puzzle, and then distributing vouchers cards, in the model of a Dictatorial Game. 120 undergraduates (80 in Study 1, and 40 in Study 2) were arranged into three types of pairs: men only, women only, or mixed. The distribution and expectation of receiving cards were not influenced by gender and, in general, participants were egalitarian in all experimental conditions. Results suggest that participants valued the work of their partners and tried to reward them, thus contributing to egalitarianism and prosociality, even in the context of a Dictator Game.

Palavras-chave: cooperation; reciprocity; dictator game; equality; prosociality.

Gender disparities are described as an obstacle to the socioeconomic development of countries. According to the report on gender inequality of the World Economic Forum (WEF, 2020), Brazil ranked position 92nd among 153 nations regarding inequality between men and women when taking into account aspects related to opportunities and access in economy, education, health, and political leadership. These differences are sharpened when one considers that in Brazil women earn up to 20% less than men (IBGE, 2018).

The investigation about potential differences in behavior between women's and men's derives from several scientific areas. These differences remained based on stereotype for many years. Some studies consider that women are more skilled in interpersonal relationships and, therefore, perceive themselves as less selfish, more friendly, and more emotionally expressive (Eagly, 2009) when compared to men. On the other hand, the fact that men have, in average, greater physical strength when compared to women would make them more competitive and individualistic-oriented (Balliet, Norman, & Vugt, 2011). These beliefs sustain the perception that some professions are typically "feminine" (e.g., pedagogue, nurse) or typically "masculine" (e.g., truck driver, bricklayer), reinforcing the gender stereotypes that undermine women, and curtail their rights (Higa, 2016). Moreover, when these activities involve financial gains, women generally earn less than men even when performing the same tasks and working side by side with them (Proni & Proni, 2018). This makes evident the strong gender inequality in the access to goods, services, and rights unfavorably to women, suggesting that such inequality still persists in our society.

Investigations regarding distributive behavior have analyzed the decisions made by men and women in a wide range of experimental situations. However, some studies were developed in real contexts of cooperative work including face-to-face interactions between participants, notably those

considering the impact of gender on the experimental design. Cooperative work refers to a class of behaviors in which two or more individuals work in integration to achieve a mutual benefit (Tomasello, 2014). For humans, cooperation is associated to prosocial motivations ensuing from components selected throughout the evolution process, which favored the work division and social organization (Trivers, 1971; Axelrod & Hamilton, 1981; Nowak, 2006). Human motivation towards cooperation goes beyond close relatives, as interactive exchanges with non-family members are important for society's survival. This factor is much stronger among human beings when compared to other species (Bowles & Gintis, 2011).

Distributive reciprocity is one of the main mechanisms used by groups to select and sustain cooperation, and can be manifested either directly or indirectly. Direct reciprocity refers to payoff given on some good, benefit or service to a third party that in the past has offered something similar (or identical) to the object of reciprocity (Nowak, 2006). Sustaining interpersonal relationships over time increases the likelihood of cooperation, considering the expectation that people will reciprocate benefits or disadvantages received from others (Axelrod & Hamilton, 1981; Blake, Rand, Tingley, & Warneken, 2015). Indirect reciprocity, in turn, refers to people's cooperation with someone unknown to them, with no expectation of further interaction. The main motivator for this kind of action is the possibility of producing benefits for the whole group, and not necessarily for single individuals. Because of that, indirect reciprocity increases the likelihood of usage of more comprehensive and impersonal distribution rules, as well as the development of distribute behavior standards that are socially desirable (Rand & Nowak, 2013).

Scholars employ an approach to the experimental investigation of distributive behavior in cooperative contexts that is based on the Economic Games (Rand & Nowak, 2013; Wu et al., 2017), such as the Dictator Game (Engel, 2011), the Ultimatum Game (Tisserand, 2014) and the Sharing Games (Zin, Escobal, Esteves, & Goyos, 2015), which are related (Thielmann, Spadaro, & Balliet, 2020). These games help the understanding on how people behave in actual distribution contexts, and on the factors that influence cooperation in these situations.

The Dictator Game (DG) is one of the games mostly used in current research designs. In the DG, the final product of distributions depends exclusively on the decision maker´s behavior (Engel, 2011). Specifically, the first player or "Dictator" determines how to split an endowment, usually a cash prize, while the "Recipient" player gets what was given by the former with no possibility of interfering on the "Dictator's" decision. On the other hand, the Ultimatum Game gives a chance to the recipient to reject the split, however in doing so both receive zero. The Sharing Game presents multiple rounds in which participants must decide between two distribution options: (a) the decider gives more to the recipient than the recipients get, or (b) the decider gets more than the recipient, but they both get less than in option (a).

In this study, DG was used to investigate the distributive behavior in a cooperative scenario. Literature suggests that distributive behavior during the DG can be influenced by several factors, such as: value to be split (Blake & Rand, 2010), personal effort to obtain the endowment (Sadrieh & Schröder, 2017), sense of property regarding what will be split (Oxoby & Spraggon, 2008), and closeness (affective ties, friendship, inbreeding, etc.) with whom the endowment will be split (Stewart-Williams, 2007). Effects of age and differences on how children and adults make distributive decisions when they are in a dictatorial position are also observed (Cabral, Sampaio, & Roazzi, 2018; Sharma, 2015; Xiong, Shi, Wu, & Zhang, 2016; Warneken & Tomasello, 2008).

Regarding sex influence, data are still controversial (Balliet. et al, 2011), with some studies suggesting differences on how men and women behave when they participate in the DG (Chowdhury, Jeon, & Saha, 2017; Croson & Gneezy, 2009; Espinosa & Kovářík, 2015), while others indicating the nonexistence of such differences (Cadsby, Servátka, & Song, 2010). For example, some data point out that women donate more than men in contexts of anonymity (Eckel & Grossman, 1998), when they have men as partners (Balliet et al., 2011), and when the Dictators' sex is emphasized (Boschini, Muren, & Persson, 2012). Generally speaking, women also get more endowments (Engel, 2011), are more averse to competitiveness and iniquity (Croson & Gneezy, 2009), and act in a more egalitarian way towards men when those contribute more to the endowment obtention (Heinz, Juranek, & Rau, 2011; Rodriguez-Lara, 2016).

Conversely, men tend to be more generous when the distributive situation involves some type of responsibility towards the recipient, while women feel more pressured to increase the donation (Bruttel & Stolley, 2018). Moreover, men showed more willingness to give up their goods in face of a situation of an unexpected heritage, i.e., when no effort was made by those engaged in the production of what will be split (Dasgupta, 2011), and when the cost of helping is higher (Amorim, Sampaio, & Cabral, 2018). Finally, "Man-Man" pairs tend to be more egalitarian than "Woman-Woman" pairs (Balliet et al., 2011).

Although the findings contribute to fill in the empirical-theoretical gap regarding the potential influence of sex on distributive behavior, most of the studies reported disregarded the direct and simultaneous interaction between those engaged in the distribution (Dasgupta, 2011; Chowdhury et al., 2017; Sharma, 2015). Particularly, these studies had participants solving the tasks by interacting with each other only virtually through an online platform, or specific software (Heinz et al., 2012; Rodriguez-Lara, 2016). Such design represents a methodological limitation to the field of studies on human cooperation, since the mere exchange of messages between the Recipient and the Dictator can influence the behavior distribution in the DG (Andreoni & Rao, 2011). Likewise, when a task is performed simultaneously, jointly, and for collective and clear purposes, individuals appear

to be more cooperative in their distributions (Mitkidis, Sørensen, Nielbo, Andersen, & Lienard, 2013).

With the objective of addressing this empirical-theoretical gap, this project aimed to evaluate if there is any significant difference in how men and women split endowment in a dictator game after performing a peered work. In order to do that, two studies were performed involving the manipulation of the sex of the team partner and the type of interaction between them (i.e., face-to-face or anonymous). We then analyzed whether both factors influenced how participants decided to split the endowments earned in collaborative work.

Study 1

Method

Participants

Eighty undergraduate students (50% men) enrolled in different courses at a Federal University located in Petrolina-PE, Brazil, ages ranging from 18 to 37 years old (Mean = 21.73; SD = 3.75) participated of the study.

Instruments and Materials

Voucher cards that could be used to pay for photocopies at the participants' universities were the endowments that could be split. Two envelopes served as containers to distribute the vouchers: a green one, in which participants placed the vouchers they would keep, and a blue one, in which they placed the vouchers to be given to partners.

A 100-piece puzzle with the image of South America was used by participants to perform the activity.

Six aspects related to task performance were evaluated with Likert-like scales: Effort (extent to which the participant made an effort in the task: 1 - No effort, 5 - Much effort), Completion (self-attributed responsibility for task completion: 1 - I did nothing, 5 - I did everything), Difficulty (perception of task difficult by the participant: 1 - Very easy, 5 - Very difficult), Liking (extent to which the participant liked to perform the task: 1 - I did not like, 5 - I liked a lot), and Closeness (familiarity between the participant and the partner: 1 - Did not know, 5 - We are friends). Moreover, the questionnaire comprised an item referring to "Expectation" asking about how many vouchers the participants expected to receive from their peer partner, if they were responsible for splitting.

The Ambivalent Sexism Inventory - ASI (Glick & Fiske, 1996), adapted to Brazil by Formiga, Gouveia and Santos (2002), was used to assess the presence and influence of Sexism on the distributive behavior of participants. Sexism was understood as the manifestation of a stereotyped view about women that favors the adoption of negative and biased attitudes towards women. The ASI measures the two main dimensions of sexism:

Benevolent and Hostile (Dardenne, Dumont, & Bollier, 2007). In Benevolent Sexism women are perceived as fragile, warm-hearted, and cooperative, but also as relatively incompetent andin need of men's help. The Hostile Sexism, in turn, suggests that women are cold, independent, mean-spirited, assertive, and scarcely willing to cooperate. In this dimension of Sexism, traditional moral standards that consider women inferior to men, and the only ones responsible for taking care of home are reinforced (Fiske, 2012).

Participants responded the questionnaire on Google Forms, using two 7" Tablets. Responses were sent to an online database for analysis using the SPSS software (version 22).

Procedures

After signing an Informed Consent Form (ICF), participants were asked to put together a 100-piece puzzle with the image of South America. The puzzle was already 65% completed, and participants should complete the task in partnership with another person and in up to 10 minutes. They were introduced to the other individual with whom they would work, and then both were taken to a room of a Lab located at the same university they were enrolled in. After being settled in, they received the remaining pieces of the puzzle, and were informed that the pair would gain a certain amount of voucher cards, depending on their performance.That is, the more pieces they assembled, the more cards they would receive.

The pairs were formed based on a 2-factor design (dictator's gender: Male, Female) X 2 (recipient's gender: Male, Female) resulting in 40 pairs: 10 male, 10 female, and 20 mixed.

After task completion, partners were separated and taken to different rooms, where they were informed that their performance granted them ten voucher cards. Same instructions were given to all participants, so that each of them believed that they were the only one who would oversee the distribution (i.e., would be the dictators, although both members of the pair had been asked to do so). After explanations, participants received the envelopes with cards, were left alone to split them as they wished, and were instructed to call the researcher when they were done.

After envelopes were picked up and stored by researchers, participants were asked to complete the questionnaire and the Ambivalent Sexism Inventory, in this order. Partners were then invited to return to the room, were informed that both were given the same instructions, and that their decisions had no practical effect on the split. Next, eventual questions were answered, all participants received 10 voucher cards, and were thanked for their participation in the study. After debriefing of participants, the experimenter counted the number of vouchers donated, in a private room.

Both studies described followed all ethical protocols and requirements for research with human beings, and were approved by an Ethics Committee, under process: CAAE 80911517.6.0000.5196 and receipt n°: 146353/2017.

Results

In general, participants enjoyed completing the puzzle (Mean = 4.59; SD = 0.61), considered they made some effort during its completion (Mean = 3.16; SD = 1.16), felt reasonably responsible for the task (Mean = 2.99; SD = 0.37), and considered the puzzle easy to be completed (Mean = 1.93; SD = 0.86). Also, participants reported barely knowing each other (Mean = 1.88; SD = 0.58). There was no significant difference between men and women in these indicators of perception about the task performance.

Regarding endowments split, most participants engaged an egalitarian behavior, as the mean donation was of 5.47 vouchers (SD = 1.22), with no significant differences between men and women regarding voucher cards donation. When the distributive behavior was classified in categories (selfish = donated 4 or less vouchers; egalitarian = donated exactly five vouchers; or prosocial = donated six vouchers or more), we found that 68.8% of the participants donated to their partners half the vouchers they got (Figure 1), a proportion higher than by chance, according to the results of a Binomial test ($p < 0.001$). Likewise, there was no difference in the ratio of men and women classified in each of the distributive categories ($p > 0.05$).

However, there was an interaction between donor's sex and recipient's sex ($U = 129$; $p = 0.024$), in such a way that men gave more voucher cards when they were playing with other men, than when their partners were women (Table 1). Women, in turn, donated equally, regardless of recipient´s sex.

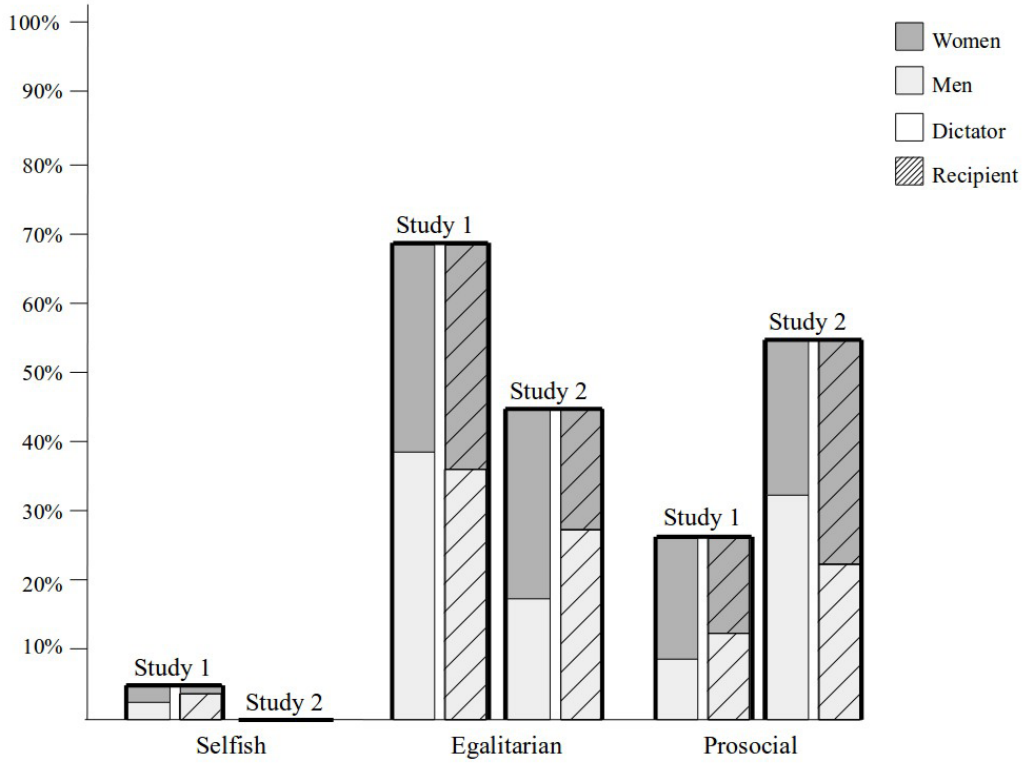

Figure 1. Percentage of selfish, egalitarian, and prosocial distributions by dictator's gender and recipient's gender in both studies.

Regarding the expectation about the number of cards participants expected to receive from their partners, the overall mean was 4.83 (SD = 0.84) (Table 1). Yet, no significant difference was found between men and women, neither an interactive effect between the dictators' and recipients' genderon this variable.

Table 1.
Mean and standard deviation of donations and expectations of receipt as function of the participants' gender referring to both studies.

	Dictator		**Recipient**		
			Male	Female	Total
Study 1	Male	Donation	6,00 (1,65)	5,10 (0,71)	5,55 (1,34)
		Expectation	4,95 (0,75)	4,90 (0,64)	4,93 (0,69)
	Female	Donation	5,25 (0,91)	5,55 (1,97)	5,40 (1,11)
		Expectation	5,05 (0,75)	4,40 (1,04)	4,73 (0,96)
	Total	Donation	5,63 (1,37)	5,33 (1,05)	5,48 (1,22)
		Expectation	5,00 (0,75)	4,65 (0,89)	4,83 (0,84)
Study 2	Male	Donation	6,90 (2,23)	6,00 (0,94)	6,45 (1,73)
		Expectation	4,70 (0,68)	4,70 (0,82)	4,70 (0,73)
	Female	Donation	5,50 (0,97)	6,00 (1,05)	5,75 (1,02)
		Expectation	4,40 (0,97)	4,10 (1,01)	4,25 (1,02)
	Total	Donation	6,20 (1,82)	6,00 (0,97)	6,10 (1,45)
		Expectation	4,55 (0,83)	4,40 (1,00)	4,48 (0,91)

It was evaluated the associations between participants' distributive behavior and the variables perception on puzzle completion (Difficulty, Effort, Completion, Liking, and Closeness), Benevolent Sexism, Hostile Sexism, number of cards split, and expectations about the number of cards to be received. Based on these analyses, significant correlations between performance in completing and expectation of receiving voucher cards ($\rho = 0.31$; $p = 0.004$), and between completion and donation ($\rho = -0.38$; $p < 0.001$) were observed. It was also observed a correlation between expectation and donation of voucher cards ($\rho = -0.56$; $p < 0.001$), as well as between number of voucher cards donated and Benevolent Sexism ($\rho = 0.25$; $p = 0.023$). However, when the associations between donation and Benevolent Sexism were analyzed for men and women separately, the correlation between donation and Benevolent Sexism remained significant for males ($\rho = 0.32$; $p = 0.045$), but not for females ($\rho = 0.18$; $p = 0.26$).

Discussion

Results showed that both men and women tended to equally distribute the task performance resources, as well as reporting similar expectations regarding how their partners would behave during the endowment split. A contributing factor in the explanation of the generalized use of egalitarian behavior could be that the task was performed in partnership, demanding contribution of both participants towards completing the task. A recent study using hypothetic scenarios (Cabral et al., 2018) found that among the different types of contribution given by a partner in the production of goods (e.g., raw material, tools to speed production, or partnership in the labor force), the one most appraised and associated highest levels of egalitarian distribution was working in partnership, regardless of there was equality in the amount of resources produced.

Moreover, as observed by Halali, Kogut and Ritov (2016), recognizing the partner existence game increases the likelihood of directly reciprocating with the partner, and indirectly reciprocating with other future partners, through gratitude for the effort made in the task. This relates to a hypothesis raised by McGrath and Gerber (2019) that, more than a tendency to egalitarianism, feelings of being in debt with the partner would be the leading factor in splitting endowments.

Findings about task completion perception are aligned with this explanation, since there was no significant difference in how men and women judged their effort made to put the puzzle together, their level of responsibility, and pleasure felt during the activity. Thus, it is suggested that a similar perception about the levels of contribution and responsibility in task performance led men and women to consider that equality would be the fairest way to split rewards among them.

Civai and Hawes (2016) emphasized that decisions during economic games are endorsed by heuristic cognitive mechanisms to adopt egalitarianism in contexts in which endowment split is mediated by social rules, inhibiting personal favoring or competition. We found that perception of an effective contribution to complete the puzzle was negatively associated to donation, regardless the participants' sex. This result suggests that the feeling of effectively participating in task accomplished affects the split of the produced goods (Cabral et al., 2018; Konow, 2001), even more so than the effort made to perform the task (Kanngiesser, Gjersoe, & Hood, 2010).

Results also show that men donated more voucher cards when the other part was male when compared to female, while only men's donations were associated to the Benevolent Sexism, even when they donated to other men. In contrast, women made no differentiation regarding their partners in distributions. It is important to note that the Sexism scales employed in this study were designed to evaluate stereotypes regarding females, with no instrument regarding stereotypes assigned to men being used. Therefore, the influence of women's perception about men may have not been captured by the measures. Moreover, the influence on men's donation

might be due to other factors related to the Benevolent Sexism (e.g., traits of personality, values, etc.). This aspect should be better investigated in further research.

Regarding expectations on receiving voucher cards, both men and women seem to show more willingness to act in a prosocial way, since the more voucher cards were donated, the less partners expected to receive from their partners. A similar result was observed in Dictator Game studies having children as participants, where it was found that those expecting to receive more from others were the ones that kept more resources to themselves. On the other hand, those who donated in a more egalitarian way tended to expect a quantity proportional to the donated value (Sampaio & Pires, 2015).

The observed preference for equality may also be because participants interacted face-to-face. Previous studies using the Dictator Game point out a general trend of egalitarian donations in when the recipient was identified (Engel, 2011), when one acknowledged the presence of an actual partner in the game (Halali et al., 2016), and when partners somehow communicated with each other (Andreoni & Rao, 2011).

Moreover, other studies showed that collaboration in a face-to-face activity has enabled some sort of social approximation, even between individuals that have not met before. This favored the use of prosocial behaviors towards anonymous partners, influencing the distributive behavior in Dictator Games (Montinari & Racan, 2018; Stewart-Williams, 2007). Thus, on-site dynamics may have been responsible for this generalized tendency towards egalitarianism (regardless the gender of the participant), which may have suppressed any potential gender-related differences that could have eventually led men and women to behave differently.

Based on these findings, a second study was designed to deepen the first experiment. This second study manipulated the type of interaction between the task partners and analyzed whether the distributive behavior of men and women would be different under an anonymity condition (Chowdhury et al., 2017; Eckel & Grossman, 1998; Espinosa & Kovářík, 2015).

Study 2

Method

Participants

Participants were 40 students (50% men) from different courses of a Federal University located at Petrolina (PE), Brazil, ages from 17 to 41 years old (Mean=21.65 years, SD=3.95), and who were not included in the first study.

Instruments and Materials

This second study used the same puzzle, voucher cards, scales, and questionnaire as in Study 1.

Procedures

Procedure was similar to Study 1, except that the puzzle was put together individually. Participants believed they were working in pairs, with a partner responding in another room. The partner was a confederate who had already done the part assigned to them and was waiting the participant to complete their part to start splitting the voucher cards (Dictator Game). The researcher informed the sex of the fictional partner before the task started, so that some participants believed to be doing the puzzle and splitting the vouchers with a man and others with a woman.

In the beginning of the task each participant was directed to a room in which the puzzle was partially completed on the edges (about 25%), with the remaining pieces being spread on a table. The experimenter informed that another person had started the puzzle before participant's arrival, and that the participant would have five minutes to put together as more pieces as possible. The researcher indicated an adjacent room with the door closed and lights on, in which the other member of the pair would supposedly have made their part of the puzzle. It was also informed that another person would be invited to continue putting the puzzle pieces together once the participant concluded their part. The person would also be granted five minutes to work, and this procedure would be repeated until the puzzle was completed. This way, the participant should decide how 10 voucher cards would be distributed to themselves and the partner that worked before at the same amount of time to complete the puzzle.

The participant was told that there would not be an interaction between partners, and the only information provided would be the partner's sex. Experimental manipulation of the sex of dictators and recipients resulted in 20 pairs: 5 male, 5 female and 10 mixed pairs. By the end of the experiment, the researcher explained any eventual questions, and that the participant did not effectively interact with someone else.

In sum, the difference in Study 2 procedures in relation to Study 1 was that participants would not cooperate with their (fictional) partners in a direct way (face-to-face). Instead, they would participate in the jointly completion of a puzzle with unknown partners. This procedure allowed participants to make an anonymous decision about how vouchers would be split, avoiding possible effects ensuing from recipient´s identification, social approximation, or communication between partners when performing the task (Halali et al., 2016). In addition, completion time granted was reduced to half used in Study 1, and participants were told they would work with other (fictional) partners in an asynchronous way. The experimenter who conducted the procedures in this second study was the same from Study 1.

Results

Participants reported to have likedputting the puzzle together (Mean = 4.8; SD = 0.46), considered they made some effort (Mean = 3.13; SD = 1.29), considered their responsibility towards completion as reasonable (Mean = 2.88; SD = 0.85), and considered the activity difficulty as median (Mean = 2.93; SD = 0.86). There was no significant effect of sex or type of pairs on these results. Since the partner was an anonymous confederate, degree of proximity between partners was not measured in this second study.

Regarding the distributive behavior, participants donated 6.10 voucher cards on average (SD = 1.45), and 45% of them donated half of their vouchers to their partners. When the distributive behavior was categorized as Selfish (donation of four vouchers or less), Egalitarian (donation of five vouchers), or Prosocial (donation of six vouchers or more), the latter two prevailed, especially Prosocial behaviors (Figure 1). There was no significant difference in the percentage of men and women classified in such distributive categories. Also, there was no significant differences regarding the dictator's and the recipient's sex, nor on the average quantity of voucher cards donated and on receiving expectation (Table 1). Finally, significant correlations between donation and the variables difficulty (ρ = 0.34, p = 0.031) and Hostile Sexism (ρ = -0,46; p = 0.001) were observed. In addition, donation and expectation correlated in a negative way (ρ = -0.48; p < 0.001), while expectation and Benevolent Sexism correlated positively (ρ = 0.34; p = 0.028).

Discussion

Results indicated that despite the expressive number of participants behaving in an egalitarian basis, most of them decided to make prosocial distributions (i.e., donating an unfavorable number of vouchers to themselves). Both occurred regardless of the gender of the donor and recipient, in opposition to other studies that found differences between men and women in contexts of distribution after tasks involving personal effort (Heinz et al., 2011; Rodriguez-Lara, 2016; Sharma, 2015).

Previous studies in the classic format of Dictator Game indicated that dictators tend to be more selfish when they did not know with whom they are playing with, and when there were no interactions between them and the recipients (Engel, 2011). In an opposite direction, results of Study 2 pointed out that participants tended to give up half or more of endowments gained, even when this decision happened in a context of complete anonymity.

Additionally, there was no difference between men and women in evaluation of task aspects (difficulty, expectation, effort, responsibility, etc.) regardless the sex of the partner. As previously discussed, working in collaboration to perform a task in association with a positive perception of the

work of both partners may have built in participants a sense of egalitarian justice that influenced their decisions related to rewards distribution.

The correlation between donation of vouchers and perception of task difficulty can be an indication that participants tried to apply a distributive principle based on equity (Lamont, 2012). Perceiving the task as more difficult when compared to Study 1 influenced an increase in the donation of vouchers to their partners and vice-versa. Such decision can be a way to pay off efforts made by the other partner to overcome the difficulties of the task (Gurevich, Kliger, & Weiner, 2012). Moreover, participants are likely to have perceived a need to collaborate on the jointly work of those they were working with in order to complete the puzzle, even if the vouchers they donated were exclusively targeted to their own partners.

Studies showed that previously cooperative contexts can foster prosociability in dictators (Engel, 2011) and that having a clear and common objective can increase resource donation (Mitkidis et al., 2013). Although not occurring simultaneously, the collective work may have led participants to donate more vouchers to pay off the difficulty of having a team participating in the completion of the puzzle. These hypotheses, however, must be tested in future studies comparing distributive behavior in peer work situations with other group situations.

Regarding the negative correlation between donation and expectation, results are similar to those found in the first study, supporting the hypothesis that collaboration reflects some participants' willingness to act in a prosocial way expecting to receive a number of vouchers comparable to the amount donated. Despite these results, associations between distributive behavior and expectation should be better investigated. There is no known study with adults specifically testing this hypothesis, notably considering experimental situations in which activities are performed by a pool of individuals collaborating with each other.

The correlations between donation and Hostile Sexism and between expectation and Benevolent Sexism are not clear. Although not surprising, they do not explain potential differences of distributive behaviors between men and women. Therefore, we believe that future studies could deepen possible influences of Sexism on distributive behavior of men and women.

Comparison between Study 1 and Study 2

When participants' perception about the puzzle completion in Study 1 and 2 were compared, significant differences were found in relation to Difficulty ($U = 648.00$; $p < 0.001$), Completion ($U = 1324.50$; $p = 0.045$) and Liking ($U = 1316.50$; $p = 0.047$): participants in Study 2 evaluated their task as more difficult and liked it more, while the participants in Study 1 considered they made a higher effort.

Regarding distributive behavior and expectations of participants in both studies, it was observed that the mean donations in the second study was significantly higher than in Study 1 ($U = 1109$; $p = 0.002$). The opposite was true regarding expectations ($U = 1287$; $p = 0.028$). In addition, when donations were categorized as selfish, egalitarian, and prosocial it was

found that egalitarian decisions were more prominent the first than in the second study, in which the prosocial distributions prevailed (Figure 1): $\chi^2 = 10.62$; df = 2; p = 0.005.

In reviewing the potential effects of sex, it was observed that in Study 1 it was reported more egalitarian distributions than in Study 2 when men were playing the Dictator role. In addition, there were also more egalitarian distributions in Study 1 when participants believed to be donating for women.

General Discussion

Results of both studies suggest that men and women behaved in an egalitarian way when the endowments to be split resulted from a cooperative activity. This may have happened because the endowments to be split resulted from an activity that was performed jointly (Civai & Hawes, 2016), and because there was no significant difference in how men and women evaluated level of participation and effort of their partners. This may be because participants perceived their partners worked like themselves, regarding the levels of participation and effort, hence considering a fair splitting as a way of gratitude (Halali et al., 2016), or a debt payment (McGrath & Gerber, 2019), in addition to an award for the partner´s dedication in completing the puzzle (Cabral et al., 2018).

Despite these similarities between results of both studies, differences were found especially on the willingness of participants towards giving up their vouchers in Study 2. This increased willingness to anonymously donate vouchers, considering what was observed in previous studies that dictators became more selfish when they could not be identified (Sampaio & Pires, 2015) and worked separately (McGrath & Gerber, 2019).

A potential reason for that more generous behavior of participants in Study 2 might be related to the way how information about the others' contribution towards performing the task were presented. Participants came across a puzzle partially completed by another person, and that would continue to be done after they left. Therefore, participants missed mechanisms to effectively evaluate the degree of collaboration of the others towards solving the task, in opposition to what happened in the synchronous face-to-face condition of Study 1.

Another difference between Study 1 and 2 refers to the higher donation of men when their partners were also men, than when partners were women. This effect, however, was significant only in the first study. This could suggest that women tend to be more consistent in their distributive decisions, appraised cooperative work regardless their partners´ sex or the context of interaction (either direct or indirect). On the other hand, the strongest motivation for men to payoff more generously the cooperative work of other men can point out to the existence of some bias in their distributive consideration. This would lead them to evaluate men as more cooperative than women and, therefore, deserving additional payoffs. This

type of bias, however, is only manifested when the cooperative partner was clearly identified, and interaction was synchronous.

In studies which used different economic games there were found gender differences in distribution other than what were found here (Fantino & Kennelly, 2009; Kennelly & Fantino, 2007; Solnick, 2001; Walters, Stuhlmacher, & Meyer, 1998). In this way economic game types can impact men's and women's decisions differently, as well. Thus, gender differences regarding distributive behavior remain controversial and deserve further investigation in future studies.

Finally, the context of cooperative interaction in the second study, which assumed the participation of several anonymous individuals working together to complete the puzzle, seems to have encouraged participants to give up an egalitarian distribution on behalf of more donation to the group, even when participants did not directly benefit from it. Perhaps participants have perceived themselves in a situation in which indirect reciprocity would be beneficial to the group and donating part of what they were supposedly entitled to would contribute to the greater good. This could explain the increase of prosocial distributions in the second study, as compared to the first one (Rand & Nowak, 2013).

Additionally, in the cooperative condition, it is possible to assume that the kind of endowment and its value to participants may have been factors that contributed to the prevalence of the egalitarian distribution, because photocopies are a consumer good to the audience of Brazilian university students. In other words, participants might have decided to equally split the vouchers to show sympathy with their partners, what would be more in line with a distributive principle based on need (Lamont, 2012), hence diminishing potential effects of sex on distributive behavior. However, data obtained here do not allow any assertion in this sense. The endowment value should be a variable better controlledin future studies changing, for example, types of endowments) to be used.

One of the main limitations of this study is related to the small sample sizes in both studies, which impacted the choice of analysis (nonparametric and univariate) and diminished the power of generalizing the data found herein. Another issue refers to the actual value of the experimental manipulation regarding the partner's sex, since no strategy or tool was implemented to manipulate participants' trust in the information provided by the researcher. Therefore, we are not sure if participants effectively believed they were interacting with another individual, notably regarding the second study.

Concerns about the association between Sexism and distributive behavior was also a limitation. Both types of Sexism measured affect distributions, but in specific contexts: in face-to-face interaction, the Benevolent Sexism proved to be relevant, while when the interaction is mediated by

the researcher, the Hostile Sexism influenced distributions. We suggest further studies to better evaluate the potential interference of Sexism on the distributive decisions of men and women.

Despite these limitations, results obtained contribute to the literature on human cooperation by investigating differences related to the distributive behavior of men and women. It is suggested a potential diminished effect of selfish behavior typically observed in Dictator Games (Axelrod & Hamilton, 1981; Engel, 2011) when the endowment split task is preceded by a collaborative activity. Therefore, this can indicate that the perception of mutual engagement in solving a task increases people's willingness to distribute their endowments in an egalitarian way, and to be reciprocal in their decisions, regardless of it is made in a situation where participants interact face-to-face, or in a context in which they do not know with whom they are collaborating with.

To conclude, data produced from both studies suggest that cooperative work can serve as a mitigating factor of gender-related distributive discrepancies found in society, driving both men and women to act in a more egalitarian and prosocial way. Analyses derived from these studies should be expanded to test if the effects of cooperative work over the distributive behavior in the Dictator Game are also applicable to real life situations, in which men and women must decide about the allocation of endowments from a task in which the roles, responsibility and attributions of both men and women are similar.

References

Amorim, D.A., Sampaio, L.R., & Cabral, G.R. (2018). Altruism and empathy in situations involving unpredictable personal cost. *Ciências Psicológicas*, *12*(1), 7-15. https://doi.org/10.22235/cp.v12i1.1589

Andreoni, J., & Rao, J. (2011). The power of asking: how communication affects selfishness, empathy, and altruism. *Journal of Public Economics*, *137*(7-8), 513-520. https://doi.org/10.3386/w16373

Axelrod, R., & Hamilton, W.D. (1981). The evolution of cooperation. *Science*, *211*(4489), 1390-1396. https://doi.org/10.1126/science.7466396

Balliet, D. L., Norman, M., S., & Vugt, M. (2011). Sex differences in cooperation: a meta-analytic review of Social Dilemmas. *Psychological Bulletin. 137*(6), 881-909. https://doi.org/10.1037/a0025354.

Blake, P. R., & Rand, D. G. (2010). Currency value moderates equity preference among young children. *Evolution and Human Behavior*, *31*(3), 210–218. https://doi.org/10.1016/j.evolhumbehav.2009.06.012

Blake, P.R., Rand, D.G., Tingley, D., & Warneken, F. (2015). The shadow of the future promotes cooperation in a repeated prisoner's dilemma for children. *Nature: Scientific Reports*, *5*(14559), 1-8. https://doi.org/10.1038/srep14559

Boschini, A., Muren, A., & Persson, M. (2012). Constructing gender differences in the economics lab. *Journal of Economic Behavior & Organization*, *84*(3), 741–752. https://doi.org/10.1016/j.jebo.2012.09.024

Bowles, S., & Gintis, H. (2011). *A cooperative Species: human reciprocity and its evolution*. Princeton, New Jersey: Princeton University Press.

Bruttel, L., & Stolley, F. (2018). Gender differences in the response to decision power and responsibility-framing effects in a Dictator Game. *Games*, *28*(9) 1-16. https://doi.org/10.3390/g9020028.

Cabral, G. R. E., Sampaio, L. R., & Roazzi, A. (2018). Distributive judgments in cooperative production contexts. *Estudos de Psicologia (Campinas)*, *35*(2), 205-215. https://doi.org/10.1590/1982-02752018000200009

Cadsby, C. B., Servátka, M., & Song, F. (2010). Gender and generosity: does degree of anonymity or group gender composition matter? *Experimental Economics*, *13* (3). https://doi.org/ 10.1007/s10683-010-9242-8

Chowdhury, S. M., Jeon, J. Y., & Saha, B. (2017). Gender differences in the giving and taking variants of the Dictator Game. *Southern Economic Journal*, *84*(2), 474–483. https://doi.org/10.1002/soej.12223

Civai, C., & Hawes, D. R. (2016). Game Theory in Neuroeconomics. In M. Reuter & C. Montag (Eds.), *Studies in neuroscience, Psychology and Behavioral Economics. Neuroeconomics* (pp. 13-37). New York, NY, US: Springer-Verlag Publishing. https://doi.org/10.1007/978-3-642-35923-1_2

Croson, R., & Gneezy, U. (2009). Gender differences in preferences. *Journal of Economic Literature*, *47*(2), 1-27. https://doi.org/10.1257/jel.47.2.448

Dardenne, B., Dumont, M., & Bollier, T. (2007). Insidious dangers of benevolent sexism: consequences for women's performance. *Journal of Personality and Social Psychology*, *93*(5), 764-779. https://doi.org/10.1037/0022-3514.93.5.764

Dasgupta, U. (2011). Do procedures matter in fairness allocations? Experimental evidence in mixed gender pairings. *Economics Bulletin*, *31*(1), 820-829. https://ssrn.com/abstract=1796484

Eagly, A. H. (2009). The his and hers of prosocial behavior: an examination of the social psychology of gender. *American Psychologist*, *64*(8), 644–658. https://doi.org/10.1037/0003-066X.64.8.644

Eckel, C. C., & Grossman, P. J. (1998). Are Women less selfish than Men? evidence from Dictator Experiments. *Economic Journal*, *108*(448), 726-735. https://doi.org/10.1111/1468-0297.00311

Engel, C. (2011). Dictator games: a meta study. *Experimental Economics*, *14* (4), 583–610. https://doi.org/10.1007/s10683-011-9283-7

Espinosa M.P., & Kovářík, J. (2015) Prosocial behavior and gender. *Frontiers in Behavioral Neuroscience*, *9*, 1-9. https://doi.org/10.3389/fnbeh.2015.00088

Fantino, E., & Kennelly, A. (2009). Sharing the wealth: Factors influencing resource allocation in the sharing game. *Journal of the Experimental Analysis of Behavior*, *91*(3), 337-354. https://doi.org/10.1901/jeab.2009.91-337

Fiske, S. T. (2012). Managing ambivalent prejudices. *ANNALS of the American Academy of Political and Social Science*, *639*(1), 33-48. https://doi.org/10.1177/0002716211418444

Formiga, N. S., Gouveia, V. V., & Santos, M. N. (2002). Inventário de sexismo ambivalente: sua adaptação e relação com o gênero. *Psicologia em Estudo*, *7*(1), 103-111. https://doi.org/10.1590/s1413-73722002000100013

Glick, P., & Fiske, S. T. (1996). The Ambivalent Sexism Inventory: differentiating hostile and benevolent sexism. *Journal of Personality and Social Psychology*, *70*(3), 491–512. https://doi.org/10.1037/0022-3514.70.3.491

Gurevich, G., Kliger, D., & Weiner, B. (2012). The role of attribution of causality in economic decision making. *The Journal of Socio-Economics*, *41*(4), 439-444. https://doi.org/10.1016/j.socec.2011.07.005

Halali, E., Kogut, T., & Ritov, I. (2016). Reciprocating (more) specifically to you: the role of benefactor's identifiability on direct and upstream reciprocity. *Behavioral Decision Making*, *30*(2), 473–483. https://doi.org/10.1002/bdm.1966

Heinz, M., Juranek, S., & Rau, H. A. (2012). Do women behave more reciprocally than men? Gender differences in real effort dictator games. *Journal of Economic Behavior & Organization*, *83*(1) 105-110. https://doi.org/10.1016/j.jebo.2011.06.015

Higa, F. C. (2016). Assédio sexual no trabalho e discriminação de gênero: duas faces da mesma moeda? *Revista Direito GV (online)*, *12*(2), 484-515. https://doi.org/10.1590/2317-6172201620

Instituto Brasileiro de Geografia e Estatística - IBGE (2018). *Pesquisa Nacional de Amostra de Domicílios Contínua*. Report of IBGE. https://www.ibge.gov.br/estatisticas/multidominio/condicoes-de-vida-desigualdade-e-pobreza/9173-pesquisa-nacional-por-amostra-de-domicilios-continua-trimestral.html?edicao=27704&t=destaques

Kanngiesser, P., Gjersoe, N. L., & Hood, B. M. (2010). The effect of creative labor on property-ownership transfer by preschool children and adults. *Psychological Science*, *21*(9), 1236-1241. https://doi.org/10.1177/0956797610380701

Kennelly, A., & Fantino, E. (2007). The sharing game: Fairness in resource allocation as a function of incentive, gender, and recipient types. *Judgment and Decision Making*, *2*(3), 204-216.

Konow, J. (2001). Fair and square: the four sides of distributive justice. *Journal of Economic Behavior and Organization*, *46*(2), 137-164. https://doi.org/10.1016/ S0167-2681(01)00194-9

Lamont, J. (2012). *Distributive Justice*. London, England: Routledge. https://doi.org/10.4324/9781315257563

McGrath, M. C., & Gerber, A. S. (2019). Experimental evidence for a pure collaboration effect. *Nature Human Behaviour*, *3*(4), 354-360. https://doi.org/10.1038/s41562-019-0530-9

Mitkidis, P., Sørensen, J., Nielbo, K.L., Andersen, M., & Lienard, P. (2013). Collective goal ascription, increases cooperation in Humans. *Plos One*, *8*(5), 1-7. https://doi.org/10.1371/journal.pone.0064776

Montinari, N., & Rancan, M. (2018). Risk taking on behalf of others: the role of social distance. Journal of Risk and Uncertainty, 57(1), 81–109. https://doi.org/10.1007/s11166-018-9286-2

Nowak, M. A. (2006). Five rules for the Evolution of Cooperation. Science, 314 (5805), 1560–1563. https://doi.org/10.1126/science.1133755

Oxoby, R. J., & Spraggon, J. (2008). Mine and yours: property rights in dictator games. Journal of Economic Behavior & Organization, 65 (3-4), 703-713. https://doi.org/10.1016/j.jebo.2005.12.006

Proni, T. T. R. W., & Proni, M. W. (2018). Discriminação de gênero em grandes empresas no Brasil. Revista Estudos Feministas (online), 26 (1), e41780. https://doi.org/10.1590/1806-9584.2018v26n141780

Rodriguez-Lara, I. (2016). Equity and bargaining power in ultimatum games. Journal of Economic Behavior & Organization, 130, 144-165. https://doi.org/10.1016/j.jebo.2016.07.007

Rand, D. G., & Nowak, M.A (2013). Human cooperation. Feature Review, 17 (8). 413-425. https://doi.org/10.1016/j.tics.2013.06.003

Sadrieh, A., & Schröder, M. (2017). Acts of helping and harming. Economics Letters, 153 (C), 77-79. https://doi.org/10.1016/j.econlet.2017.01.019

Sampaio, L. R., & Pires, M. F. D. N. (2015). Sharing in private and public situations: does this really matter for children? The Spanish Journal of Psychology, 18 (42), 1-7. https://doi.org/10.1017/sjp.2015.45

Sharma, S. (2015). Gender and distributional preferences: Experimental evidence from India. Journal of Economic Psychology, 50, 113-123. https://doi.org/10.1016/j.joep.2015.08.004

Solnick, S. J. (2001). Gender differences in the ultimatum game. Economic Inquiry, 39 (2), 189-200. https://doi.org/10.1111/j.1465-7295.2001.tb00060.x

Stewart-Williams, S. (2007). Altruism among kin vs. nonkin: effects of cost of help and reciprocal exchange. Evolution and Human Behavior, 28 (3), 193-198. https://doi.org/10.1016/j.evolhumbehav.2007.01.002

Thielmann, I., Spadaro, G., & Balliet, D. (2020). Personality and prosocial behavior: A theoretical framework and meta-analysis. Psychological Bulletin, 146 (1), 30–90. https://doi.org/10.1037/bul0000217

Tisserand, J. C. (2014). Ultimatum game: A meta-analysis of the past three decades of experimental research. In *Proceedings of International Academic Conferences* (No. 0802032). International Institute of Social and Economic Sciences.

Tomasello, M. (2014). The ultra-social animal. *European Journal of Social Psychology*, *44*(3), 187–194. https://doi.org/10.1002/ejsp.2015

Trivers, R. (1971). The evolution of reciprocal altruism. *The Quarterly Review of Biology*, *46*(1), 35–57. https://doi.org/10.1086/406755

Walters, A. E., Stuhlmacher, A. F., & Meyer, L. L. (1998). Gender and negotiator competitiveness: A meta-analysis. *Organizational behavior and human decision processes*, *76*(1), 1-29. https://doi.org/10.1006/obhd.1998.2797

Warneken, F., & Tomasello, M. (2008). Extrinsic rewards undermine altruistic tendencies in 20-month-olds. *Developmental Psychology*, *44*(6), 1785–1788. https://doi.org/10.1037/a0013860

World Economic Forum - WEF (2020). Global Gender Gap. Report of WEF. http://www3.weforum.org/docs/WEF_GGGR_2020.pdf

Wu, J., Balliet, D., Tybur, J. M., Arai, S., Van Lange, P. A. M., & Yamagishi, T. (2017). Life history strategy and human cooperation in economic games. *Evolution and Human Behavior*, *38*(4), 496-505. https://doi.org/10.1016/j.evolhumbehav.2017.03.002

Xiong, M., Shi, J., Wu, Z., & Zhang, Z. (2016). Five-Year-Old Preschoolers' Sharing is Influenced by Anticipated Reciprocation. *Frontiers in Psychology*, *7*, 460. https://doi.org/10.3389/fpsyg.2016.00460

Zin, G., Escobal, G., Esteves, G., & Goyos, C. (2015). Sharing Game: Influence of gender, cost of response, history of reinforcement, and amount of money in the resource distribution of undergraduate students. *Behavior Analysis: Research and Practice, 15*(1), 65-80. https://doi.org/10.1037/h0101071