

## 375 **Appendix A. Materials and Method**

376 Amazon Mechanical Turk (AMT) is an online labor market and crowdsourc-  
377 ing platform, which is increasingly being used for social and economic experi-  
378 ments in order to investigate the real time interactions of small to medium sized  
379 groups. AMT has repeatedly been shown to meet or exceed the standards set by  
380 data collection methods using other means [1, 4]. The platform has a large partic-  
381 ipant pool (called turkers), various demographic and quality selection options for  
382 researchers, and provides an integrated participant compensation system.

## 383 **Appendix B. Experimental Design**

384 After turkers accept our ‘HIT’ (‘human intelligence task’), they have to pro-  
385 vide informed consent, see Figure B.5. Then they wait until there are enough  
386 turkers who have accepted the HIT to form random groups (grouped by arrival)  
387 of size 2, 4 or 8, respectively, depending on the treatment condition. When group  
388 has been formed, instructions are displayed for 90 seconds, see Figure B.6. After  
389 pressing NEXT, turkers see a page where they have to enter into a form field an  
390 integer number between 0 and 100. When all turkers in a group have done so,  
391 a result page is displayed, see Figure B.7, where they can see their own guess,  
392 the guesses of the other players, the average and the  $2/3$  of the average as well as  
393 information about whether they have won a bonus in the current round and what  
394 their total payoff is for the time being. After this, the previous steps are repeated  
395 for a total of 8 rounds. Every time turkers enter a new number, they can see a list  
396 of the  $2/3$  of the average of the previous rounds as shown in Figure B.8. Turkers  
397 have 90 seconds to think about a number. After eight rounds, turkers are required

## Informed Consent Information

Attention!

You have **2** minutes to read and accept this Consent Form.

If you are not going to proceed with this HIT, please return it right now!

Please read carefully before checking the box below.

### Rules:

In this experiment you will be asked to make a series of choices involving different payoffs. The experiment has 8 rounds and the entire session will last no more than 8-12 minutes to complete, once groups are formed.

**It may take 2-12 minutes for groups to form. We ask you only to accept this HIT if you can wait for groups to form and commit to completing the game.** We will compensate you for your time with a participation fee of **\$2.00** and possibly high bonuses.

### Privacy:

The only personal information that will be available to the researchers is what is publicly available on your MTurk profile and any information that you choose to provide during the course of the study. This information will not be shared with any individuals who are not part of the research team.

### Consent:

By checking the box below next to the red informed consent statement, you acknowledge that you have read the rules and privacy policy, you certify you are 18 years of age or older, and you agree that your participation is voluntary.

☐ *I acknowledge that I have read the rules and privacy policy, I certify I am 18 years of age or older, and I agree that my registration in the subject pool is voluntary.*

Time left to complete this page: **1:38**

Next

Figure B.5: Screen dump of the consent page shown to all participants.

398 to give feedback by answering the question: ‘What strategy did you use while  
399 playing this game?’, after which they are thanked for their participation.

## 400 Appendix C. AMT Setting

401 When working with AMT it is important to consider the right settings in order  
402 to get the best data quality possible [7]. Fair wage, attrition rates, removal of  
403 duplicate workers and informative feedback are some of the most important issues  
404 to address. Average wage for turkers in our experiments was approximately \$15

## Guess 2/3 of the average

Time left to complete this page: **1:21**

### Instructions

You are in a group of 4 players. In each round players will be asked to choose a number between 0 and 100. The winner will be the player whose number is closest to 2/3rds of the average of all chosen numbers. The game has 8 rounds.

**Payoffs:** Each player will receive a participation fee of \$2.00 after finishing the game. In addition, the winner in each round will get a bonus of \$0.50. If there is more than one winner the bonus is split. *Examples: if you choose 30 as the number closest to 2/3rds of the average and win the round, you will receive \$0.50. If you and another player guess 20 and win, you will win half of the bonus.*

Next

Figure B.6: Screen dump of an instruction page for a game with four players.

## Results (round 5 of 8)

Time left to complete this page: **0:44**

Here are the numbers guessed:

Round	You	P. 1	P. 2	P. 3	2/3 of average
1	34	87	23	45	31.5
2	34	56	34	76	33.33
3	23	26	38	17	17.33
4	24	14	14	16	11.33
5	7	13	15	6	6.83

Two-thirds of the average of the last round is 6.83; the closest guess was 7.

Your guess was 7.

Therefore, you win!

Your bonus in this round is \$0.50. Your total bonus is \$1.25.

Next

Figure B.7: Screen dump of a result page from a game with four players.

## Your Guess

Time left to complete this page: **1:23**

These are the two-thirds-average values in previous rounds: [31.5, 33.33, 17.33, 11.33, 6.83, 5.33]

Please pick a number from 0 to 100:

Next

Attention: The game will be aborted if you do not make your choice in time.

Figure B.8: Screen dump of a choice page from a game with four players.

405 per hour, which is considered generous according to AMT guidelines and certainly  
406 above the estimated average of \$6 per hour when excluding un-submitted and  
407 rejected work [12]. Quitting a study before completing it is prevalent on AMT,  
408 and varies systemically across experimental conditions. Our overall attrition rate  
409 was 24%, which is considered normal [23]. The main reason, we believe, was  
410 either a player not being able to enter a number within the allotted time, or – more  
411 likely – due to a player not bothering to wait for the others to make their guess and  
412 therefore quitting prematurely. This was very detrimental for the rest of the group  
413 and for the experiment as such, because it meant that the rest of the group would  
414 continue the game with one player less, making the whole process much slower  
415 and skewing the results. If somebody had quit, we still let the other players finish  
416 their game and paid them for their efforts, but we decided to remove those groups  
417 from the data analysis. Out of a total of 114 initial groups, 27 groups were thus  
418 removed from the final data set, giving an overall attrition rate of 24%. All turkers  
419 automatically received a unique qualification when accepting a HIT, ensuring that

420 they could not play the game twice. In addition, we set the qualification that  
421 workers should have completed at least 50 HITs and have an accepted HIT rate of  
422 90% or above. This ensured that we would get experienced and qualified workers.  
423 During our experiments, participants had easy access to our email for questions  
424 and possible bug reports.

## 425 **Appendix D. Code and Software**

426 All experiments are coded in the experimental software oTree 1.4.39 [8] which  
427 is based on Python and Django. The code for the data analysis done is available  
428 on Github at <https://github.com/gavstrik/game-of-regret>.

## 429 **Appendix E. Data Collection and Distribution**

430 We obtained a total of 2368 guesses from 296 unique participants who played  
431 the classic iterated beauty contest game. Players were partitioned into 50 groups  
432 of size 2, 23 groups of size 4, and 13 groups of size 8. Figure F.9 shows the  
433 guesses for all eight rounds, partitioned into their respective groups. As can be  
434 seen from the histograms, guesses move slowly towards lower numbers in subse-  
435 quent rounds, with the 2-players groups (in blue) lacking slightly behind the other  
436 groups.

## 437 **Appendix F. Guess Dynamics**

438 As noted in figure 4 in the main text, players often choose numbers greater than  
439  $2/3$  of the mean of the previous round. Less than 2% of all players on AMT never  
440 go above  $2/3$  of the previous mean, while 53% go above this target more than  
441 four times. Figure F.10 shows some examples of the up and down movements

442 of individual guesses from one round to the next. It is difficult to interpret this  
443 behavior observed in Fig. S6 as simple directional learning. Instead, players  
444 seem to try to “talk” with each other with occasional high guesses, and instead  
445 of adapting to the new target (explicitly shown as  $2/3$  of the previous mean), they  
446 may adapt to what they think the other players will guess in the next round. We  
447 can illustrate the guess-dynamics in another way as well. Figure F.11 shows the  
448 dynamics of guesses round by round in such a way that the previous round  $n$  is  
449 always shown on the x-axis and the next round  $n + 1$  is always shown on the y-axis.  
450 The diagonal black line corresponds to staying at the same guess in subsequent  
451 rounds. Lines connecting the dots in Figure F.11 then indicate the sequence of  
452 guesses by the same player, whose comments are shown in the legend. The total  
453 bonus earned is shown in parenthesis.

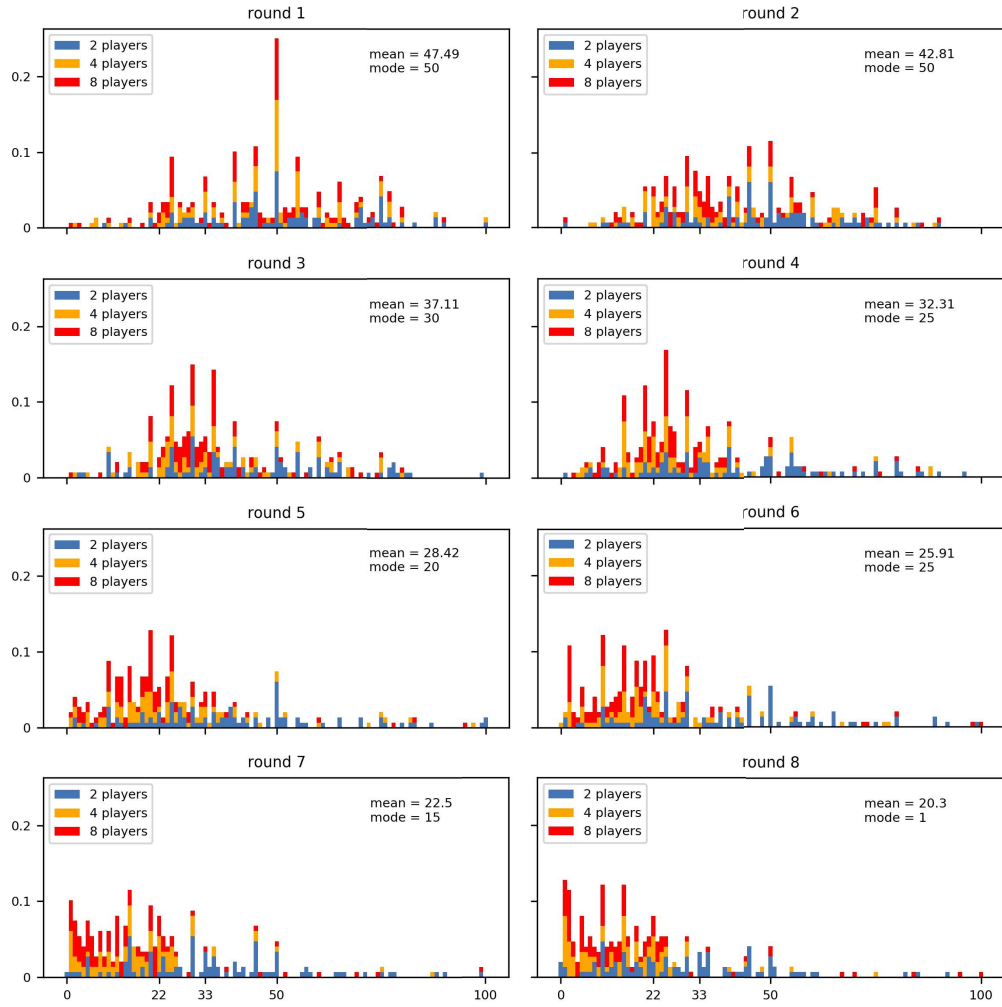


Figure F.9: Histograms of guess distributions partitioned into groups and rounds.

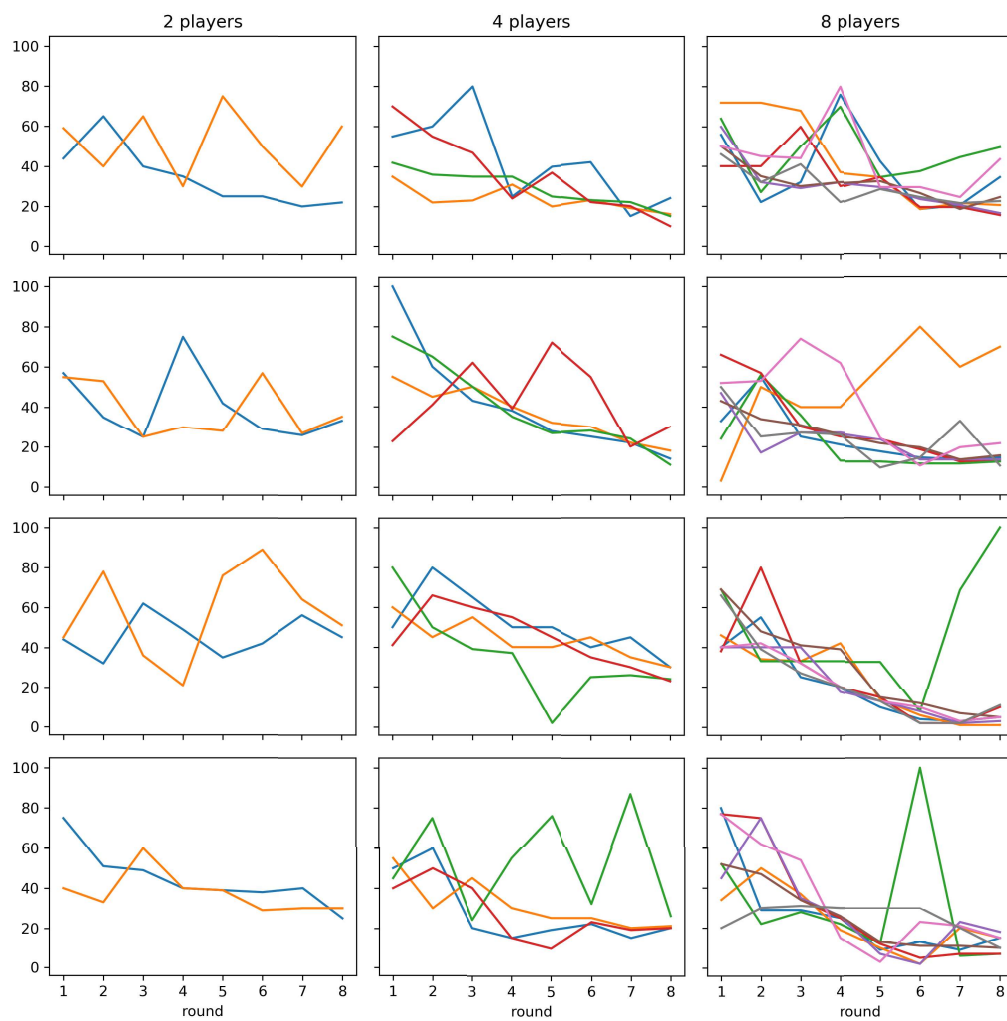
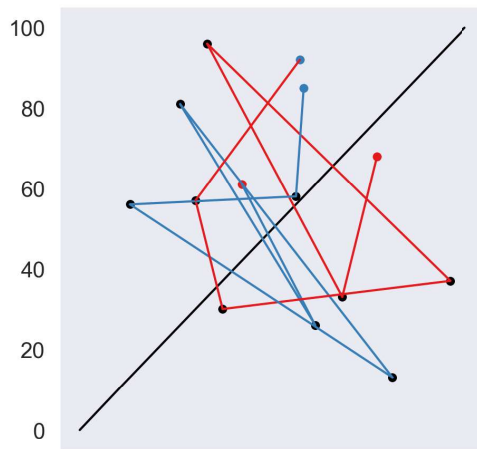


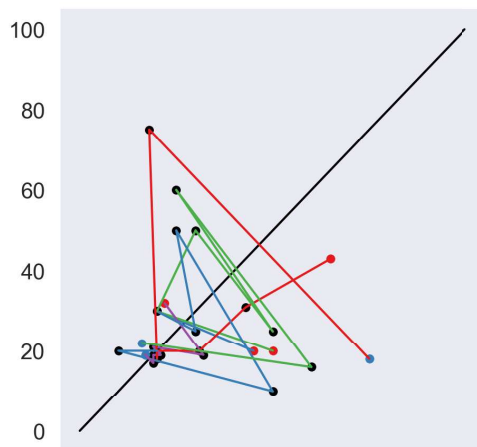
Figure F.10: Guess dynamics of player guesses from randomly selected groups.





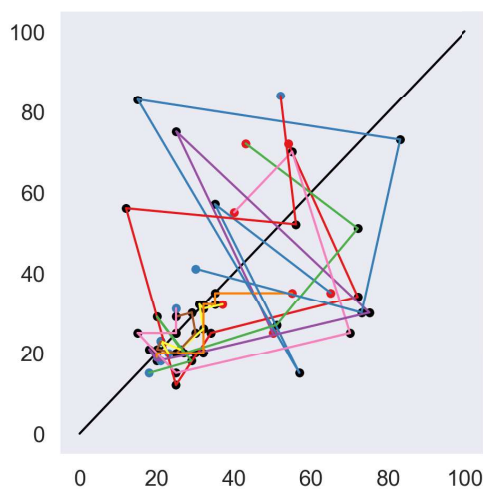
### Group 351 (2 players)

- "If there was a low number the last time, I tried to go with a higher number the next time. I also just randomly picked numbers I like." (\$0.5)
- "I went low at first thinking low would come up first and then I went high. I continued this for the whole game. I figured that one of us would win and one would lose no matter what." (\$1.5)
- 1.-2. round
- 2.-7. round
- 7.-8. round



### Group 250 (4 players)

- "I just tried to be close to what was the average the last round." (\$1.5)
- "Just a mind game" (\$0.75)
- "Going with my intuition." (\$0.25)
- "I tried to guess what other players would guess, then realized that the other players are robots, because if they weren't, no one would randomly pick a higher number each round. CHOICES should have reverted to a mean by the 3rd round, or 4th at the latest." (\$1.5)



### Group 67 (8 players)

- "I attempted to guess number within the same range everytime" (\$0.0)
- "I tried to see how people were guessing and match that." (\$1.0)
- "I noticed that they all seemed to be lower numbers so guessed those" (\$1.5)
- "As the game progressed I guessed numbers closer to the average." (\$0.5)
- "I took into consideration the 2/3 aver and adjusted my numbers." (\$0.0)
- "Since the answer would be 2/3 of the average the first number I went with was like at the 30-40 range just because it made sense to me. Then once I saw the answer was 30, my answers afterwards were in that 30 range. Then once the answer went down by 10 to the high teens and 20 range I changed my answers after that. My strategy was a bit common sense followed by reacting to previous answers and trends." (\$4.0)
- "Tried to guess the next trend." (\$1.0)
- "I just guessed randomly" (\$0.0)

Figure F.11: Dynamics of guesses round by round.