

# Competition, Cooperation, and Social Perceptions

## Online Appendix

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This Appendix provides:

A. Supplementary statistical analyses including

- additional information on characteristics of the subject pools
- regression analyses that decompose the true number of common answers into four dummy variables corresponding to common answers on each question
- regression analyses that split subjects by gender
- figure displaying the frequency distributions of the gaps between the reported and true number of common answers in the two treatments

B. Details on the selection of questions for the Study Questionnaire

C. The experimental consent form and instructions.

## A. Supplementary Statistical Analyses

	<i>Competition</i>	<i>Cooperation</i>	All	t-tests
Number of Subjects	1004	996	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	$p=0.870$
Average age (years)	33.63	33.64	33.63	$p=0.982$
Average level of education	2.17	2.14	2.15	$p=0.490$
Average time needed to complete the study (minutes)	7.38	7.35	7.36	$p=0.893$
Average number of tables counted correctly	5.04	4.95	4.99	$p=0.301$

Note: Four levels of education are coded: level 1 corresponds to high school or less than high school, or some college but no degree; level 2 corresponds to two years of college or professional degree; level 3 corresponds to four years of college or master degree; level 4 corresponds to doctoral degree.

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

	Reported_Common		Similarity	
	(1)	(2)	(3)	(4)
Common_Ans	0.555*** (0.023)		0.656*** (0.019)	
Same_Gender		0.513*** (0.043)		0.614*** (0.034)
Same_Married		0.525*** (0.043)		0.505*** (0.034)
Same_Season		0.514*** (0.047)		0.489*** (0.037)
Same_PolParty		0.720*** (0.053)		1.173*** (0.042)
<i>N</i>	2000	2000	2000	2000

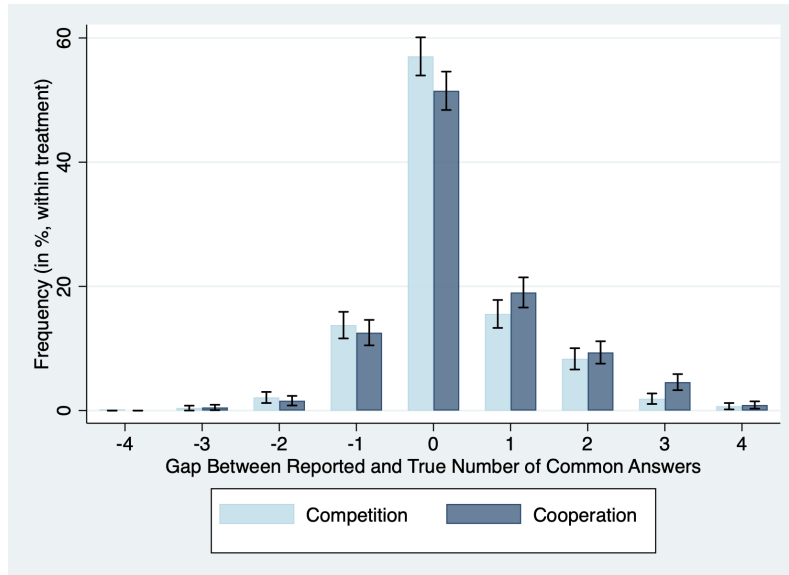
*Note:* The Table reports OLS coefficients (standard errors in parenthesis). The regressions include a constant. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . All specifications include demographics: age, education (coded using four levels ranging from high school to doctoral degree), answers to the Study Questionnaire and answers to the questions about being competitive and liking working in teams (coded as 0 or 1).

Table A.2. Complementary Regression Analysis for Social Perceptions Questions

	Reported_Common				Similarity			
	Female	Female	Male	Male	Female	Female	Male	Male
Coop	0.196*** (0.059)	0.198*** (0.060)	0.175*** (0.062)	0.182*** (0.061)	0.087* (0.048)	0.094** (0.046)	-0.033 (0.052)	-0.014 (0.050)
Common_Ans	0.588*** (0.031)		0.522*** (0.034)		0.744*** (0.025)		0.566*** (0.028)	
Same_Gender		0.541*** (0.061)		0.485*** (0.062)		0.768*** (0.047)		0.464*** (0.050)
Same_Married		0.599*** (0.061)		0.468*** (0.062)		0.555*** (0.047)		0.459*** (0.050)
Same_Season		0.548*** (0.065)		0.472*** (0.067)		0.561*** (0.051)		0.398*** (0.054)
Same_PolParty		0.700*** (0.076)		0.728*** (0.073)		1.223*** (0.059)		1.111*** (0.059)
Com_Before	0.080 (0.060)	0.075 (0.060)	0.165*** (0.062)	0.157** (0.061)	-0.014 (0.049)	-0.013 (0.047)	0.003 (0.052)	-0.017 (0.050)
<i>N</i>	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 four levels ranging from high school to doctoral degree), answers to the Study Questionnaire (except for gender) and answers to the questions about being competitive and liking team work (coded as 0 or 1).

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



Note: Solid lines show 95% confidence intervals.

Figure A.1. Frequency Distribution of the Gaps between the Reported and True Number of Common Answers

## 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.<sup>1</sup> 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.<sup>2</sup> Rotated factor loadings provided the extent to which questions loaded onto each factor. To ensure the robustness of the estimations, we also considered a fifteen-factor structure and eliminated questions with the least variation in responses.

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, shown in Table A.4. Table A.5. provides the correlation matrix of the answers to the highest loading questions for each of the eleven factors.

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 po-

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<sup>1</sup>Five hundred participants were recruited; three participants were removed from the sample because they declined to share their responses for use in future studies.

<sup>2</sup>2.41% of subjects were non-binary. In the factor analysis, we pool non-binary subjects with males. Results do not change when pooling non-binary subjects with females.

litical 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 (see Table A.5.) and hence was selected. Correlation coefficients for the answers to the four selected items (gender, marital status, political party, preferred season fall vs. spring) range from -0.23 to 0.15 (see again Table A.5.).

	Q1	Q2	Q3	Q4	Q5
Factor 1	Marriage (0.798)	Children (0.781)	College (0.490)	Sandals (0.270)	Siblings (0.237)
Factor 2	Other Language (0.685)	Travel (0.645)	Diverse (0.378)	City (0.339)	CNN (0.271)
Factor 3	PolParty (0.854)	CNN (0.793)	TextMessage (0.361)	Travel (0.205)	CocaCola (0.205)
Factor 4	Season (0.734)	Moon (0.661)	PolParty (0.204)	ChocIceCream (0.185)	PastaSalad (0.149)
Factor 5	Android (0.835)	PC (0.799)	ComfortClothing (0.338)	Children (0.175)	Moon (0.162)
Factor 6	Female (0.732)	Sandals (0.646)	HardwoodFloor (0.354)	PopMusic (0.231)	Children (0.229)
Factor 7	Smoke (0.583)	Surprises (0.366)	Sarcasm (0.317)	PreferDog (0.294)	USlife (0.217)
Factor 8	Timely (0.662)	PreferDog (0.302)	Extrovert (0.240)	City (0.227)	ComedyMovie (0.222)
Factor 9	Cake (0.491)	Fries (0.378)	City (0.265)	BeachVacation (0.254)	IceCream (0.252)
Factor 10	StoreGift (0.578)	Wealth (0.516)	StateGrew (0.366)	StickPlan (0.262)	Timely (0.224)
Factor 11	EastMississippi (0.539)	CocaCola (0.325)	IceCream (0.279)	MusicFestival (0.187)	PastaSalad (0.174)

Note: Rotated factor loadings appear in parentheses.

Table A.4. Eleven Factor Solution and Five Highest Loading Questions per Factor

	1	2	3	4	5	6	7	8	9	10	11
1 Marriage											
2 Other Language	0.001										
3 Political Party	-0.230***	0.269***									
4 Season	0.003	-0.153**	0.149								
5 Android	0.015	-0.274***	-0.290***	0.014							
6 Female	0.121*	-0.011	0.069	0.100	-0.107						
7 Smoke	0.009	-0.171**	-0.067	-0.026	-0.051	-0.094					
8 Timely	0.008	0.013	-0.096	0.121	0.123	-0.174**	-0.164*				
9 Cake	-0.063	-0.112	-0.027	-0.024	0.056	0.135*	-0.124	0.142			
10 StoreGift	-0.029	-0.116	-0.214***	0.000	0.040	-0.135*	0.079	0.143*	0.053		
11 East Mississippi	0.006	-0.158**	-0.019	-0.006	-0.022	0.031	-0.115	0.050	0.006	-0.007	

Note: \* $p < 0.10$ , \*\* $p < 0.05$ , \*\*\* $p < 0.01$

Table A.5. Correlations of Highest Loading Questions in Eleven-Factor Structure

Table A.6. 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 ***	-0.1290***	1	
Prefers Fall	0.011	0.002	0.016	1

Note: \* $p < 0.10$ , \*\* $p < 0.05$ , \*\*\* $p < 0.01$

Table A.6. Correlations of Study Questionnaire Items in Main Study

## C. Consent and Instructions

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

### C.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.

## C.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.

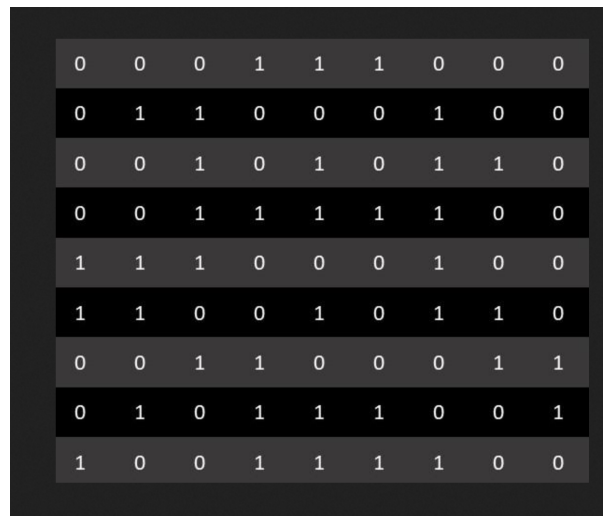
——New Screen——

## 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:



0	0	0	1	1	1	0	0	0
0	1	1	0	0	0	1	0	0
0	0	1	0	1	0	1	1	0
0	0	1	1	1	1	1	0	0
1	1	1	0	0	0	1	0	0
1	1	0	0	1	0	1	1	0
0	0	1	1	0	0	0	1	1
0	1	0	1	1	1	0	0	1
1	0	0	1	1	1	1	0	0

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.*

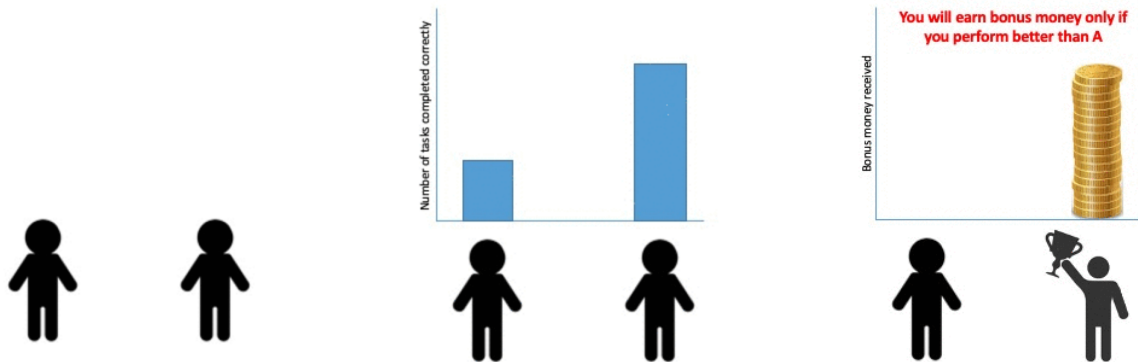
### **Payment**

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.*



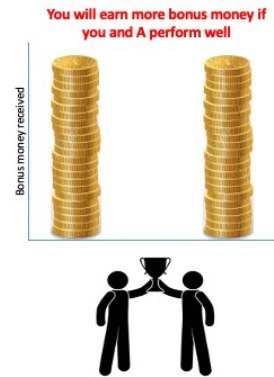
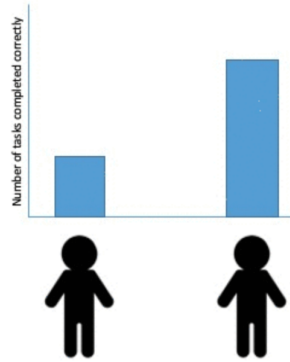
*Text for Cooperation Treatment only.*

### **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 Prolific website.*