Competition, Cooperation, and Motivated Social Perceptions

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Abstract: What are the sources of social divisions? Many empirical and experimental studies show that social divisions negatively impact economic outcomes. This experiment reverses the causal arrow and asks if economic settings affect how individuals perceive one another. Subjects receive information about counterparts' traits (preferences and demographics) and then work for bonus pay by completing a real-effort task. Subjects who compete for pay against their counterparts report having fewer traits in common with their counterparts than subjects who work in a cooperative setting. This effect emerges despite that subjects have monetary incentives to report correctly the number of common traits. In response to a vaguer question about similarity to counterparts, women also report less similarity in the competitive setting than in the cooperative setting. In an experiment with descriptions of natural scenes in place of counterparts' traits, cooperative vs. competitive settings do not have a significant effect on subjects' reports of features in common.

1 Introduction

What are the causes of social divisions? How do people come to think of themselves as having more or less in common with others? Much research shows that social divisions adversely affect economic outcomes. Ethnically divided communities invest less in public goods; ethnic fractionalization relates directly to deforestation; and ethnic diversity helps explain cross-country patterns of low relative economic growth.[1] At the individual level, experimental evidence indicates that even mild social distinctions can lead to choices that reduce the payoffs of counterparts from other groups.[2]

This paper reverses the causal arrow and studies possible economic sources of social divisions. We ask, in particular, whether competitive or cooperative economic settings impact how people socially perceive others, as more or less similar to themselves and as having more or less in common. The paper thus hearkens back to early experiments in social psychology which show that competition creates animosities but these animosities can be mitigated by cooperation (Sherif et al. (1954)),[3] and our findings are consistent with a recent historical study demonstrating that anti-Semitism emerged in Germany more strongly in regions where Christians and Jews could compete in money lending (Becker & Pascali (2019)).

We propose an experiment that varies the economic context in which subjects interact with counterparts and test for differences in subjects' social perceptions.[4] Subjects receive true information about counterparts' preferences and demographics and then perform a real-effort task for pay. We find that subjects randomly assigned to the competitive pay scheme later report having less in common with their counterparts than subjects assigned to the

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[1]See, respectively, Alesina, Baqir & Easterly (1999), Miguel & Gugerty (2005), Goldin & Katz (1997), Alesina, Gennaioli & Lovo (2019), Easterly & Levine (1997). For review, see Alesina & Ferrara (2005).

[2]See, for example, Glaeser et al. (2000), Fershtman & Gneezy (2001), Chen & Li (2009), Goette, Huffman & Meier (2012), Klor & Shayo (2010), Bauer et al. (2018), Kranton et al. (2020).

[3]In social psychology, see Brewer (1979) for review of subsequent lab experiments on the effect of intergroup competition or cooperation on outcomes such as the likeability of people in the other group and Ruscher & Fiske (1990) and Stapel & Koomen (2005) for the effect of competition or competition on self-evaluations and evaluations of others' competency and other such traits.

[4]The experiments were approved by Duke University IRB, pre-registered at AsPredicted (#80504, #85269, #132541), and involved no deception.

cooperative pay scheme. This effect emerges despite that subjects have monetary incentives to report correctly how many characteristics they have in common with their counterparts. Women also report more similarity to counterparts in the cooperative setting than in the competitive setting.

The experimental design isolates the economic setting from economic outcomes that could influence social evaluations, such as relative performance or earnings. The experiment consists of three parts. First, each subject answers a Study Questionnaire which we developed and consists of four questions: gender, political party leaning, preferred season, and marital status. Second, subjects are randomly matched with a counterpart and informed of the real-effort task they will perform to earn bonus pay.[5] Subjects are randomly assigned to either (a) *Competition*, where subjects are only paid when they outperform their counterpart, or (b) *Cooperation*, where subjects are paid according to the sum of their performance and their counterpart's performance. After learning the pay scheme, subjects see their counterpart's answers to the Study Questionnaire and then work on the real-effort task for three minutes. Third, subjects provide their views of their counterpart by answering two questions. One question asks subjects to report the number of answers to the Study Questionnaire that they have in common with their counterpart, and subjects have monetary incentives to report the correct number. 0ne question asks subjects to assess their similarity to the counterpart, a subjective question to which no monetary incentives can be attached. The subjects answer these questions before knowing their relative performance or bonus payments. Therefore, subjects' answers depend only on the treatment, that is, on whether the counterpart is presented as a competitor or as a co-worker.

Analyzing the social perception outcomes, we find that subjects report significantly fewer Questionnaire answers in common with their counterparts in the *Competition* treatment than in *Cooperation* treatment. This effect is robust to controls for the true number of common

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[5]The counterparts performed the real-effort task in an earlier experimental session and their performances were recorded.

answers, the order of the social perception questions, and demographic characteristics, and is of the same magnitude for male and female subjects. The treatments have no overall significant effect on the assessments of similarity to counterparts, though women report more similarity to counterparts in *Cooperation* than in *Competition*. The similarity assessments overall appear to be dominated by political leanings more than by any other factor including treatment, and subjects answer the similarity question about three times faster than the commonality question (a highly significant difference).

We find further that in the competitive setting subjects' reports of the number of traits in common are on average significantly more accurate than subjects' reports in the cooperative setting. Said differently, the absolute difference between the reported number of common answers and the true number of common answers is smaller in *Competition* than in *Cooperation*. This pattern gives another view of our main result: on average overall and in each treatment, subjects report having more traits in common than is truly the case but this global tendency to over-state commonality is significantly smaller in *Competition*.

The higher accuracy in *Competition* raises the possibility of a mechanical explanation for the treatment effect: competition could induce subjects to be more accurate in general when reporting the number of common items in two shorts lists.[6] This explanation would imply that mistakes in *Cooperation* would be evenly distributed in the positive and negative direction relative to *Competition*. However, we find that mistakes in *Cooperation* are biased in the direction of more commonality. Following the criteria of Bénabou & Tirole (2016), this directionality indicates a motivated, rather than mechanical, process behind the treatment effect on commonality.

We further assess this mechanical explanation by implementing a complementary experiment with exactly the same design as the main experiment except that the Study Questionnaire

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[6]This enhanced accuracy in *Competition* could emerge from, for example, greater attention paid to the counterpart's answers or overall higher level of concentration. A few studies in psychology examine the effect of competitive settings on effort, memory, and attention, summarized in DiMenichi & Tricomi (2015). Conclusions are mixed, with no general finding. Effects depend on the nature of the competition, gender, individuals' normative goals, reactions to stress, and already-present cognitive loads.

and the list of counterparts' traits are replaced by two lists which each consist of four features describing natural scenes.[7] Subjects report the number of common features of the two scenes with the same incentives for accurate reports as in the main experiment. In this non-social setting, we find no significant difference between the reports and the gaps between the reports and the true common number of common answers in the *Competition* and *Cooperation* treatments.

The paper's investigation and results are a proof of concept, embarking in a new direction in the economic study of social divisions and advancing the study of motivated beliefs to the domain of social perceptions. Relative to the experimental studies of social divisions, the present paper is a study of causes rather than consequences. Many previous economic experiments have a structure similar to classic experiments in social psychology which consider the impact of group divisions on choices such as reward allocations (e.g., Tajfel et al. (1971)). The treatments invoke group or social divisions, or subjects' common traits and preferences, and the outcomes are subjects' behavior towards others in allocation and strategic settings.[8] The experimental design in the present paper is based on the same premise, namely that social divisions can derive from common or different individual traits. However, we ask if subjects' perceptions of counterparts' traits change depending on the economic context within which they interact.[9]

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[7]Each feature is drawn randomly from two possibilities so that the statistical properties are the same as those of the Survey Questionnaire. Natural scenes are used in Khaw, Kranton & Huettel (2021) to compare visual biases when looking at human and non-human ensembles.

[8]In one approach, treatments exploit natural groups such as common race, ethnicity, political party, or subjects' fields of study (e.g., Fershtman & Gneezy (2001), Glaeser et al. (2000), Goette, Huffman & Meier (2006), Bernhard, Fehr & Fischbacher (2006), Klor & Shayo (2010)). The "minimal group" approach creates groups in the laboratory by dividing subjects according to answers to surveys on individual tastes and preferences, as in Chen & Li (2009), Charness, Rigotti & Rustichini (2007), Chen & Chen (2011) and Hargreaves Heap & Zizzo (2009). Studies also contrast subjects' choices when divided into minimal groups versus real-world groups (Goette, Huffman & Meier (2012), Kranton et al. (2020)).

[9]The present study also relates to recent economic field experiments that apply and test the contact hypothesis (Allport (1954)) in an effort to reduce discrimination. In rural India, Lowe (2021) studies mixed or single caste cricket matches, with pay for individual vs. team performance, which is learned before social outcomes are measured. The results indicate no marginal effect of the incentive schemes. Mousa (2020) finds no effect of playing together on soccer teams on longer-term 'tolerance" between Muslims and Christians in post-war Iraq. The present paper posits purely economic cooperation and competition and isolates these settings from outcomes to identify the effect of the settings per se on social perceptions. See Bertrand & Duflo (2017) for

By testing whether people think of each other as having more or less in common or being more or less similar in different economic settings, this experiment expands the economics of motivated beliefs to the social realm. Research on motivated beliefs is rooted in work in psychology that posits that beliefs, in addition to actions, serve important needs (Kunda (1987)); people derive direct benefits from believing they are able and moral people, their future is bright, and they made the right choices. Experiments in economics have recently advanced our understanding of how individuals form and maintain such comforting beliefs.[10] Only a few studies examine motivated beliefs of subjects involved in strategic or economic interactions with others. These studies typically demonstrate that subjects select information about whether or not their action will hurt others, in a way that make them feel moral while acting immorally.[11] The experiment we propose is quite different: We study whether subjects have motivated views of themselves vis à vis their counterparts and ask if these social perceptions depend on the economic context. People could feel worse when they compete against someone who is socially close and have the reverse sentiments when they cooperate. Thus, people adjust their perceptions of closeness accordingly. We discuss possible mechanisms behind these adjustments in the Conclusion.

2 Experimental Design

This experiment, which aims to causally identify the impact of economic settings on social perceptions, consists of three parts.[12]

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review of economics field experiments on discrimination including tests of elements of the contact hypothesis.

[10]For example, see Eil & Rao (2011) for the asymmetric use of negative and positive information about oneself, and see Zimmermann (2020) selective memory of feedback on own performance. See Bénabou (2015) for a review of the motivated belief literature.

[11]Work in this area includes Grossman (2014), Di Tella et al. (2015), Grossman & Van der Weele (2017), Serra-Garcia & Szech (2021), Chen & Heese (2021), Exley & Kessler (2021). For a study of how agents' rely on counterparts' beliefs, see Oprea & Yuksel (2021).

[12]The Appendix C.1. provides the full instructions.

2.1 The Three Parts of the Experiment

Part 1 - Study Questionnaire

Subjects first complete a Study Questionnaire about themselves. The Questionnaire consists of four questions: gender (male, female, or non-binary), political party leanings (Democrat or Republican), married or in a domestic partnership (yes or no), preference for a season (fall or spring). (As described below in Section 2.2, we designed the Questionnaire to elicit as much differentiating information as possible in a few questions.) Each subject is presented these questions in one of ten orders, randomly selected.

Part 2 - Work Setting and Counting Task

Subjects are told they will participate in a work setting with another person, *Person A*, to whom they have been randomly matched. Person A is described (truthfully) as a real person who participated in a previous study. Subjects then see a description of the work, which is to count the number of ones in 9 x 9 tables of randomly-ordered zeros and ones. This real-effort task, borrowed from Abeler et al. (2011), requires no prior knowledge, is known to be tedious, and offers little learning possibilities. Subjects' performance is the number of tables for which they report the correct number of ones. Subjects are told (again truthfully) that Person A completed this task previously and that A's performance was recorded.

Subjects are then randomly assigned either to the *Competition* or to the *Cooperation* treatment and informed of the corresponding payment scheme.[13] In *Competition*, subjects earn bonus money based on their performances only if they perform better than Person A; otherwise, only Person A earns money based on A's performance. In particular, if the subject outperforms Person A, the subject earns $0.40 bonus pay for each correctly counted table and Person A earns nothing. In *Cooperation*, the subject and Person A both earn money based on their combined performance. Precisely, both individuals earn $0.10 times the sum of their correctly counted tables. Thus, the total economic surplus is the same in each treatment

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[13]While we use the words "Competition" and "Cooperation" to describe the settings, the subjects do not see such wording. They just see a verbal description of the pay scheme and an accompanying illustrative gif.

($0.40 per correctly counted table). In *Competition* either Person A or the subject receives the full surplus while in *Cooperation* they split the surplus, and the subject's expected monetary payoff is the same in each treatment.[14]

Just before starting the real-effort task, subjects see Person A's answers to the Study Questionnaire. These answers are displayed for ten seconds and then the screen advances automatically to the counting task. Thus, when performing the task, subjects know how the task is rewarded and "whom" they are cooperating with or competing against. Competition or cooperation then has the possibility to alter the perception of the counterpart. Subjects are told they have three minutes to do the counting task and will learn their bonus money at the very end of the study. Hence, relative performance and earnings cannot affect subjects' social evaluations of counterparts measured in Part 3.

Part 3 - Questions about Person A and Yourself

Subjects are asked two social perception questions. We refer to question (i) as the *similarity* question and to question (ii) as the *commonality* question. To check for order effects, one of the questions is asked first in each of two experimental sessions.

(i) How similar are you to Person A?

Choices: Not similar at all, Not similar, Neutral, Similar, Very similar.

(ii) You answered the Study Questionnaire at the beginning of the survey. How many answers do you have in common with Person A? You will earn a bonus of $0.10 if you are exactly correct, $0.05 if you are within 1 of the correct number and $0 if you are 2 or more outside the correct number.[15]

Choices (pull-down menu): 4, 3, 2, 1, 0.

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[14]The marginal return to a correctly counted table to subject's bonus pay is $0.20 in expectation in *Competition* and $0.10 in *Cooperation*. In *Cooperation*, each of the subject's correctly counted table also gives $0.10 to Person A. As we discuss below, we find no difference in performance between the two treatments. We further can rule out, as discussed in the Introduction, enhanced attention in *Competition* (due to, say, higher marginal returns) as a mechanical process driving the treatment effect on commonality.

[15]See Charness, Gneezy & Rasocha (2021) for a discussion of the advantages of such simple incentive schemes.

Finally, subjects answer demographic questions (e.g, state of residence, educational attainment) and questions concerning preferences towards teamwork and competition, and, on the last screen, subjects are informed of their bonus payments. Figure 1 provides the timeline of the experiment and summarizes.

| **Part 1** | **Part 2** | **Part 3** |
| **Study Questionnaire** | **Work Setting and Counting Task** | **Social Perception Questions** |

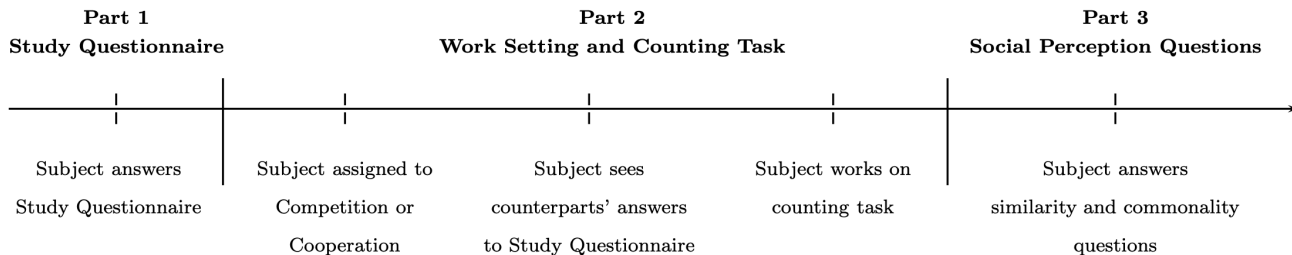| Subject answers | Subject assigned to | Subject sees | Subject works on | Subject answers |
| Study Questionnaire | Competition or | counterparts' answers | counting task | similarity and commonality |
| | Cooperation | to Study Questionnaire | | questions |

Figure 1: Timeline and Summary of Three Parts of Experiment

Our main hypothesis is that the assigned economic setting in Part 2 affects subjects' answers to the social perception questions in Part 3. Specifically, we hypothesize that subjects assigned to *Competition* report having less in common with and being less similar to their counterparts than do subjects assigned to *Cooperation*.[16]

2.2 Study Questionnaire Design

We designed the Study Questionnaire to be a personal survey which distinguishes individual subjects in terms of demographics and preferences. We sought demographics and preferences which are not highly correlated, so that each answer provides new information about the individual. We also sought a short, four-item questionnaire so that subjects could, in principle, easily remember their own survey answers as well as those or their counterparts.[17]

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[16]At pre-registration, we anticipated that similarity, being a more subjective measure, would be more affected by the treatments. We find the opposite result, as detailed below.

[17]According to the early memory literature in psychology, seven is the average number of items individuals can remember in the short run, plus or minus two depending on the individual (Miller (1956)). Research now indicates that this number also depends on the items themselves (length, complexity, etc.), but a consensus has emerged around three or four simple objects that can be visually memorized in the short term (Luck & Vogel (1997) and Machizawa, Goh & Driver (2012)).

Building on methods in Lee et al. (2021), we developed the Study Questionnaire by recruiting five hundred subjects on Prolific to answer 50 questions about themselves. The questions concerned demographics such as gender, age, parental status, martial status, as well as political leanings and preferences about seasons, food, art, and vacation destinations. The answers to all questions were binary except for the question concerning gender. The participants were paid $1.00 for completing the survey.

We used factor analysis, along with correlations of the answers to the questions, to choose four items for the Study Questionnaire.[18] Principal factor extraction yielded eleven ordered factors along with the factor loadings which indicate the extent to which each question is associated with a given factor. Given observed gender differences in preferences for competition and preferences for gender of counterparts in competitive settings (Niederle & Vesterlund (2011), Datta Gupta, Poulsen & Villeval (2013)), we selected gender to be one of the questions (gender was the highest loading question of the sixth factor). We then selected marital status, political party leaning, and preferred season by considering the highest loading questions of the top four factors which also had low correlations to each other.

2.3   Counterparts

Before implementing the main study, we recruited on Prolific two hundred people to serve as counterparts. These participants answered the Study Questionnaire and completed the same counting task used in the main experiment. Participants were paid $1.00 for completion and earned bonus pay of $0.20 per correctly counted table (the same expected bonus pay as for subjects in the main experiment). Participants were invited to possibly be passive participants in future studies to earn additional bonus pay; 198 participants agreed and were included as counterparts.

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[18]The Appendix B provides details. In this analysis and in all analyses of the experimental data, we pool non-binary subjects with males, with no difference if non-binary subjects are pooled with females.

2.4 Implementation

The experiment was run on Prolific with 2000 participants restricted to the United States and filtered to ensure gender balance. Subjects were told they would receive a fixed payment for completion of $1.00 and possible bonus payments. The average payment (fixed and bonus) actually received was $2.15 (s.d. 0.97), which corresponded to the going rate on the Prolific platform at the time. Randomization into the two treatments, *Competition* and *Cooperation*, occurred at the participant level.

3   Results

Our objective is to test whether the economic treatments affect subjects' social perceptions. To do so, we establish first that the randomizations (of subjects to treatments and of counterparts to subjects) successfully yielded two balanced subject pools in terms of characteristics and performance on the counting task. We also demonstrate the consistency of subjects' responses to the social perception questions. Unless stated otherwise, reported p-values are obtained from two-sided t-tests.

3.1   Balance of Characteristics, Performance, True Commonality

Out of 2000 participants, 996 were assigned to the *Competition* treatment and 1004 to the *Cooperation* treatment. The frequencies of characteristics and preferences are virtually identical:[19] Subjects in each treatment are almost evenly divided between males and females (and about 2.45% non-binary), about three-quarters prefer the Democratic party, about two-thirds prefer the fall to the spring, and marital status is divided almost evenly between yes and no responses. Age range (from 18 to 81, with an average at 33.63) and education (coded as five levels from less than high school to doctoral degree) were represented with no significant

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[19]Table A.1. in the Appendix A provides details.

difference between the treatments. Subjects took the same amount of time to complete the study, about 7.37 minutes in both treatments ($p = 0.893$).

As for performance, the average number of correctly counted tables was 5.05 (s.e. 0.067) in the *Competition* treatment and 4.95 (s.e. 0.063) in the *Cooperation* treatment, which are not different ($p = 0.301$). The Kolomogorov-Smirnov test comparing the distributions of performance gives a p-value of 0.100.[20]

The random matching of subjects and counterparts generated similar distributions of common answers to the Survey Questionnaire in the two treatments. On average, the true number of common answers is 2.141 (s.e. 0.032) in the *Competition* treatment and 2.163 (s.e. 0.031) in the *Cooperation* treatment, which is not significantly different ($p = 0.610$). There is no significant difference in the frequencies of 1, 2, 3 or 4 common answers between the two treatments ($p > 0.356$ in all cases) but 0 common answers is slightly more frequent in the *Competition* than in the *Cooperation* treatment (5.32% and 3.78%, $p = 0.099$).[21]

3.2 Consistency of Social Perception Responses

We find robust consistency in subjects' answers to the social perception questions. We code the answers to the similarity question from 1 for *Not similar at all* to 5 for *Very similar*. Conditional on the true number of common answers, the similarity measure and the reported number of common answers exhibit a significant positive correlation ($p < 0.005$ for every possible true number of common answers). Table 1 below presents the estimated linear regressions for the reported number of common answers and stated similarity. Specifications (1) and (6) consider the true number of common answers, (Comm_Ans), as an explanatory variable and show this number positively affects commonality and similarity.

As we discuss further below, however, the two questions are different in content and nature

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[20]Overall, performance significantly declines in the age of the subject by about 0.036 (s.e. 0.004) correct tables per year.

[21]Across the whole experiment, the frequencies of 0, 1, 2, 3, and 4 common answers are 4.55%, 21.05%, 37.65%, 28.15% and 8.60% respectively.

and are treated differently by subjects. The commonality question is precise and the answer is incentivized in a simple way. The similarity question captures a broad, subjective assessment of closeness on a Likert scale which cannot be incentivized.[22] We find subjects answer the similarity question much more quickly than the commonality question independently of which question is asked first, 5.95 seconds on average (s.e. 0.186) versus 20.65 seconds on average (s.e. 0.291) ($p < 0.001$).

3.3   Treatment Effect on Social Perceptions

We find subjects' reports of commonality are significantly lower in the *Competition* treatment than in the *Cooperation* treatment. While the true number of common answers is the same on average in the two treatments (see Section 3.1), the average reported number is 2.54 (s.e. 0.035) in *Cooperation* and only 2.35 (s.e. 0.035) in *Competition*. The difference 0.19 is highly significant ($p < 0.001$). Figure 2 shows the effect of the treatment on the frequency distributions: The frequency with which subjects report 0, 1, and 2 common answers is higher in *Competition*, and the frequency which with subjects report 3 and 4 common answers is lower. The differences in frequencies are statistically significant for 2 common answers ($p = 0.051$) and for 4 common answers ($p < 0.001$). By the Kolmogorov–Smirnov test, we can reject that the frequency distributions of reports of commonality question are the same in *Cooperation* and *Competition* ($p = 0.006$).

The gap between the reported and true number of common answers on the Study Questionnaire provides another window on this treatment effect and shows subjects are more accurate in the competitive setting. Combining the data from both treatments, overall subjects overstate the number of common answers; the average gap is 0.294 (s.e. 0.024) which is positive and significant ($p < 0.001$).[23] However, the overstatement of commonality is significantly

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[22]The Likert Scale is known induce various response biases that could push subjects to the mid-range answers (Kreitchmann et al. (2019)). Over the whole experiment, the most common answer is *Similar* chosen by 43.30% of the subjects.

[23]The mean true number of common answers is 2.152 (s.e. 0.022), while the mean report is 2.445 (s.e.
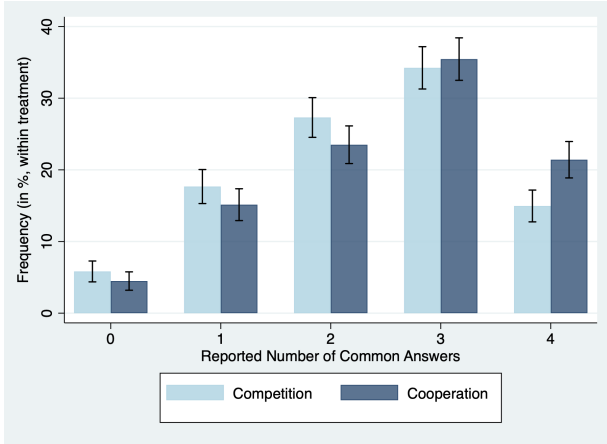
Note: Solid lines show 95% confidence intervals.

Figure 2: Frequency Distributions of the Reported Number of Common Answers
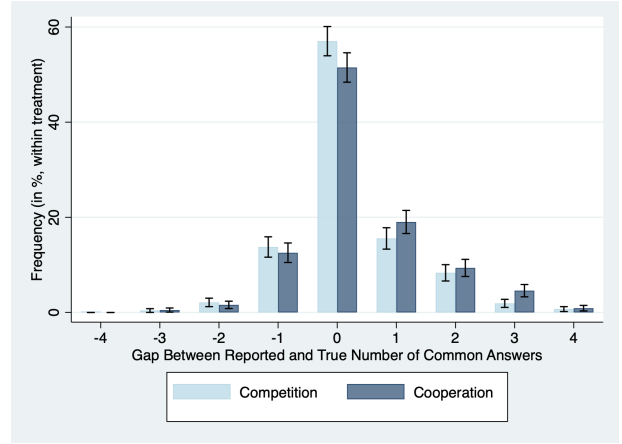
Note: Solid lines show 95% confidence intervals.

Figure 3: Frequency Distributions of the Gap between Reported and True Number of Common Answers

lower in the *Competition* treatment than in the *Cooperation* treatment; the average gap is 0.38 (s.e. 0.035) items in the *Cooperation* setting and only 0.21 (s.e. 0.032) items in the *Competition* setting, a significant difference of -0.17 items ($p < 0.001$). On average, subjects give more accurate reports in *Competition* than in *Cooperation*; the average of the absolute value of the gaps is 0.607 (se.e. 0.264) in *Competition* versus 0.723 (se.e. 0.029) in *Cooperation* ($p = 0.003$).

Figure 3 shows the distributions of the gap between subjects' reports of common answers and the true number, by treatment. The frequency of reports that correspond to overstatements of commonality (gaps of 1, 2, 3 and 4) is significantly lower in *Competition* (26.51%) than in *Competition* (33.86%, $p < 0.001$). By the Kolmogorov–Smirnov test, we can reject that the frequency distributions of gaps between reports and the true number of common answers are the same in *Cooperation* and *Competition* ($p = 0.009$).

While the responses to the similarity question are generally in the same direction as the responses to the commonality question, the treatments do not have a significant overall effect

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0.025). Reports are greater than the true number in 30.20% of the matches, correct in 54.25%, and lower in 15.55%.

on similarity. The mean similarity assessment in the *Competition* treatment is 3.280 (s.e. 0.034) and 3.321 (s.e. 0.033) in the *Cooperation* treatment, which are not significantly different ($p = 0.391$). The frequencies of the most common responses, *Similar* and *Neutral*, are not different in the two treatments but the frequency of *Not similar* is higher in *Competition* than in *Cooperation* (21.49% and 17.63%, $p = 0.030$). We cannot reject that the frequency distributions of responses to the similarity question are the same ($p = 0.609$ for the Kolmogorov-Sirnov test). However, below, we find that women's similarity evaluations of counterparts are slightly but significantly lower in the *Competition* treatment.

Regression specifications (2)-(3) and (7)-(8) in Table 1 confirm the above results. Controlling for the actual number of common answers (Comm_Ans), the *Cooperation* treatment (Coop) has a significant effect on the reported number of common answers (specification (2)) but not on answers to the similarity question (specification (7)). Specifications (3) and (8) show no change in the treatment effect coefficient when breaking down the actual number of common answers into four dummy variables: same gender, same marital status, same season preference, same political leanings.

Specifications (3) and (8) also show the varied impacts of shared traits on the subjects' responses, indicating the two social perception questions are fundamentally different. When subjects report the number of common answers, the particular shared trait (whether gender or preferred season for example) has a similar impact on the report. In contrast, when assessing similarity, the particular shared trait matters. The same political leaning has a significant, outsized effect on perceived similarity which appears to swamp any impact of the treatments.

Specifications (4) and (9) show that the treatment effect on commonality, and the lack thereof on similarity, are robust to the inclusion of controls for whether the commonality question was asked first (Com_Before) and subject demographics. Specification (4) shows that the reported number of common answers is significantly higher when the commonality question was asked first. However, interacting the treatment dummy with question order

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		Report_Common					Similarity			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Coop		0.181***	0.184***	0.187***	0.200***		0.025	0.037	0.032	0.090*
		(0.043)	(0.043)	(0.061)	(0.062)		(0.036)	(0.034)	(0.051)	(0.051)
Common_Ans	0.563***	0.562***		0.554***	0.552***	0.678***	0.678***		0.656***	0.655***
	(0.022)	(0.022)		(0.023)	(0.023)	(0.018)	(0.018)		(0.019)	(0.019)
Same_Gender			0.509***					0.609***		
			(0.043)					(0.035)		
Same_Married			0.528***					0.506***		
			(0.043)					(0.034)		
Same_Season			0.525***					0.505***		
			(0.043)					(0.035)		
Same_PolParty			0.703***					1.157***		
			(0.045)					(0.036)		
Com_Before				0.124**					0.004	
				(0.061)					(0.051)	
Coop*Com_Before				-0.003					-0.010	
				(0.086)					(0.072)	
Male					0.052					0.040
					(0.062)					(0.052)
Coop*Male					-0.029					-0.122*
					(0.086)					(0.072)
Demographics	No	No	No	Yes	Yes	No	No	No	Yes	Yes
N	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000

Note: The Table reports OLS coefficients (standard errors in parenthesis). * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The regressions include a constant. Demographics include age, education (coded using five levels ranging from less than high school to doctoral degree), answers to the Study Questionnaire (except for gender in (5) and (10)), and subjects' answers to the questions on competitiveness and working in teams (coded as 0 or 1).

Table 1: Regression Analysis for the Social Perception Questions: Specifications (1) to (5) for Commonality and Specifications (6) to (10) for Similarity

3.4 Gender Effects

Given observed differences between women and men's preferences for competition and for gender of counterparts (see, e.g., Niederle & Vesterlund (2011), Datta Gupta, Poulsen & Villeval (2013), Saccardo, Pietrasz & Gneezy (2018)), we test for gender differences in social perceptions. On average men and women both report significantly lower commonality in *Competition*

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[24]Specification (2) restricted to subjects who were asked the commonality question first yields an estimated coefficient of Coop of 0.181 (s.e. 0.063) Specification (2) restricted to subjects who were asked the similarity question first yields an estimated coefficient of Coop of 0.177 (s.e. 0.058).

than in *Cooperation*, and women have significantly lower average reports of similarity in *Competition*. Regressions (5) and (10) in Table 1 interact the treatment dummy with gender (Coop*Male) and control for demographics. Specification (5) indicates a significant treatment effect on reports of commonality that does not differ by gender. For similarity, specification (10) indicates a weakly significant treatment effect for women's assessments only.[25] Given the nature of the similarity question and the clear results for commonality, we see this latter result as supportive of the general premise of motivated social perceptions rather than indicative of a gender difference.

Finally, we find no difference between men and women's social perceptions for same gender matches within each treatment. In the *Cooperation* treatment, the mean reported number of common answers for females in female-female matches (223 observations) is 2.85 with 2.71 for males in male-male matches (242 observations) ($p = 0.127$); in the *Competition* treatment, the mean reported number of common answers for females in female-female matches (220 observations) is 2.66 with 2.69 for males in male-male matches (227 observations) ($p = 0.766$).

3.5 Natural Scenes in place of Counterparts

Our complementary study considers how *Competition* vs. *Cooperation* affects the subjects' reports of commonality between two natural scenes instead of their commonality to counterparts. The experimental design is identical to the main experiment with the following replacements.[26] In Part 1, in the place of the Study Questionnaire, subjects generate four, randomly selected features of a natural scene.[27] In Part 2, in place of Person A's answers to the Study Questionnaire, subjects see a set of four randomly selected features of another natural scene. In Part 3, subjects are asked only to report the number of features the first scene has in common with the second scene. When doing that, subjects are reminded of the

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[25]Regressions that split the sample into male and female subjects, reported in Table A.3. of the Appendix A confirm these results.

[26]Appendix C.2. provides the full instructions.

[27]To parallel the Survey Questionnaire, the features of the natural scenes were selected from binary sets: landscape (Mountains or River), season (Spring or Fall), location (East or West), weather (Rainy or Sunny).

features of the first scene since in our main experiment subjects know their own answers to the Survey Questionnaire.

The experiment was run on Prolific with 604 participants restricted to the United States and filtered to ensure gender balance. The characteristics of the subject population match the ones of the main study in terms of gender and level of education, but subjects are on average older in the complementary study.[28]

We find no significant difference in the reports of common features of the natural scenes in the two treatments *Competition* and *Cooperation*. The mean of the true number of common features is the same —1.94 (s.e. 0.060) in *Competition* and 1.93 (s.e. 0.059) in *Cooperation* ($p = 0.88$) —and by a Kolmogorov-Smirnov test we cannot reject the frequency distributions are the same ($p = 0.995$). The mean reports of common features are 2.17 (s.e. 0.061) in *Competition* and 2.27 (s.e. 0.061) in *Cooperation* ($p = 0.257$). The average gap between the reported and the true number of common answers is positive and significant in both treatments, 0.23 (s.e. 0.063) in *Competition* and 0.34 (s.e. 0.060) in *Cooperation*; the difference between these average gaps of -0.11 is not significant ($p = 0.20$). By Kolmogorov-Smirnov tests, we cannot reject that the frequency distributions of reports and of gaps are the same in *Cooperation* and *Competition* ($p = 0.708$ and $p = 0.995$). The absence of a treatment effect is confirmed by the regression analyses provided in Table A.4 of Appendix A.

4   Conclusion

This paper tests whether the economic context affects people's social evaluations of others. In the experiment, subjects are given true information about counterparts' preferences and demographics. In a between-subjects design, subjects report how similar they are and how much they have in common with counterparts in a competitive or cooperative work setting. Subjects' reports of commonality are significantly lower in the competitive setting despite

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[28]Details are given in Appendix A, Table A.2 and subsequent text.

monetary incentives to make accurate reports. Women also report significantly less similarity to their counterparts in the competition setting. In a follow-up study, we find no significant effect of competition vs. cooperation on subjects' reports of common features of natural scenes. This outcome, along with the directionality of the results on commonality, indicates a motivated rather than mechanical process is driving the main treatment effect.

The paper advances and connects two areas of experimental economics—social divisions and motivated beliefs—and speaks to the larger questions of economic interactions and social difference. As elaborated in the Introduction, a growing body of economic experiments demonstrate that dividing people into groups based on preferences and demographics can affect strategic play and allocation of income. The present paper demonstrates the reverse causality: economic settings can lead subjects to view their counterparts as more or less the same or different. An emerging literature on motivated beliefs shows that when constructing views of the world, individuals trade-off the need for accuracy and the need to feel good about themselves and what they do or plan to do. Our study is the first to indicate that such a trade-off might be at play when individuals think about their relationships to others.

This study advances a new paradigm indicating people can have motivated social perceptions, and future research can explore mechanisms which could be a play. People could manipulate their social perceptions for affective and instrumental reasons.[29] The competitive pay scheme in-and-of-itself leads to inequality in payoffs between subjects and their counterparts. To the extent that people are more inequality averse towards people with whom they are socially close (Chen & Li (2009)), reducing social closeness in the competitive setting reduces the utility loss from inequality aversion. The same reasoning would hold for guilt aversion. Increased social distance to counterparts could also increase motivation to compete against them for pay, or if close, to cooperate. Our experiment, where the profile of counterparts is presented before the subject performs the real-effort task, is consistent with both possibilities.

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[29] Adopting the terminology of Bénabou (2015), beliefs have an *affective* value when people feel better and an *instrumental* value when people perform better.

Future research could distinguish between these mechanisms by changing the experimental timeline. Our portable design could also permit the study of how other economic settings affect social perceptions.

With the focus on economic settings and motivated social perceptions, the present paper introduces a new dimension to the study of social difference and conflict. Our experiment indicates that people possibly process and report social information about self and others differently, depending on how they interact in the economic realm. This biased processing could contribute to why historical patterns of prejudice and violence have economic roots (e.g. Becker & Pascali (2019)) as well as why returns from the economic success of others can mitigate conflict (e.g. Jha & Shayo (2019)). Further research could range from such societal patterns to the neural foundations of motivated social perceptions, building on findings, for example, that brain regions associated with social rewards are activated while engaging in a cooperative task but not a competitive task (Decety et al. (2004)). These investigations could identify the larger impact of economic settings, which could entail not just pecuniary incentives for people to work for or against each other but could shape their social world.

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Appendix

This Appendix provides (A) Supplementary statistical analyses including additional information on characteristics of the subject pools and regression analyses that split subjects by gender; (B) Details on the selection of questions for the Study Questionnaire; (C) The experimental consent form and instructions.

A. Supplementary Statistical Analyses

	Competition	Cooperation	All	t-tests
Number of Subjects	996	1004	2000	
Fraction Female (%)	48.59	48.80	48.70	p=0.925
Fraction Democrat (%)	76.10	75.00	75.55	p=0.566
Fraction Prefers Fall (%)	64.06	63.45	63.75	p=0.777
Fraction Married (%)	45.58	45.22	45.40	p=0.871
Average age (years)	33.63	33.64	33.63	p=0.982
Average level of education	3.21	3.19	3.20	p=0.624
Average time to complete the study (minutes)	7.35	7.38	7.37	p=0.893
Average number of tables counted correctly	5.05	4.95	5.00	p=0.301

Note: Five levels of education are coded: level 1 corresponds to less than high school or high school; level 2 corresponds to some college but no degree; level 3 corresponds to Associate's degree (two years of college); level 4 corresponds to Bachelor's degree (four years of college); level 5 corresponds to Master's or professional (JD, MD) or doctoral degree.

Table A.1. Characteristics of Subject Populations in the Two Treatments for the Main Study

	Competition	Cooperation	All	t-tests
Number of Subjects	301	303	604	
Fraction Female (%)	45.51	54.13	49.83	p=0.022
Average age (years)	40.67	42.32	41.50	p=0.137
Average level of education	3.13	3.28	3.20	p=0.164
Average time to complete the study (minutes)	8.05	8.09	8.07	p=0.877
Average number of tables counted correctly	4.53	4.48	4.50	p=0.742

Note: Five levels of education are coded: level 1 corresponds to less than high school or high school; level 2 corresponds to some college but no degree; level 3 corresponds to Associate's degree (two years of college); level 4 corresponds to Bachelor's degree (four years of college); level 5 corresponds to Master's or professional (JD, MD) or doctoral degree.

Table A.2. Characteristics of Subject Populations in the Two Treatments for the Complementary Study

Regarding comparisons between the populations of subjects in the Main Study and in the Complementary Study, the fractions of females and the average levels of education are not different in the two populations ($p = 0.625$ and $p = 0.846$ respectively). The subject population is however significantly older in the Complementary Study than in the Main Study ($p < 0.001$), which explains that subjects count significantly fewer tables correctly in the Complementary Study than in the Main Study ($p < 0.001$). On average, subjects need about 30 seconds more to complete the Complementary Study than the Main Study, which is not surprising: in the Main Study, Part 1 is made up of one screen displaying the Study Questionnaire; in the Complementary Study, Part 1 is made up of 8 screens on which subjects need to click to generate the four features of the landscape.

| | Reported_Common | | | | Similarity | | | |
	Female	Female	Male	Male	Female	Female	Male	Male
Coop	0.197***	0.199***	0.173***	0.179***	0.090*	0.095**	-0.032	-0.014
	(0.060)	(0.060)	(0.062)	(0.062)	(0.048)	(0.046)	(0.052)	(0.050)
Common_Ans	0.588***		0.516***		0.743***		0.566***	
	(0.031)		(0.034)		(0.025)		(0.029)	
Same_Gender		0.537***		0.481***		0.770***		0.463***
		(0.061)		(0.062)		(0.047)		(0.050)
Same_Married		0.603***		0.460***		0.554***		0.460***
		(0.061)		(0.062)		(0.047)		(0.050)
Same_Season		0.548***		0.462***		0.560***		0.399***
		(0.065)		(0.067)		(0.051)		(0.054)
Same_PolParty		0.701***		0.730***		1.220***		1.112***
		(0.076)		(0.073)		(0.059)		(0.059)
N	974	974	1026	1026	974	974	1026	1026

Note: The Table reports OLS coefficients (standard errors in parenthesis). The regressions include a constant. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. All specifications include demographics: age, education (coded using five levels ranging from less than high school to doctoral degree), answers to the Study Questionnaire except for gender, and subjects' answers to the questions on competitiveness and working in teams (coded 0 or 1).

Table A.3. Regression Analysis for Social Perceptions Questions by Gender

	Report_Common_Complementary			Report_Common_Main		
	(1)	(2)	(3)	(4)	(5)	(6)
Coop		0.104	0.105		0.181**	0.184**
		(0.076)	(0.076)		(0.043)	(0.043)
Common_Items	0.489***	0.490***	0.490***	0.563***	0.562***	0.561***
	(0.037)	(0.037)	(0.037)	(0.022)	(0.022)	(0.022)
N	604	604	604	2000	2000	2000

Note: The Table reports OLS coefficients (standard errors in parenthesis). The regressions include a constant. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Specifications (3) and (6) include demographics: age, gender, education (coded using five levels ranging from less than high school to doctoral degree), and subjects' answers to the questions on competitiveness and working in teams (coded as 0 or 1).

Table A.4. Regression Analysis for the Reported Number of Common Items in the Complementary Study, Specifications (1) to (3), and in the Main Study, Specifications (4) to (6)

B. Development of the Study Questionnaire

We developed the Study Questionnaire using data collected from 497 participants who were asked 50 questions on demographics and personal preferences. The sample was 52.3% female, with an average age of 33.9 years old.

Our objective was to select a set of four questions from among the 50 which would capture key, differentiating personal characteristics of participants. We used principal factor extraction on binary data which indicated an eleven factor structure. Rotated factor loadings provided the extent to which questions loaded onto each factor.

A set of questions consistently loaded highly onto the highest factors. Across all approaches, the highest loading questions for the highest factors appeared to be substitutes for similarly high loading questions (e.g. marital status could be replaced by parental status, political party preference could be replaced by preferred media outlet (CNN vs. Fox)). Given this consistency across solutions, we focused on the eleven factor estimations.

We selected the four items for the Study Questionnaire as follows: Given documented gender differences in preferences in competitive settings, we selected gender (the highest loading question for the sixth factor) as one of the survey items. We then selected three items as follows: Marital status was the top loading question for the first factor. Speaking a language other than English and Democratic political leanings were the highest loading questions for the second and third factors, respectively, but were highly correlated. Hence, we opted for only one of these questions, choosing political party leanings given the divisive current political climate in the United States. The highest loading question for the fourth factor was preference for the season spring or fall, the answer to which was not highly correlated with the other questions and hence was selected. Table B.1. presents the correlations between subjects' answers to the Study Questionnaire in the main experiment, which range from 0.114 to -0.129.

	Female	Married	Democrat	Prefers Fall
Female	1			
Married	0.016	1		
Democrat	0.114 ***	-0.1285***	1	
Prefers Fall	0.011	0.002	0.016	1

Note: $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$

Table B.1. Correlations of Study Questionnaire Items in Main Study

C. Consent and Instructions

We report below the experimental text for the main experiment and for the complementary experiment. In italics, we give additional information to the reader that was not seen by subjects.

C.1. Main Study

C.1.1. Text of the Consent

This study, run by researchers at Duke University (USA) and at Sciences Po (France), concerns how people make choices in strategic contexts.

For completing the study, you will be paid $1.00. In this study, we will ask you to answer a set of questions about yourself (including your political leaning, demographics, and health behavior), be placed in a work setting with another participant and do a counting task, and answer questions about this participant and yourself. This study should take about 8 minutes to complete.

On average, you can additionally expect to earn a bonus payment up to about $1.20 depending on your answers, your performance in the counting task, and possibly the performance of other participants.

We will not ask your name at any point during the study, so your responses can never be connected with you. Data collected in this study (without your Prolific ID), coupled with data collected about you by Prolific, may be shared with other researchers or used for future studies.

Your participation is voluntary. You can withdraw at any time by closing the survey. However, to receive your completion code for payment, you must reach the last screen.

We know of no risks resulting from participating in the study. If you have questions about this research, you may send a message to the researchers via Prolific. If you have any questions concerning your rights as a participant in this research study, you may contact the Duke University Campus Institutional Review Board at campusirb@duke.edu, referencing Protocol ID #2019-0170.

Please indicate below whether you consent to take part in this study. *Yes or No*

C.1.2. Experimental Instructions

Welcome! Thank you for participating in this study. The study will have three parts:

1. Study Questionnaire about yourself.
2. Work Setting involving another participant.
3. Questions about the other participant and yourself.

Each part should take about 2-3 minutes. Altogether, the survey should take about 8 minutes to complete.

During the survey, there will be opportunities to obtain bonus money, which you would receive in addition to the fixed payment of $1.00 for completing the survey.

Please read each question carefully. It is important that you remove any potential distractions (e.g. phone, music, watches, email).

———New Screen———

Part 1: Study Questionnaire

Please answer each of the following questions carefully. Your answers are important to our study.

Questions are presented in one of ten orders, randomly selected.

Are you married or in a domestic partnership?

Answers: Yes, No

What is your gender?

Answers: Male, Female, Non-binary

Which of the following two seasons do you like more?

Answers: Spring, Fall

Do you lean closer to the Democratic or Republican party?

Answers: Democratic Party, Republican Party.

———New Screen———

Part 2: Work Setting & Counting Task

You will now participate in a work setting involving you and another real person who participated in a previous study. This other participant has been randomly

selected and will be called "Person A"

What you do here will affect the bonus money that you receive and the bonus money that Person A will receive.

You are asked to do a counting task. This task consists of counting the number of 1s in different tables containing 0s and 1s like this one:

You will be given 3 minutes to count the 1s in as many tables as possible, up to 20 tables. Your performance will correspond to the number of tables in which you counted the 1s correctly.

Person A has done this exact same task previously and we recorded his or her performance.

Subject is randomly assigned to Competition or Cooperation treatment.

——New Screen——

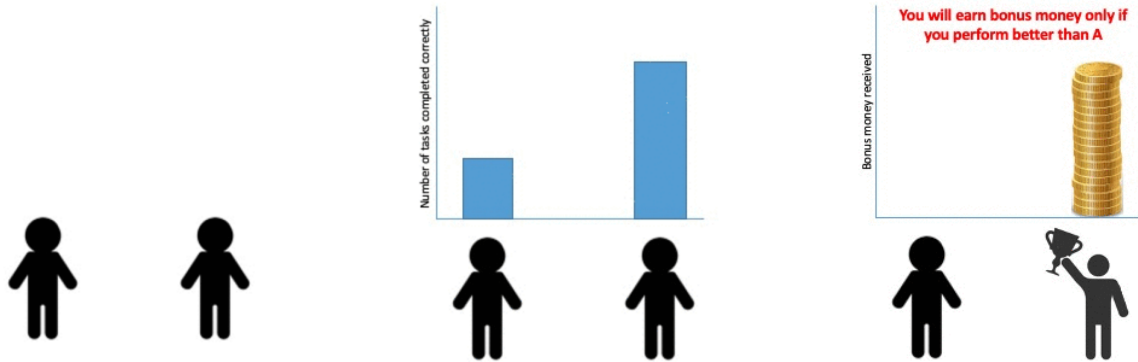*Text for Competition Treatment only.*

Payment
If your performance in the counting task is better than that of Person A, you will earn 0.40 bonus pay for each table that you counted correctly, and Person A will earn no bonus money.

If Person A's performance in the counting task is better than yours, you will earn no bonus money, and Person A will earn 0.40 bonus pay for each table that he or she counted correctly.

In short, you will earn bonus money only if you perform better than Person A.

*Images below are displayed as a gif.*

Text for Cooperation Treatment only.

Payment

For each table that you count correctly, both you and Person A will each earn 0.10 bonus pay. For each table that Person A counted correctly, both you and Person A will each earn 0.10 bonus pay.

In short, you will earn more bonus money if both you and Person A together perform well.

Images below are displayed as a gif.
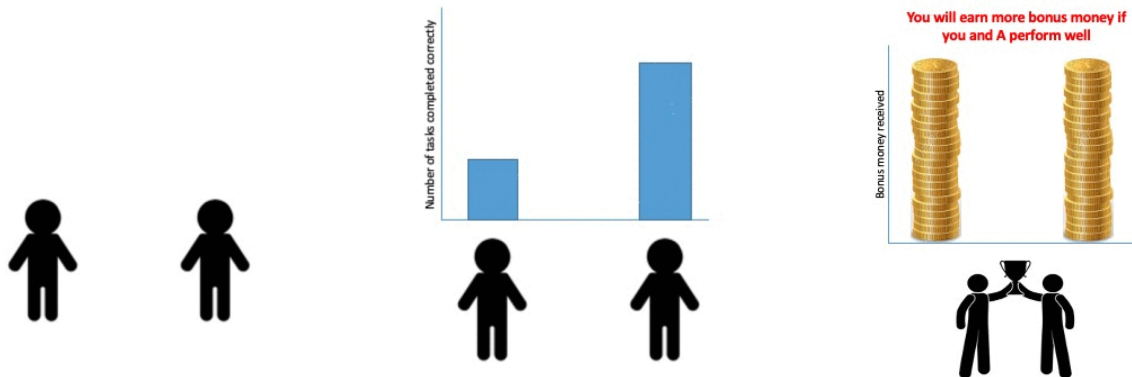
———New Screen———

Person A answered the Study Questionnaire, just as you did in Part 1 of the survey. This page will display Person A's answers for 10 seconds, after which you will advance automatically to the counting task.

Person A's answers are displayed here in the same order as the questions were asked the subject. An example of the display follows:

Person A's answers to the Study Questionnaire
Not married or in a domestic partnership
Female
Prefers spring
Closer to the Democratic party

This page will automatically advance in 10 seconds.

——New Screen——

When you are ready to start the counting task, click NEXT.

Text for Competition Treatment only.

Remember, you will have to perform better than Person A to earn bonus payment.

Text for Cooperation Treatment only.

Remember, you will earn more bonus money if both you and Person A together perform well.

——New Screen——

You have 3 minutes to count the 1's in as many tables as possible.

This page will automatically advance after 3 minutes.

Please indicate how many 1's appear in the table below.

Twenty tables are displayed with boxes for answers. Digital countdown clock appears before every table. After 3 minutes, the subject moves automatically to the next screen.

——New Screen——

Time is up. You will learn how much bonus money you earned at the end of the study.

——New Screen——

Part 3: Questions about Another Participant and Yourself

Please answer a few questions about you and Person A.

The question about common answers is asked first in the first experimental session and asked second in the second session.

You answered the Study Questionnaire at the beginning of the survey. How many answers do you have in common with Person A? You will earn a bonus of

$0.10 if you are exactly correct
$0.05 if you are within 1 of the correct number
$0 if you are 2 or more outside the correct number

Pull-down menu of 4,3,2,1,0

———New Screen———

How similar are you to Person A?

Answers: Not similar at all, Not similar, Neutral, Similar, Very similar

———New Screen———

How much do you agree with the following statements?

I am a competitive person.

Answers: Strongly disagree, Disagree, Neither agree nor disagree, Agree, Strongly agree

I like working in teams.

Answers: Strongly disagree, Disagree, Neither agree nor disagree, Agree, Strongly agree

I like working by myself.

Answers: Strongly disagree, Disagree, Neither agree nor disagree, Agree, Strongly agree

———New Screen———

Subject answers a demographic questionnaire: year of birth, state and county of residence, level of education.

———New Screen———

Thank you for taking part in our study!

Since you counted x tables correctly, and Person A counted y tables correctly, you will receive the following payments if your submission is approved:

- $1.00 for study completion.

- As bonus payment, you will earn

    · b from Part 2 of the study
    · c from Part 3 of the study

After you complete your submission, you will be redirected to Prolific where you can submit your completion code. Please reach out to us if you experience technical difficulties or if you do not hear back from us in the next few weeks. You can also leave an anonymous comment here. *Text box.*

Redirection to the Prolific website.

C.2. Complementary Study

C.2.1. Text of the Consent

This study, run by researchers at Duke University (USA) and at Sciences Po (France), concerns how people make work and make choices.

For completing the study, you will be paid 1.00. We will ask you to play a simple game with the computer, perform a counting task, and answer some survey questions. This study should take about 8 minutes to complete.

You can additionally expect to earn a bonus payment of around 1.20 depending on your answers, your performance in the counting task, and possibly the performance of other participants.

We will not ask your name at any point during the study, so your responses can never be connected with you. Data collected in this study (without your Prolific ID), coupled with data collected about you by Prolific, may be shared with other researchers or used for future studies.

Your participation is completely voluntary. If you do not want to answer any particular question or continue, you can simply exit the survey. As stated above, payment is for completed surveys, and the payment code is provided after reaching the final screen.

We know of no risks resulting from participating in the study. If you have questions about this research, you may send a message to the researchers via Prolific. If you have any questions

concerning your rights as a participant in this research study, you may contact the Duke University Campus Institutional Review Board at campusirb@duke.edu, referencing Protocol ID #2019-0170. Please indicate below whether you consent to take part in this study.

Please indicate below whether you consent to take part in this study. *Yes or No*

C.2.2. Experimental Instructions

Welcome! Thank you for participating in this study. The study will have three parts:

1. Simple game with the computer.
2. Work Setting involving another participant.
3. Survey questions.

Each part should take about 2-3 minutes. Altogether, the survey should take about 8 minutes to complete.

During the survey, there will be opportunities to obtain bonus money, which you would receive in addition to the fixed payment of $1.00 for completing the survey.

Please read each question carefully. It is important that you remove any potential distractions (e.g. phone, music, watches, email).

——New Screen——

Part 1: Simple Game with the Computer

You will now play a simple game to randomly select four features of a scene in nature.
The following four clicks are presented in one of ten orders, randomly selected.

——New Screen——

Please click so that the computer chooses the landscape: Mountains or River *Click Here button*

——New Screen——

The screen displays what the computer selected, namely Mountains or River

——New Screen——

Please click so that the computer chooses the season: Spring or Fall *Click Here button*

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———New Screen———

The screen displays what the computer selected, namely Spring or Fall

———New Screen———

Please click so that the computer chooses the weather: Rainy or Sunny *Click Here button*

———New Screen———

The screen displays what the computer selected, namely Rainy or Sunny

———New Screen———

Please click so that the computer chooses the location: East or West *Click Here button*

———New Screen———

The screen displays what the computer selected, namely East or West

———New Screen———

Part 2: Work Setting & Counting Task

You will now participate in a work setting involving you and *another real person* who participated in a previous study. This other participant has been randomly selected and will be called "Person A"

What you do here will affect the bonus money that you receive and the bonus money that Person A will receive.

You are asked to do a counting task. This task consists of counting the number of 1s in different tables containing 0s and 1s like this one:

You will be given 3 minutes to count the 1s in as many tables as possible, up to 20 tables. Your performance will correspond to the number of tables in which you counted the 1s correctly.

Person A has done this exact same task previously and we recorded his or her performance.

Subject is randomly assigned to Competition or Cooperation treatment.

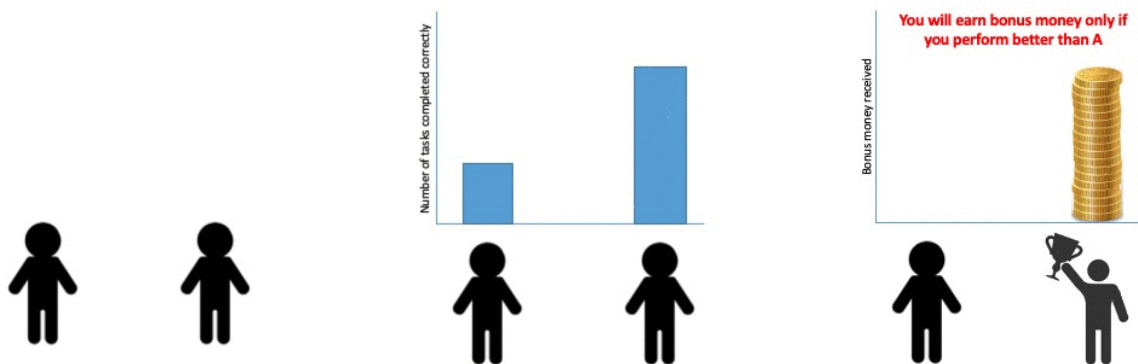*Text for Competition Treatment only.*

Payment

If your performance in the counting task is better than that of Person A, you will earn 0.40 bonus pay for each table that you counted correctly, and Person A will earn no bonus money.

If Person A's performance in the counting task is better than yours, you will earn no bonus money, and Person A will earn 0.40 bonus pay for each table that Person A counted correctly.

In short, you will earn bonus money only if you perform better than Person A.
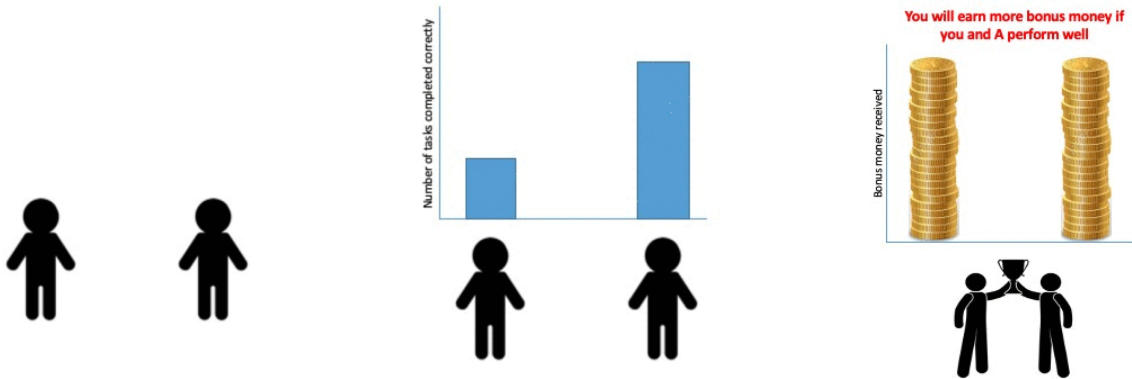
Images below are displayed as a gif.

Text for Cooperation Treatment only.

Payment

For each table that you count correctly, both you and Person A will each earn 0.10 bonus pay. For each table that Person A counted correctly, both you and Person A will each earn 0.10 bonus pay.

In short, you will earn more bonus money if both you and Person A together perform well.

Images below are displayed as a gif.

———New Screen———

Before launching the counting task, the computer randomly selected another set of four features describing a scene in nature, from the same possibilities as in Part 1. This page will display these features for 15 seconds, after which you will advance automatically to the counting task.

The four features are displayed here in the same order as the features were selected in Part 1. An example of the display follows:

<div align="center">

River
Fall
Sunny
West

</div>

———New Screen———

When you are ready to start the counting task, click NEXT.

Text for Competition Treatment only.

Remember, you will have to perform better than Person A to earn bonus payment.

Text for Cooperation Treatment only.

Remember, you will earn more bonus money if both you and Person A together perform well.

———New Screen———

You have 3 minutes to count the 1's in as many tables as possible.

This page will automatically advance after 3 minutes.

Please indicate how many 1's appear in the table below.

Twenty tables are displayed with boxes for answers. Digital countdown clock appears before every table. After 3 minutes, the subject moves automatically to the next screen.

———New Screen———

Time is up. You will learn how much bonus money you earned at the end of the study.

———New Screen———

Part 3: Survey Questions

In Part 1 you played a game with the computer, and the computer randomly selected these four features for a scene in nature:

The exact four features selected in Part 1 are displayed here. An example of the display follows:

<div align="center">

Mountain
Fall
Rainy
East

</div>

In Part 2 the computer randomly selected four features for another scene in nature.

How many features do the two scenes have in common? You will earn a bonus of

$0.10 if you are exactly correct
$0.05 if you are within 1 of the correct number
$0 if you are 2 or more outside the correct number

Pull-down menu of 4,3,2,1,0

————New Screen————

How much do you agree with the following statements?

I am a competitive person.

Answers: Strongly disagree, Disagree, Neither agree nor disagree, Agree, Strongly agree

I like working in teams.

Answers: Strongly disagree, Disagree, Neither agree nor disagree, Agree, Strongly agree

I like working by myself.

Answers: Strongly disagree, Disagree, Neither agree nor disagree, Agree, Strongly agree

————New Screen————

Subject answers a demographic questionnaire: gender, year of birth, state and county of residence, level of education.

————New Screen————

Thank you for taking part in our study!

Since you counted x tables correctly, and Person A counted y tables correctly, you will receive the following payments if your submission is approved:

- $1.00 for study completion.

- As bonus payment, you will earn

  · b from Part 2 of the study
  · c from Part 3 of the study

After you complete your submission, you will be redirected to Prolific where you can submit your completion code. Please reach out to us if you experience technical difficulties or if you do not hear back from us in the next few weeks. You can also leave an anonymous comment here. *Text box.*

Redirection to Prolific website.