

# Online Appendix: Communication, Renegotiation, and the Scope for Collusion

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## Appendix A: Details of the Econometric Analysis

*A.1: Treatment Effects:* To confirm the statistical significance of our treatment effects, Table A.1 shows the results of two regressions. For both regressions, the dataset consists of all individual choices from Rounds 11 – 20. The dependent variable is the Period 1 choice. Given that the available choices are naturally ordered categories, we use an ordered probit specification (0 = Low, 1 = Medium, 2 = High). Estimating an ordered probit model requires fitting bins that map the latent variable in outcomes. The cut points between the bins for different categories are not reported since these are not of direct interest. All standard errors are corrected for clustering at the subject level.<sup>16</sup>

$$\begin{aligned}
 P_{it} = & \alpha + \sum_{RdCat=2}^5 (\beta_{RdCat} d_{RdCat}) + \varphi Ave\_Per1_i + \gamma Aver\_Per2_i + \\
 \text{(A1)} \quad & \sum_{RdCat=1}^5 (\gamma_{RdCat} d_{RdCat} (d_{P1} + d_{P1C} + d_{PChat} + d_{RChat})) + \sum_{RdCat=1}^5 (\psi_{RdCat} d_{RdCat} (d_{P1C} + d_{PChat} + d_{RChat})) \\
 & + \sum_{RdCat=1}^5 (\eta_{RdCat} d_{RdCat} (d_{PChat} + d_{RChat})) + \sum_{RdCat=1}^5 (\nu_{RdCat} d_{RdCat} (d_{RChat})) + \varepsilon_{it}
 \end{aligned}$$

The two models are designed to answer different questions about the data. Model 1 looks for differences between treatments. The equation being estimated for the latent variable is shown above as (A1). The dependent variable is the Period 1 price for subject  $i$  in Round  $t$  ( $P_{it}$ ). To control for changes over time, rounds have been broken down into five categories: category 1 ( $RdCat = 1$ ) is Rounds 11 and 12, category 2 ( $RdCat = 2$ ) is Rounds 13 and 14, etc. Use of a non-linear specification for time is necessary given the non-monotonic time trend in the Pchat treatment.<sup>17</sup> The variables  $d_{RdCat}$  are dummies for the five round categories. The variables  $d_{P1}$ ,  $d_{P1C}$ ,  $d_{PChat}$ , and  $d_{RChat}$  are dummies for the P1, P1C, PChat, and RChat treatments respectively.

<sup>16</sup> Our conclusions are robust to clustering at the session level or fitting a mixed effects model (random effects at the subject level nested within random effects at the session level).

<sup>17</sup> Using categories containing two rounds rather than round dummies makes reporting results more manageable by reducing the number of parameters and does not affect the conclusions.

The interactions between dummies are stacked so we get an estimate of the difference between pairs of treatments in each round category. For example,  $\gamma_1$  estimates the difference between the P1 and N treatments in round category 1 (Rounds 11 – 12),  $\psi_1$  estimates the difference between the P1 and P1C treatments in round category 1,  $\eta_1$  estimates the difference between the PChat and P1C treatments in round category 1, and  $\nu_1$  estimates the difference between the PChat and RChat treatments in round category 1. The variables  $Ave\_Per1_i$  and  $Ave\_Per2_i$  give the average Period 1 and Period 2 prices respectively for subject  $i$  from Rounds 1 – 10. These averages are calculated setting 0 = Low, 1 = Medium, and 2 = High. These variables are included to better capture the individual effects in the data.

The results of Model 1 (the model studying differences between treatments) strongly support the existence of treatment effects on Period 1 choices. With one exception, all of the pairwise comparisons of treatments for a two round block are statistically significant at least at the 5% level and generally at the 1% level.<sup>18</sup> The sole exception is that the initial difference (Rounds 11 – 12) between the PChat and RChat treatments is not statistically significant. The control for average Period 1 price in Rounds 1 – 10 is statistically significant, consistent with the existence of strong individual effects in the data. There is no statistically significant relationship between Period 2 prices in Rounds 1 – 10 and Period 1 prices in Rounds 11 – 20.

$$(A2) \quad P_{it} = \alpha + \sum_{RdCat=2}^5 (\beta_{RdCat} \delta_{RdCat} d_N) + \sum_{RdCat=1}^5 (\gamma_{RdCat} \delta_{RdCat} d_{P1}) + \sum_{RdCat=1}^5 (\psi_{RdCat} \delta_{RdCat} d_{P1C}) \\ + \sum_{RdCat=1}^5 (\eta_{RdCat} \delta_{RdCat} d_{PChat}) + \sum_{RdCat=1}^5 (\nu_{RdCat} \delta_{RdCat} d_{RChat}) + \phi Ave\_Per1_i + \gamma Ave\_Per2_i + \varepsilon_{it}$$

Model 2 looks for changes within treatments over time. The most important question this model addresses is whether the dip and recovery in Period 1 prices for the PChat treatment is statistically significant. The equation being estimated is shown in (A2). The dependent variable has not changed from Model 1, and  $Ave\_Per1_i$  and  $Ave\_Per2_i$  are defined as in Model 1. The variables  $d_N$ ,  $d_{P1}$ ,  $d_{P1C}$ ,  $d_{PChat}$ , and  $d_{RChat}$  are dummies for the N, P1, P1C, PChat, and RChat treatments respectively. The primary change from Model 1 comes in how the round category dummies are defined, reflecting Model 2's goal of studying changes over time rather than

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<sup>18</sup> Within a round category, this also holds for the pairwise comparisons that are not explicitly made in Model 1 since the treatments have been stacked from lowest to highest Period 1 prices.

differences between treatments. The variable  $\delta_{\text{RdCat}}$  is a dummy for all observation from that round category *and* subsequent rounds. Thus,  $\delta_1$  is a dummy for Rounds 11 – 20,  $\delta_2$  is a dummy for Rounds 13 – 20,  $\delta_3$  is a dummy for Rounds 15 – 20, and so forth. The dummies are set up to estimate the difference in Period 1 play between two consecutive round categories for the same treatment. For example,  $\gamma_1$  estimates the difference between round category 1 of P1 treatment and the base (round category 1 of the N treatment),  $\gamma_2$  estimates the difference between round category 1 (Rounds 11 – 12) and round category 2 (Rounds 13 – 14) for the P1 treatment,  $\gamma_3$  estimates the difference between round category 2 (Rounds 13 – 20) and round category 3 (Rounds 15 – 16) for the P1 treatment, and so on. The  $\psi$ ,  $\eta$ , and  $\nu$  parameters measure equivalent differences for the P1C, PChat, and RChat treatments.

Looking at the results for Model 2, studying changes over time, the most important issue is whether the u-turn in the PChat treatment is statistically significant. The decline between round categories 1 (Rounds 11 – 12) and 2 (Rounds 13 – 14) is statistically significant at the 5% level and there are smaller (and not statistically significant) declines between round categories 2 and 3 and round categories 3 and 4. The difference between round category 1 (Rounds 11 – 12) and round category 4 (Rounds 17 – 18) is statistically significant at the 1% level.<sup>19</sup> The downward trend then reverses, as the increase between round categories 4 (Rounds 17 – 18) and 5 (Rounds 19 – 20) is statistically significant at the 1% level. Both the initial decline in Period 1 prices for the PChat treatment and the following recovery are statistically significant changes. If we compare Period 1 prices for round categories 1 and 5 in the PChat treatment, the difference is not statistically significant.<sup>20</sup> By the end of the experiment, Period 1 prices in the PChat treatment have returned to the levels reached immediately following the introduction of communication. Turning to the other treatments, decreases in Period 1 prices are statistically significant at the 5% level in all round categories for the P1 and P1C treatments. Thus, even though Model 1 indicates there remain significant differences between the N, P1, and P1C treatments for Rounds 19 and 20, we feel confident in stating that play has not converged in the P1 and P1C treatments and hence these differences would probably not persist if the experiment ran for more rounds. The

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<sup>19</sup> We use a variant on Model 2 to estimate the change between round categories 1 and 4 for the PChat treatment. The parameter estimate for the difference is -.496 with a standard error of .149.

<sup>20</sup> Using a variant on Model 2 to estimate the difference between round categories 1 and 5 for the PChat treatment, the parameter estimate for the difference is .026 with a standard error of .148.

RChat treatment shows a weak increase in Period 1 prices. If we compare Period 1 prices for the round categories 1 and 5, the difference is statistically significant at the 10% level.<sup>21</sup>

*A.2: Effect of Message Types:* Equation A3 shows the full specification estimated in Table 3 of the main text, with  $Cheat_{it}$  giving the latent variable, where  $i$  indexes subjects and  $t$  indexes rounds.  $Received_{it}^{Cat}$  is the variable for subject  $i$  receiving a message coded under category “Cat” in Round  $t$  and  $Send_{it}^{Cat}$  is the variable for subject  $i$  sending a message coded under category “Cat” in Round  $t$ . The variables  $d_{Medium}$  and  $d_{Low}$  are dummies for agreements to play Medium or Low, respectively, in Period 1. Agreement to play High is the excluded category. The variables denoted ( $d_{Round}$ ) are dummies for each round, with the dummy for Round 11 as the excluded category. The subject’s average Period 1 price in Rounds 1 – 10 is given by  $Ave\_Per1_i$  and the average Period 1 price in Rounds 1 – 10 of their opponent in Round  $t$  is given by  $Ave\_Opponent\_Per1_{it}$ .

$$(A3) \quad Cheat_{it} = \alpha + \sum_{Round=2}^{10} (\beta_{Round} d_{Round}) + \sum_{Cat \in \text{included categories}} (\rho_{Cat} Received_{it}^{Cat} + \sigma_{Cat} Send_{it}^{Cat}) \\ + \lambda_H d_{Medium} + \lambda_L d_{Low} + \phi Ave\_Per1_i + \gamma Ave\_Opponent\_Per1_{it} + \varepsilon_{it}$$

Table A.2 shows the full version of Table 5 from the appendix in the published text. Table A.3 is the equivalent table for the RChat treatment.

(Insert Tables A.2 and A.3 here)

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<sup>21</sup> The parameter estimate for this difference is .495 with a standard error of .267.

**Table A.1: Ordered Probit Regressions on Period 1 Choices**

Model 1 (Treatment Differences)			Model 2 (Changes Over Time)		
Variable	Parameter Estimate	Standard Error	Variable	Parameter Estimate	Standard Error
Rounds 13 – 14 ( $\beta_2$ )	-.468 <sup>***</sup>	.123	N, Difference Rds 13-14 vs. Rds 11-12 ( $\beta_1$ )	-.468 <sup>***</sup>	.123
Rounds 15 – 16 ( $\beta_3$ )	-.593 <sup>***</sup>	.201	N, Difference Rds 15-16 vs. Rds 13-14 ( $\beta_1$ )	-.125	.205
Rounds 17 – 18 ( $\beta_4$ )	-.488 <sup>***</sup>	.187	N, Difference Rds 17-18 vs. Rds 15-16 ( $\beta_1$ )	.105	.230
Rounds 19 – 20 ( $\beta_5$ )	-.884 <sup>***</sup>	.203	N, Difference Rds 19-20 vs. Rds 17-18 ( $\beta_1$ )	-.395	.255
Rds 11 – 12, Difference P1 vs. N ( $\gamma_1$ )	1.824 <sup>***</sup>	.185	P1 Treatment	1.824 <sup>***</sup>	.185
Rds 13 – 14, Difference P1 vs. N ( $\gamma_2$ )	1.899 <sup>***</sup>	.201	P1, Difference Rds 13-14 vs. Rds 11-12 ( $\gamma_1$ )	-.393 <sup>***</sup>	.100
Rds 15 – 16, Difference P1 vs. N ( $\gamma_3$ )	1.645 <sup>***</sup>	.221	P1, Difference Rds 15-16 vs. Rds 13-14 ( $\gamma_1$ )	-.379 <sup>***</sup>	.118
Rds 17 – 18, Difference P1 vs. N ( $\gamma_4$ )	1.026 <sup>***</sup>	.243	P1, Difference Rds 17-18 vs. Rds 15-16 ( $\gamma_1$ )	-.514 <sup>***</sup>	.111
Rds 19 – 20, Difference P1 vs. N ( $\gamma_5$ )	1.183 <sup>***</sup>	.243	P1, Difference Rds 19-20 vs. Rds 17-18 ( $\gamma_1$ )	-.239 <sup>**</sup>	.110
Rds 11 – 12, Difference P1C vs. P1 ( $\psi_1$ )	.435 <sup>**</sup>	.202	P1C Treatment	2.259 <sup>***</sup>	.218
Rds 13 – 14, Difference P1C vs. P1 ( $\psi_2$ )	.424 <sup>**</sup>	.199	P1C, Difference Rds 13-14 vs. Rds 11-12 ( $\psi_1$ )	-.404 <sup>***</sup>	.111
Rds 15 – 16, Difference P1C vs. P1 ( $\psi_3$ )	.576 <sup>***</sup>	.209	P1C, Difference Rds 15-16 vs. Rds 13-14 ( $\psi_1$ )	-.226 <sup>**</sup>	.108
Rds 17 – 18, Difference P1C vs. P1 ( $\psi_4$ )	.869 <sup>***</sup>	.214	P1C, Difference Rds 17-18 vs. Rds 15-16 ( $\psi_1$ )	-.221 <sup>**</sup>	.093
Rds 19 – 20, Difference P1C vs. P1 ( $\psi_5$ )	.921 <sup>***</sup>	.217	P1C, Difference Rds 19-20 vs. Rds 17-18 ( $\psi_1$ )	-.187 <sup>**</sup>	.079
Rds 11 – 12, Difference PChat vs. P1 ( $\eta_1$ )	.492 <sup>**</sup>	.191	PChat Treatment	2.750 <sup>***</sup>	.202
Rds 13 – 14, Difference PChat vs. P1 ( $\eta_2$ )	.638 <sup>***</sup>	.183	PChat, Difference Rds 13-14 vs. Rds 11-12 ( $\gamma_1$ )	-.257 <sup>**</sup>	.121
Rds 15 – 16, Difference PChat vs. P1 ( $\eta_3$ )	.768 <sup>***</sup>	.193	PChat, Difference Rds 15-16 vs. Rds 13-14 ( $\gamma_1$ )	-.096	.111
Rds 17 – 18, Difference PChat vs. P1 ( $\eta_4$ )	.848 <sup>***</sup>	.199	PChat, Difference Rds 17-18 vs. Rds 15-16 ( $\gamma_1$ )	-.142	.126
Rds 19 – 20, Difference PChat vs. P1 ( $\eta_5$ )	1.556 <sup>***</sup>	.205	PChat, Difference Rds 19-20 vs. Rds 17-18 ( $\gamma_1$ )	.521 <sup>***</sup>	.127
Rds 11 – 12, Difference RChat vs. PChat ( $\nu_1$ )	.264	.202	RChat Treatment	3.014 <sup>***</sup>	.220
Rds 13 – 14, Difference RChat vs. PChat ( $\nu_2$ )	.566 <sup>***</sup>	.196	RChat, Difference Rds 13-14 vs. Rds 11-12 ( $\gamma_1$ )	.045	.165
Rds 15 – 16, Difference RChat vs. PChat ( $\nu_3$ )	.758 <sup>***</sup>	.193	RChat, Difference Rds 15-16 vs. Rds 13-14 ( $\gamma_1$ )	.095	.112
Rds 17 – 18, Difference RChat vs. PChat ( $\nu_4$ )	.921 <sup>***</sup>	.226	RChat, Difference Rds 17-18 vs. Rds 15-16 ( $\gamma_1$ )	.021	.190
Rds 19 – 20, Difference RChat vs. PChat ( $\nu_5$ )	.733 <sup>***</sup>	.273	RChat, Difference Rds 19-20 vs. Rds 17-18 ( $\gamma_1$ )	.336	.255
Average Period 1 Price (Rds 1 – 10)	.760 <sup>***</sup>	.169	Average Period 1 Price (Rds 1 – 10)	.760 <sup>***</sup>	.169
Average Period 2 Price (Rds 1 – 10)	.122	.113	Average Period 2 Price (Rds 1 – 10)	.122	.113

Note: Both regressions contain 3282 observations from 346 subjects. Standard errors are corrected for clustering at the individual level. Three (\*\*\*), two (\*\*), and one (\*) stars indicate statistical significance at the 1%, 5%, and 10% respectively.

Table A.2: Alternative Regressions on Effect of Chat Categories in PChat

	Model 1	Model 2	Model 3	Model 4	Model 5
Subject Fixed Effects			✓	✓	✓
Opponent Fixed Effects				✓	✓
IV					✓
# Observations	626	626	626	626	525
Model Type	Probit	Probit	Linear Probability	Linear Probability	Linear Probability
Received	.475	.417	.105	-.002	-.257
Implicit Threat	(.453)	(.440)	(.155)	(.165)	(.664)
Received	<b>-.808<sup>***</sup></b>	<b>-.767<sup>***</sup></b>	<b>-.220<sup>***</sup></b>	<b>-.292<sup>***</sup></b>	<b>-.602<sup>*</sup></b>
Explicit Threat	<b>(.310)</b>	<b>(.295)</b>	<b>(.064)</b>	<b>(.084)</b>	<b>(.360)</b>
Received	.215	.073	.038	.047	-.864
Request for Proposals	(.382)	(.358)	(.080)	(.100)	(.685)
Received	-.284	-.245	-.059	.003	-.242
Appeal to Mutual Payoffs	(.194)	(.178)	(.052)	(.058)	(.382)
Received	-.101	-.094	-.007	-.010	-.072
Reference to Safety or Risk of Strategies	(.403)	(.416)	(.101)	(.119)	(.509)
Received	-.119	-.052	.020	.058	.333
Specific Reference to Payoff Table	(.269)	(.245)	(.058)	(.071)	(.410)
Received	-.167	-.299	-.017	.026	.298
Promise of Trustworthy Behavior	(.292)	(.293)	(.080)	(.080)	(.343)
Received	.206	-.102	.020	-.023	-.373
Expression of Distrust	(.285)	(.263)	(.080)	(.088)	(.389)
Received	.369	.155	.003	.046	-.089
Appeal for Trustworthy Behavior	(.258)	(.241)	(.049)	(.061)	(.401)
Received	-.175	-.334	-.003	-.062	-.187
Self-Report Being Cheated Earlier	(.231)	(.239)	(.053)	(.062)	(.353)
Sent	-.419		-.144	-.209	
Implicit Threat	(.474)		(.127)	(.129)	
Sent	<b>-1.261<sup>***</sup></b>		<b>-.227<sup>***</sup></b>	<b>-.274<sup>***</sup></b>	
Explicit Threat	<b>(.371)</b>		<b>(.078)</b>	<b>(.081)</b>	
Sent	-.284		-.045	.062	
Request for Proposals	(.425)		(.110)	(.106)	
Sent	-.223		-.033	-.000	
Appeal to Mutual Payoffs	(.247)		(.066)	(.065)	
Sent	-.053		.020	.036	
Reference to Safety or Risk of Strategies	(.427)		(.075)	(.098)	
Sent	.257		-.041	-.021	
Specific Reference to Payoff Table	(.287)		(.079)	(.087)	
Sent	<b>-.603<sup>**</sup></b>		<b>-.133<sup>*</sup></b>	<b>-.127<sup>*</sup></b>	
Promise of Trustworthy Behavior	<b>(.243)</b>		<b>(.065)</b>	<b>(.066)</b>	
Sent	.316		.085	.059	
Expresion of Distrust	(.383)		(.103)	(.110)	
Sent	-.455		<b>-.199<sup>***</sup></b>	<b>-.174<sup>**</sup></b>	
Appeal for Trustworthy Behavior	(.379)		(.072)	(.078)	
Sent	-.281		-.048	-.063	
Self-Report Being Cheated Earlier	(.241)		(.065)	(.066)	

Note: Three (\*\*\*), two (\*\*), and one (\*) stars indicate statistical significance at the 1%, 5%, and 10% respectively.

Table A.3: Alternative Regressions on Effect of Chat Categories in RChat

	Model 1	Model 2	Model 3	Model 4	Model 5
Subject Fixed Effects			✓	✓	✓
Opponent Fixed Effects				✓	✓
IV					✓
# Observations	602	602	602	602	502
Model Type	Probit	Probit	Linear Probability	Linear Probability	Linear Probability
Received Implicit Threat	-1.211** (.112)	-1.223** (.494)	-.159** (.073)	-.325*** (.121)	.112 (.696)
Received Explicit Threat	.556 (.875)	.174 (.754)	.013 (.125)	-.070 (.104)	.137 (1.288)
Received Request for Proposals	.370 (.292)	.416 (.265)	.067 (.070)	.093 (.085)	.225 (.529)
Received Appeal to Mutual Payoffs	-.022 (.294)	-.055 (.272)	-.012 (.051)	-.062 (.069)	-.368 (.638)
Received Reference to Safety or Risk of Strategies	.802 (.624)	.889 (.548)	.106 (.105)	.160 (.123)	1.275 (1.124)
Received Specific Reference to Payoff Table	.128 (.331)	.272 (.329)	.026 (.065)	.038 (.056)	.249 (.346)
Received Promise of Trustworthy Behavior	-.079 (.617)	-.423 (.494)	-.015 (.054)	.002 (.066)	-.033 (.659)
Received Expression of Distrust	1.632** (.830)	.435 (.680)	.160 (.131)	.138 (.161)	1.086* (.596)
Received Appeal for Trustworthy Behavior	-.256 (.633)	-.519 (.596)	-.060 (.044)	-.201** (.096)	.199 (.802)
Received Self-Report Being Cheated Earlier	.232 (.298)	.031 (.266)	.074 (.053)	.017 (.074)	-.306 (.316)
Sent Implicit Threat	Perfectly Predicts No Cheating		-.219** (.092)	-.194** (.090)	
Sent Explicit Threat	Perfectly Predicts No Cheating		-.183 (.137)	-.208 (.190)	
Sent Request for Proposals	.235 (.316)		-.053 (.104)	-.033 (.094)	
Sent Appeal to Mutual Payoffs	-.430 (.371)		-.083 (.059)	-.098 (.071)	
Sent Reference to Safety or Risk of Strategies	.897* (.469)		-.036 (.134)	-.060 (.170)	
Sent Specific Reference to Payoff Table	.573 (.407)		-.004 (.054)	.051 (.061)	
Sent Promise of Trustworthy Behavior	-1.686*** (.486)		-.038 (.047)	-.017 (.055)	
Sent Expresion of Distrust	-.580 (1.109)		-.125 (.125)	-.192 (.140)	
Sent Appeal for Trustworthy Behavior	.298 (.678)		.001 (.054)	-.008 (.064)	
Sent Self-Report Being Cheated Earlier	-.408 (.316)		-.001 (.054)	.058 (.054)	

Note: Three (\*\*\*), two (\*\*), and one (\*) stars indicate statistical significance at the 1%, 5%, and 10% respectively.

## **Appendix B: Full List of Codes**

This appendix shows the original list of codes that was given to the coders. Notes in square brackets discuss interpretations of the codes and changes that were made after the coding process had started.

### *Period 1 Codes*

1. Proposal of Action
  - a. Proposed Action period 1
    - i. Both A
    - ii. Both B
    - iii. Both C
  - b. Proposed Action period 2
    - i. D
    - ii. E
    - iii. F
2. Response to Proposal
  - a. Disagreement
  - b. Weak Agreement
  - c. Clear Agreement

[We initially hoped to distinguish the intensity of agreement with proposals. We abandoned this when it became clear that there was no valid way to make this distinction. The final version of the coding combined 2b and 2c into a single category for agreement.]

3. Proposed Threats
  - a. Nonspecific Threat
  - b. Concrete Threat with Medium
  - c. Concrete Threat with Low
  - d. Mutual Threat
  - e. Explicitly non-contingent
4. Response to Proposed Threats
  - a. Disagreement



- b. Weak Agreement
- c. Strong Agreement
- d. Extension to Mutual Threat
- e. Request for explanation

[Categories 4b, 4c, and 4d were combined into a single category as it proved too difficult to distinguish between the varying degrees of agreement.]

5. Request for Proposals

6. Explanation

- a. In reference to own proposal
- b. In reference to other's proposal
- c. In reference to own proposed threat
- d. In reference to other's proposed threat
- e. Appeal to mutual benefits
- f. Appeal to "fairness"
- g. Discussion of incentive to cheat
- h. Safety or risk
- i. Specific reference to payoff table
- j. Explanation of contingencies

7. Cheating

- a. Weak Cheating
- b. Clear Cheating
- c. Strong Cheating

[This was not a coding category per se. To help us identify interesting dialogues, we asked the coders to keep track of cases where they thought somebody had cheated on an agreement, with subcategories for the intensity of cheating. This is *not* the variable used to measure cheating in the analysis contained in the main text. See the main text for a description of how cheating was measured.]

8. Boredom

9. Trust and Fairness

- a. Indicating that you should be trusted
- b. Indicating that you trust the other person

- c. Indicating that you *do not* trust the other person
  - d. Appeal for mutual trust
  - e. Appeal for trustworthy behavior
  - f. Appeal to fairness
10. Past Play
- a. Reporting about having been cheated
  - b. Self-reporting about past own behavior
  - c. Judgmental comments about others' behavior
  - d. Agreement about judgmental comments
  - e. Sympathy
  - f. Inaccurate reporting

*Period 2 Codes*

11. Comments on Previous Period
- a. Positive feedback after first period cooperation
  - b. Positive feedback after both deviate first period
  - c. Apology for cheating
  - d. Suggesting to cheat in future rounds to make up for loss
  - e. Rationalizing cheating
  - f. Clarifying whether deviation was deliberate or accident
  - g. Admonition for cheating
  - h. Admonition for lying

[Categories 11g and 11h are not well distinguished, so we have combined them into a single category for purposes of analysis.]

12. Proposal of Action (period 2)
- a. D
  - b. E
  - c. F
13. Response to Proposal
- a. Disagreement

- b. Weak Agreement
- c. Clear Agreement
- d. Mutual Statement of Same Action

[Categories 13b, 13c, and 13d were combined into a single category as it proved too difficult to distinguish between the varying degrees of agreement.]

- 14. Promise not to lie in period 2
- 15. Request for Proposals
- 16. Explanation
  - a. In reference to own proposal
  - b. In reference to other's proposal
  - c. Appeal to mutual benefits
  - d. Pointing out that there are no cheating incentives in period 2
  - e. Appeal to "fairness"
  - f. Appeal that past play does not matter
  - g. Statement that punishment results from first period behavior
  - h. Absence of reasons for punishments

### Appendix C: Derivation of the TPBG from an Infinite Horizon Game

The game played in the first period is based on a standard model from oligopoly theory, a symmetric Bertrand duopoly with homogeneous goods. The game is simplified by only allowing three prices: Low (L), Medium (M), and High (H). Let  $\pi^i$  be industry profits if demand is served at price  $i$ , and assume  $\pi^H > \pi^M > \pi^L > 0$  and  $\pi^L > \pi^M/2 > \pi^H/4$ . The following matrix (with player 1's strategies being the rows and player 2's strategies the columns) shows the payoffs for the Period 1 game:

(C1)	<i>Player 1 payoffs</i>	<i>L</i>	<i>M</i>	<i>H</i>
	<i>L</i>	$\frac{\pi^L}{2}$	$\pi^L$	$\pi^L$
	<i>M</i>	0	$\frac{\pi^M}{2}$	$\pi^M$
	<i>H</i>	0	0	$\frac{\pi^H}{2}$

The unique Nash equilibrium of the game shown in (C1) is (L,L). In a typical collusion game we would model the competition between firms as an infinite repetition of the stage game shown in (1), with future payoffs discounted by the discount factor  $\delta$ . Such an infinite horizon game would yield a continuation game with an infinite number of strategies. To reduce the strategy space while still capturing the essential features of the infinitely repeated game, we instead use the pay-off matrix shown in (C2) for the continuation game, where  $\Pi^i = (\delta/(1 - \delta)) * (\pi^i/2)$  and  $\delta$  is the discount factor. The rows are player 1's strategies and the columns are player 2's strategies.

(C2)	<i>player 1 payoffs</i>	<i>L</i>	<i>M</i>	<i>H</i>
	<i>L</i>	$\Pi^L$	$\delta[\pi^L + \Pi^L]$	$\delta[\pi^L + \Pi^L]$
	<i>M</i>	$\delta\Pi^L$	$\Pi^M$	$\delta[\pi^M + \Pi^L]$
	<i>H</i>	$\delta\Pi^L$	$\delta\Pi^L$	$\Pi^H$

Given the definition of  $\Pi^i$ , the payoff matrix in (C2) has three equilibria, in each of which the players choose the same strategy. These equilibria are Pareto ranked with (H,H) being the Pareto dominant equilibrium.

The second period game is derived from the matrix of continuation profits of the infinitely repeated version of (C1) when players are restricted to symmetric stationary equilibrium strategies in which players play the same pair of symmetric actions forever. In the infinite

horizon version of (C1) the optimal punishment is to revert to play of (L,L) forever. Hence, the worst equilibrium in (C2) corresponds to the optimal punishment of the infinite horizon game. The payoffs on the diagonal of (C2) then correspond to the discounted payoffs from the three strongly symmetric stationary equilibria that can be sustained with a threat to revert to the optimal punishment equilibrium. The off-diagonal payoffs give the discounted payoffs following a deviation in the second period (i.e. the first period of the continuation game) followed by the most severe punishment equilibrium: If a player is cheated and therefore has a higher price than the other player, he earns zero payoffs in the first period of the continuation game and  $\pi^L/2$  thereafter. If a player deviates and undercuts a symmetric equilibrium at price H (M), he receives the industry profit  $\pi^H$  ( $\pi^M$ ) in the first period of the continuation game and then  $\pi^L/2$  forever. The payoff matrix in (C2) can therefore be interpreted as a reduced form of the infinite horizon game when attention is restricted to the symmetric optimal punishment equilibria. This is the set of equilibria that is often analyzed in applications of collusion theory in industrial organization.

We assume that the incentive conditions are satisfied so that  $\{(L,L),(L,L)\}$ ,  $\{(M,M),(M,M)\}$ , and  $\{(H,H),(H,H)\}$  are subgame perfect equilibrium outcomes of the TPBG if players play (L,L) in the second period after any deviation in the first. Colluding at either M or H in Period 1 is therefore feasible, allowing us to detect whether communication leads to full collusion or not.

The two stage game used in the experiments is obtained by setting  $\pi^L = 78$ ,  $\pi^M = 138$ ,  $\pi^H = 168$ ,  $\delta = 2/3$ , and subtracting a fixed cost of 24 from all payoffs in every period.

## Appendix D

Table D.1: Period 1 Play by Round and Treatment

### N Treatment

Round	High	Medium	Low
1	0.1094	0.3281	0.5625
2	0.1563	0.2188	0.625
3	0.125	0.2656	0.6094
4	0.1094	0.2344	0.6563
5	0.0469	0.2344	0.7188
6	0.0781	0.2344	0.6875
7	0.0625	0.2344	0.7031
8	0.0469	0.1563	0.7969
9	0.0469	0.125	0.8281
10	0.0781	0.0938	0.8281
11	0.0625	0.125	0.8125
12	0.0469	0.125	0.8281
13	0.0313	0.0625	0.9063
14	0.0156	0.0781	0.9063
15	0.0156	0.0469	0.9375
16	0.0156	0.0781	0.9063
17	0.0469	0.0469	0.9063
18	0.0313	0.0313	0.9375
19	0.0156	0.0313	0.9531
20	0	0.0476	0.9524

P1 Treatment

Round	High	Medium	Low
1	0.1471	0.5	0.3529
2	0.0294	0.3824	0.5882
3	0.0735	0.3235	0.6029
4	0.0735	0.25	0.6765
5	0.0294	0.25	0.7206
6	0	0.2647	0.7353
7	0.0147	0.2059	0.7794
8	0.0147	0.1618	0.8235
9	0	0.1618	0.8382
10	0.0147	0.0882	0.8971
11	0.3676	0.4559	0.1765
12	0.3235	0.4706	0.2059
13	0.2353	0.4706	0.2941
14	0.2059	0.4559	0.3382
15	0.1618	0.4118	0.4265
16	0.1029	0.3971	0.5
17	0.0588	0.3235	0.6176
18	0	0.3382	0.6618
19	0.0294	0.25	0.7206
20	0.0441	0.1912	0.7647

### PIC Treatment

Round	High	Medium	Low
1	0.0541	0.3649	0.5811
2	0.0676	0.3919	0.5405
3	0.027	0.2973	0.6757
4	0.0405	0.2838	0.6757
5	0.027	0.2162	0.7568
6	0.027	0.1757	0.7973
7	0.027	0.1081	0.8649
8	0	0.1081	0.8919
9	0.0135	0.1081	0.8784
10	0.027	0.1216	0.8514
11	0.4865	0.3243	0.1892
12	0.473	0.3784	0.1486
13	0.3378	0.4459	0.2162
14	0.2432	0.5135	0.2432
15	0.2568	0.4865	0.2568
16	0.2027	0.4189	0.3784
17	0.1486	0.4189	0.4324
18	0.1892	0.4459	0.3649
19	0.1216	0.4595	0.4189
20	0.1216	0.3649	0.5135



PChat Treatment

Round	High	Medium	Low
1	0.1094	0.4688	0.4219
2	0.0313	0.3906	0.5781
3	0.0313	0.3125	0.6563
4	0.0313	0.3906	0.5781
5	0.0313	0.2656	0.7031
6	0.0469	0.25	0.7031
7	0.0156	0.1406	0.8438
8	0.0156	0.1406	0.8438
9	0	0.125	0.875
10	0	0.0781	0.9219
11	0.7031	0.25	0.0469
12	0.6719	0.2969	0.0313
13	0.625	0.2969	0.0781
14	0.5469	0.4219	0.0313
15	0.5	0.4531	0.0469
16	0.5313	0.4531	0.0156
17	0.4219	0.4688	0.1094
18	0.5938	0.2969	0.1094
19	0.6719	0.2969	0.0313
20	0.7188	0.25	0.0313

### RChat Treatment

Round	High	Medium	Low
1	0.1184	0.4474	0.4342
2	0.0263	0.3947	0.5789
3	0.0658	0.2895	0.6447
4	0.0526	0.2632	0.6842
5	0.0526	0.2237	0.7237
6	0.0789	0.1447	0.7763
7	0.0921	0.1579	0.75
8	0.0658	0.1184	0.8158
9	0.0263	0.1447	0.8289
10	0.0658	0.1184	0.8158
11	0.8158	0.1316	0.0526
12	0.7763	0.2105	0.0132
13	0.7895	0.1842	0.0263
14	0.8158	0.1579	0.0263
15	0.8421	0.1579	0
16	0.8026	0.1711	0.0263
17	0.84	0.1	0.06
18	0.82	0.16	0.02
19	0.9167	0.0833	0
20	0.875	0.125	0

Table D.2: Period 2 Play by Round and Treatment

N Treatment

Round	High	Medium	Low
1	0.4219	0.2656	0.3125
2	0.3906	0.3594	0.25
3	0.4063	0.3438	0.25
4	0.3594	0.4531	0.1875
5	0.4531	0.3438	0.2031
6	0.4063	0.3594	0.2344
7	0.3281	0.4688	0.2031
8	0.4063	0.3906	0.2031
9	0.2813	0.5	0.2188
10	0.4063	0.4063	0.1875
11	0.3281	0.5313	0.1406
12	0.375	0.4688	0.1563
13	0.25	0.625	0.125
14	0.1875	0.6875	0.125
15	0.2188	0.6719	0.1094
16	0.2031	0.6719	0.125
17	0.25	0.6563	0.0938
18	0.1563	0.6875	0.1563
19	0.2344	0.6875	0.0781
20	0.2143	0.6905	0.0952

P1 Treatment

Round	High	Medium	Low
1	0.5588	0.3824	0.0588
2	0.3971	0.4118	0.1912
3	0.3382	0.5	0.1618
4	0.3676	0.5147	0.1176
5	0.3235	0.4265	0.25
6	0.2206	0.6176	0.1618
7	0.2647	0.5294	0.2059
8	0.2206	0.6471	0.1324
9	0.1029	0.7206	0.1765
10	0.1765	0.6912	0.1324
11	0.4559	0.4265	0.1176
12	0.2353	0.6324	0.1324
13	0.2206	0.5735	0.2059
14	0.1912	0.5735	0.2353
15	0.1912	0.5294	0.2794
16	0.0588	0.5441	0.3971
17	0.0882	0.6029	0.3088
18	0.0441	0.6471	0.3088
19	0.0735	0.6765	0.25
20	0.0588	0.6618	0.2794

PIC Treatment

Round	High	Medium	Low
1	0.4054	0.3649	0.2297
2	0.3919	0.473	0.1351
3	0.4054	0.4189	0.1757
4	0.4189	0.4459	0.1351
5	0.3649	0.4865	0.1486
6	0.2838	0.5135	0.2027
7	0.2838	0.5405	0.1757
8	0.2568	0.5405	0.2027
9	0.2432	0.6081	0.1486
10	0.2297	0.5946	0.1757
11	0.5676	0.2973	0.1351
12	0.6351	0.2973	0.0676
13	0.527	0.3784	0.0946
14	0.5	0.3919	0.1081
15	0.473	0.3919	0.1351
16	0.3919	0.4189	0.1892
17	0.4459	0.3919	0.1622
18	0.4189	0.4054	0.1757
19	0.2838	0.4595	0.2568
20	0.2973	0.4189	0.2838

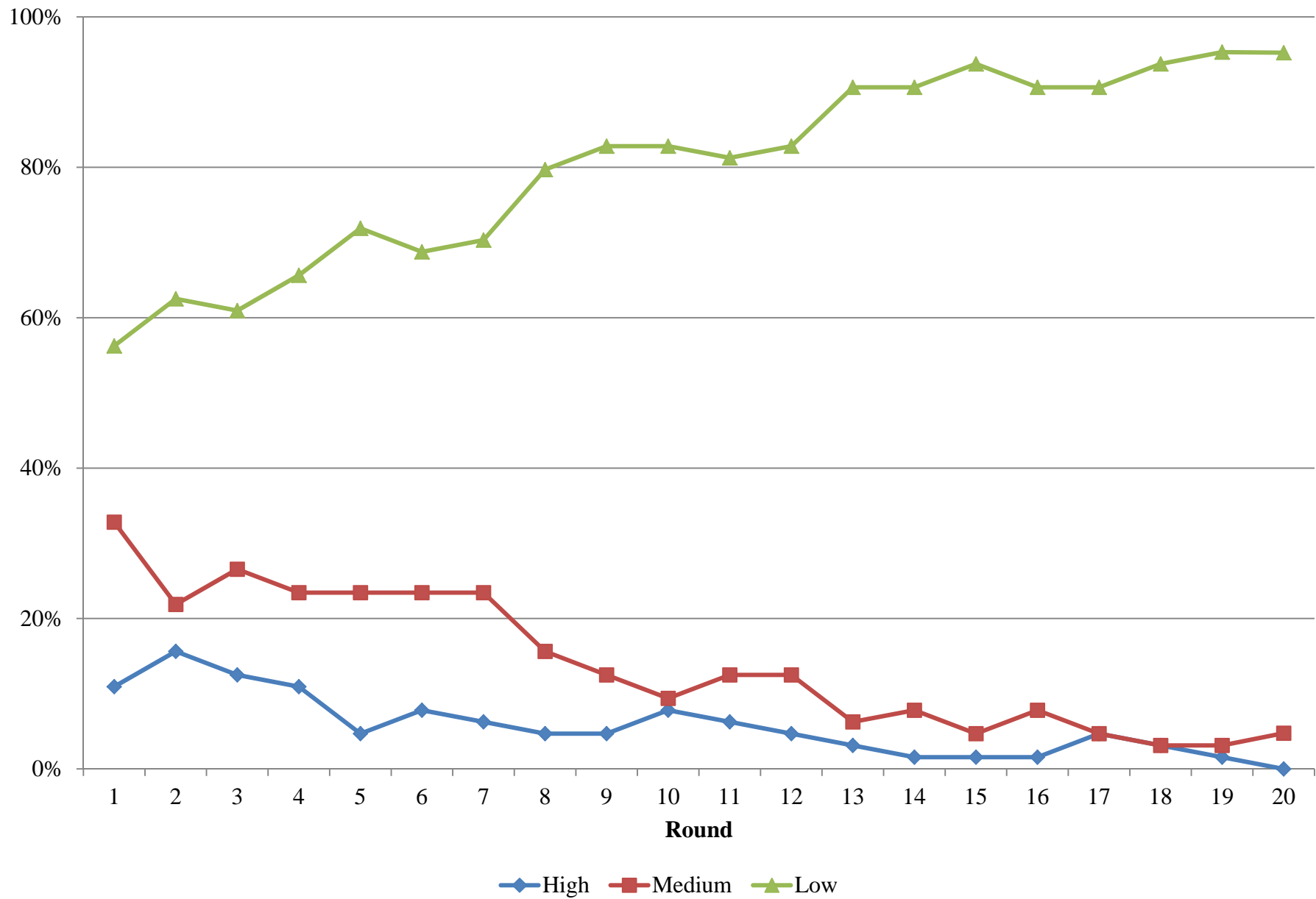
PChat Treatment

Round	High	Medium	Low
1	0.4219	0.3594	0.2188
2	0.2656	0.4531	0.2813
3	0.2813	0.375	0.3438
4	0.25	0.4688	0.2813
5	0.2344	0.4531	0.3125
6	0.2188	0.4375	0.3438
7	0.2031	0.4844	0.3125
8	0.1719	0.5469	0.2813
9	0.1406	0.5938	0.2656
10	0.1563	0.5938	0.25
11	0.7031	0.1406	0.1563
12	0.7656	0.1719	0.0625
13	0.625	0.2656	0.1094
14	0.7188	0.1563	0.125
15	0.7188	0.1875	0.0938
16	0.6875	0.1875	0.125
17	0.5625	0.2188	0.2188
18	0.6406	0.1719	0.1875
19	0.7813	0.0781	0.1406
20	0.8125	0.125	0.0625

### RChat Treatment

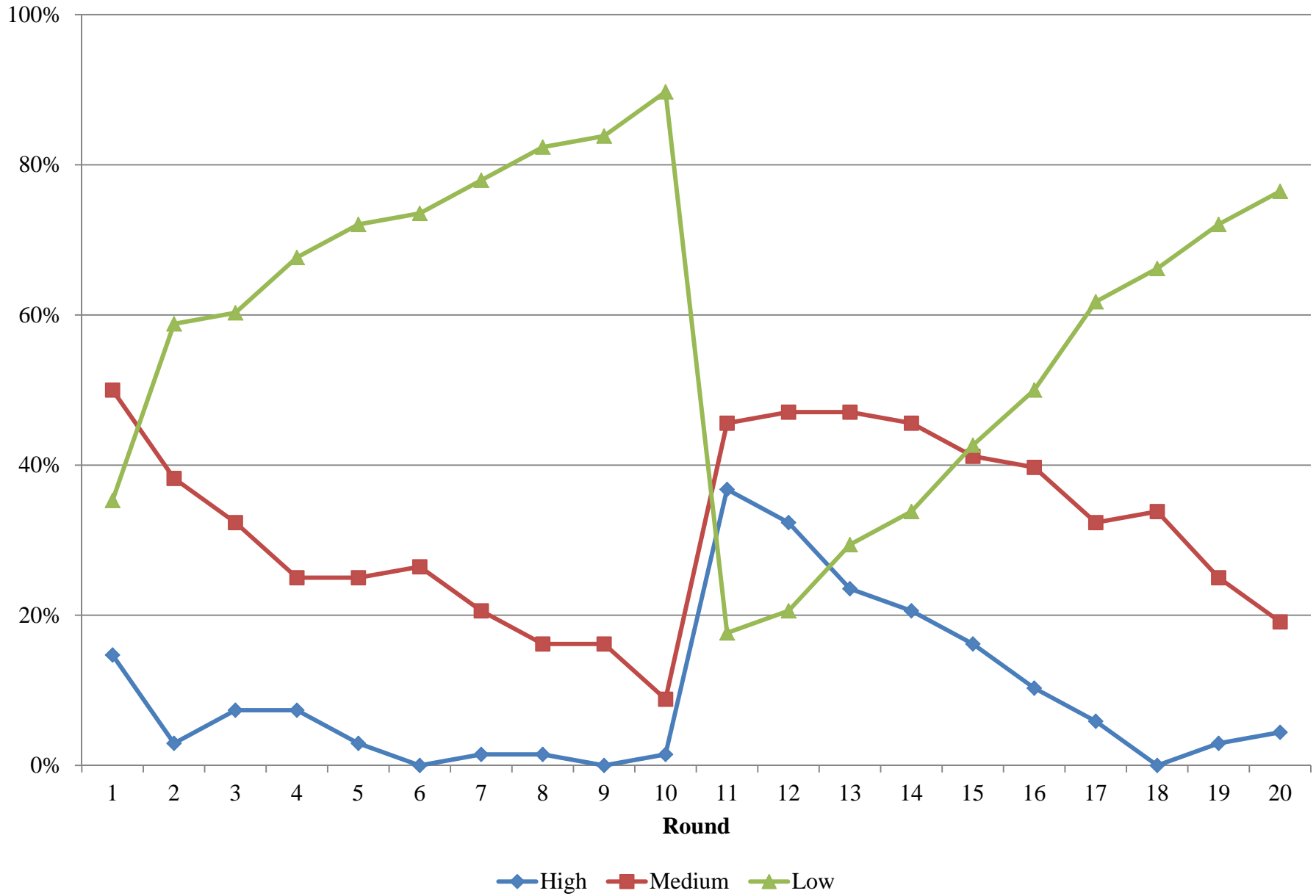
Round	High	Medium	Low
1	0.3684	0.4211	0.2105
2	0.3684	0.3947	0.2368
3	0.3026	0.3816	0.3158
4	0.2895	0.4079	0.3026
5	0.2237	0.4342	0.3421
6	0.2237	0.4737	0.3026
7	0.2763	0.4605	0.2632
8	0.25	0.4474	0.3026
9	0.2632	0.3947	0.3421
10	0.25	0.4342	0.3158
11	0.9605	0.0132	0.0263
12	0.9079	0.0526	0.0395
13	0.9079	0.0263	0.0658
14	0.8816	0.0263	0.0921
15	0.9605	0.0132	0.0263
16	0.9342	0.0395	0.0263
17	0.96	0.04	0
18	0.94	0.04	0.02
19	0.9583	0.0417	0
20	0.9167	0	0.0833

**Period 1 Play, N Treatment**

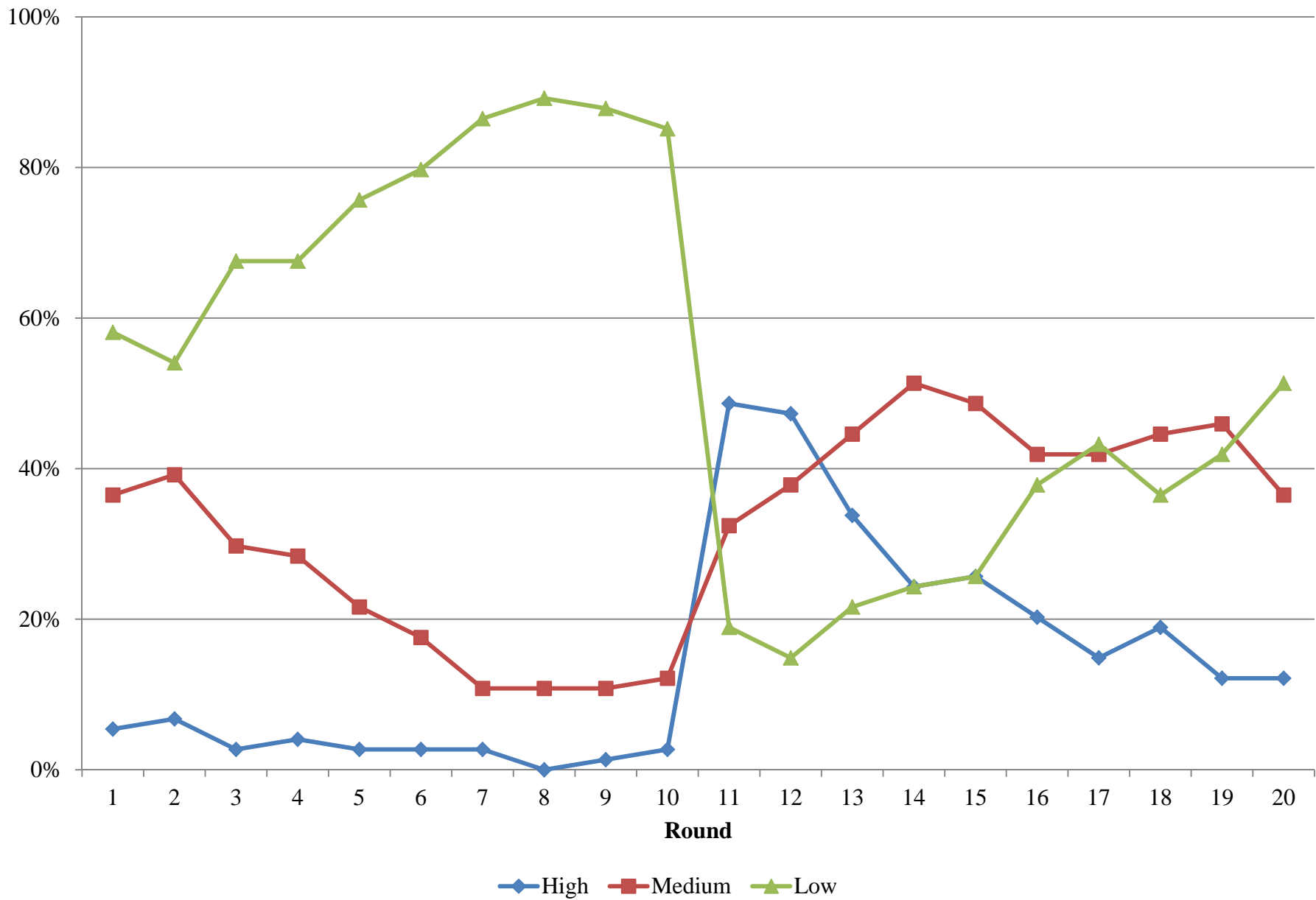




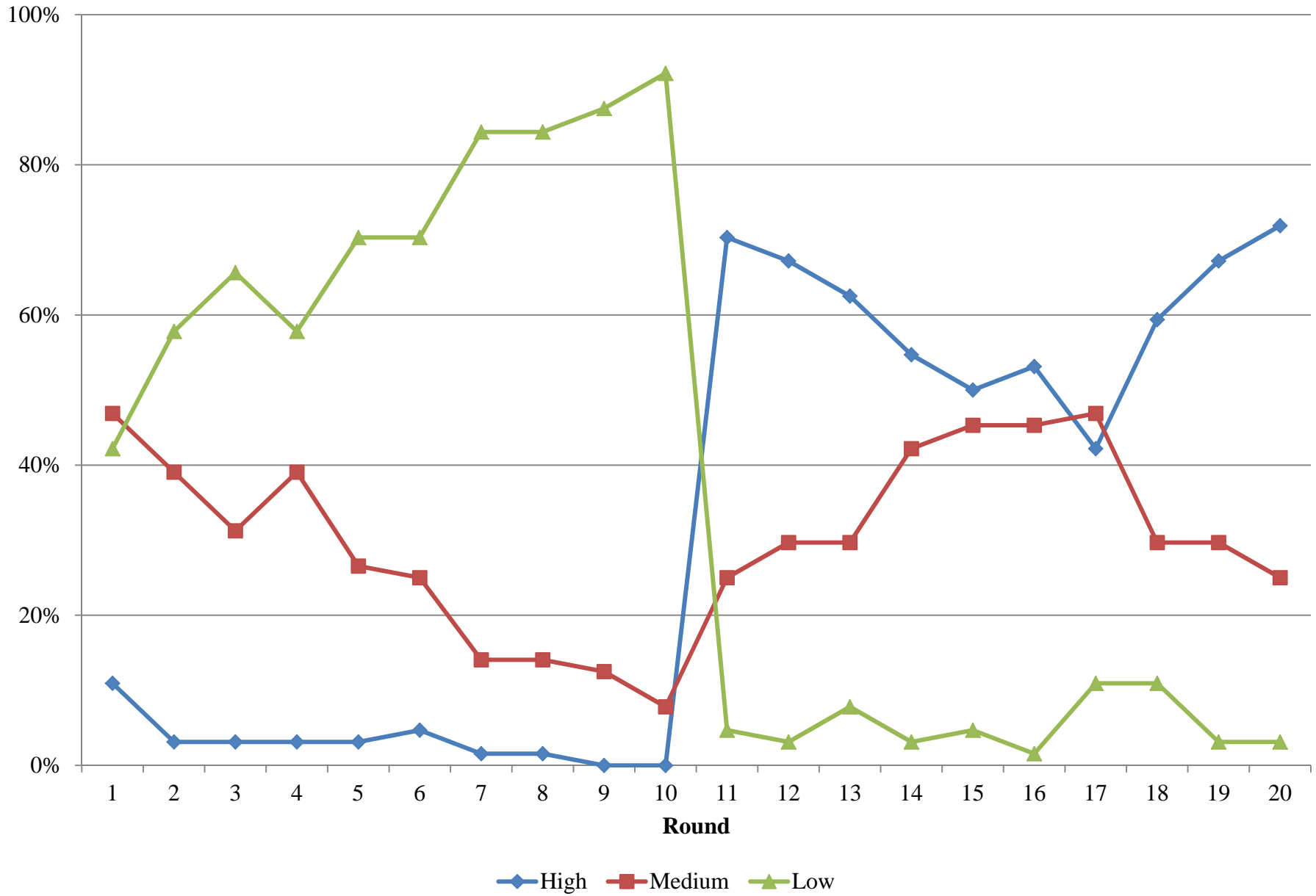
**Period 1 Play, P1 Treatment**



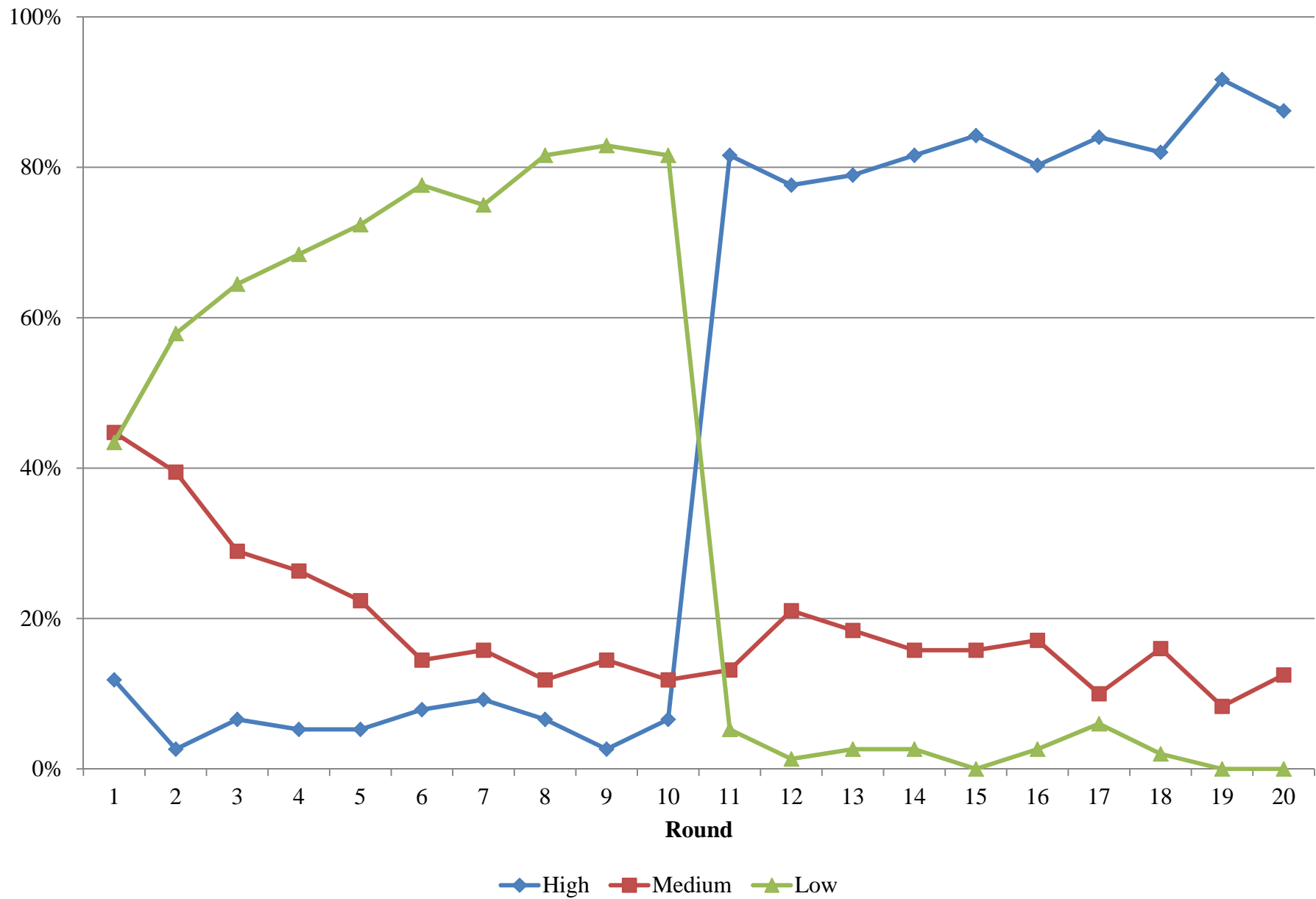
Period 1 Play, P1C Treatment



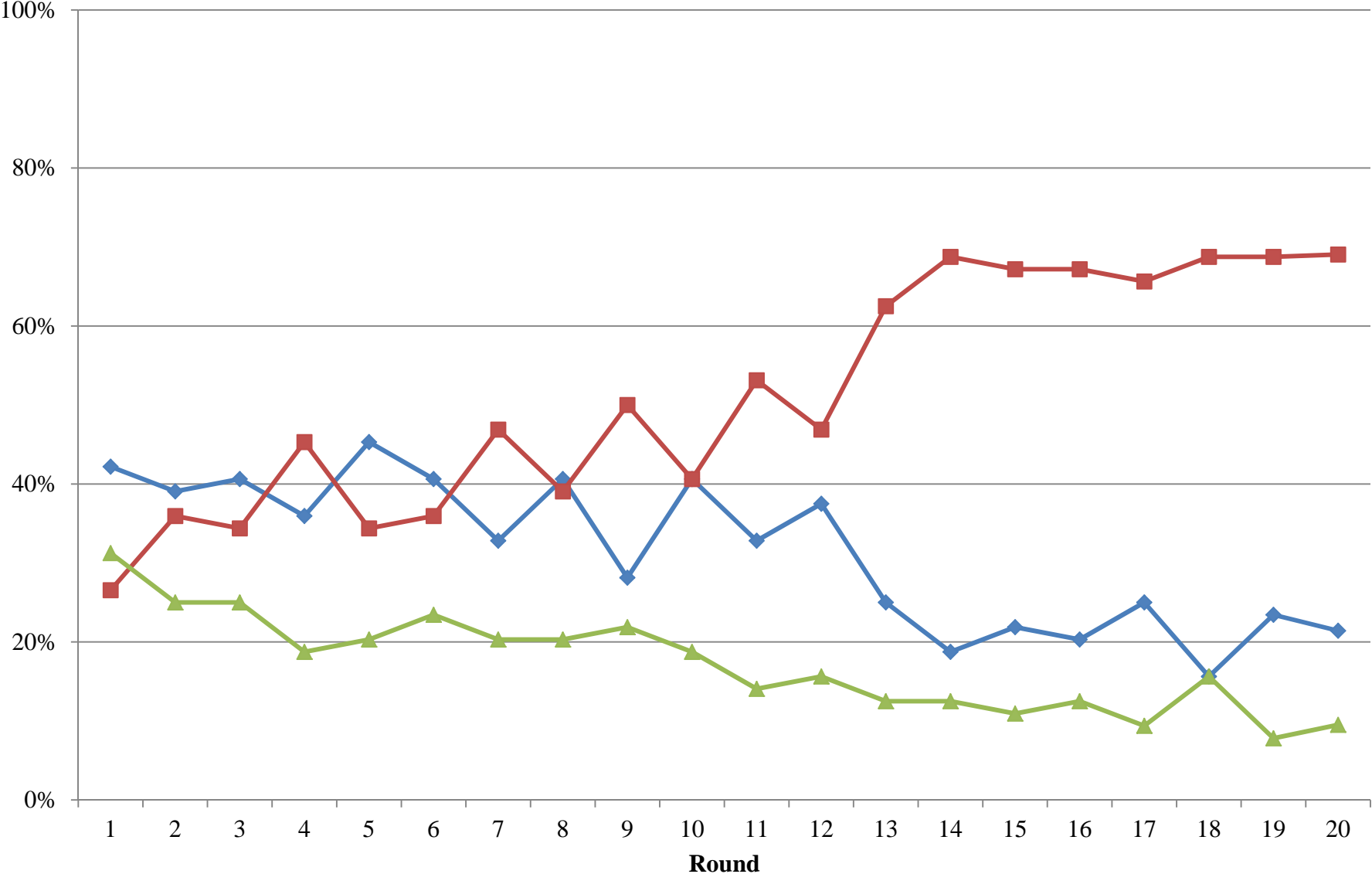
**Period 1 Play, PChat Treatment**



**Period 1 Play, RChat Treatment**

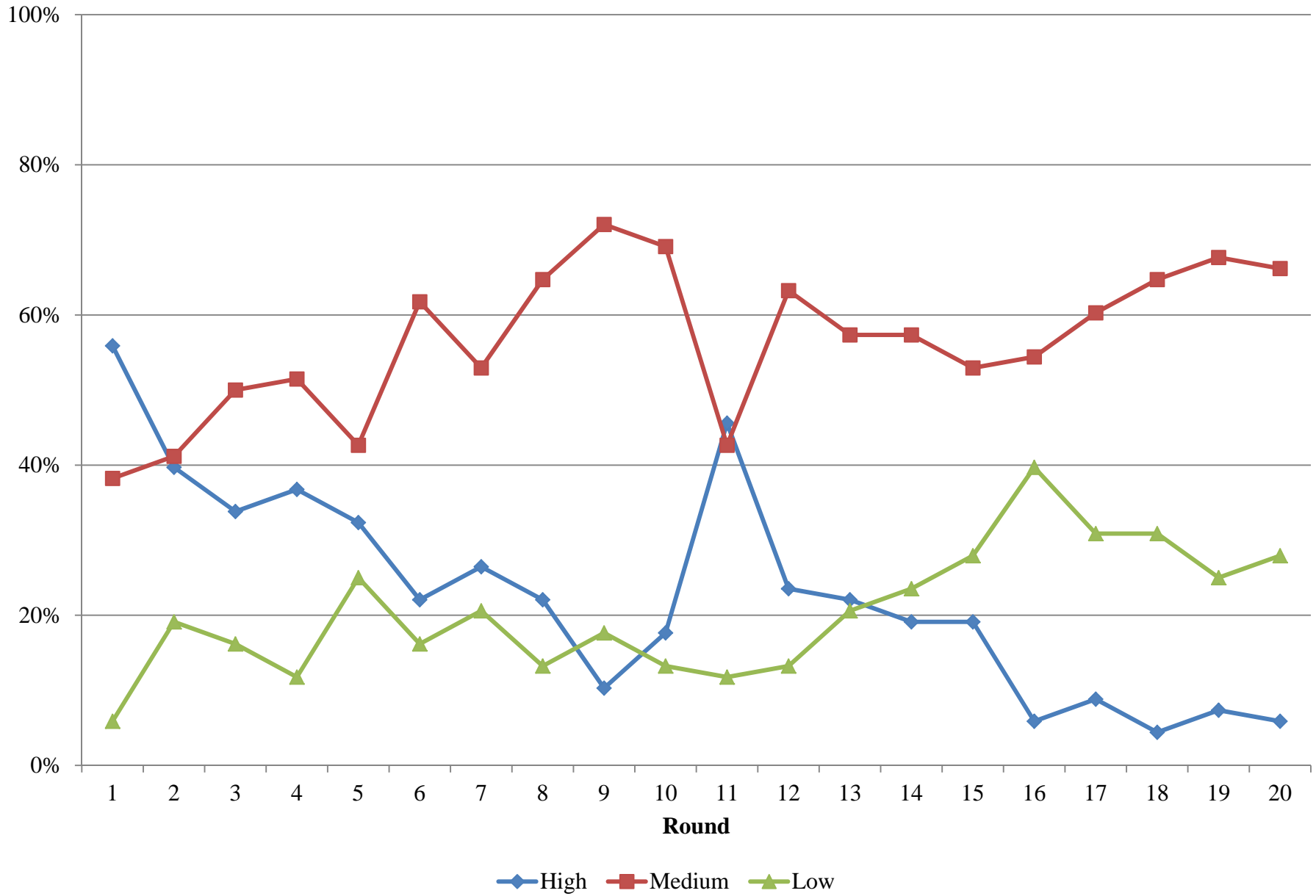


Period 2 Play, N Treatment

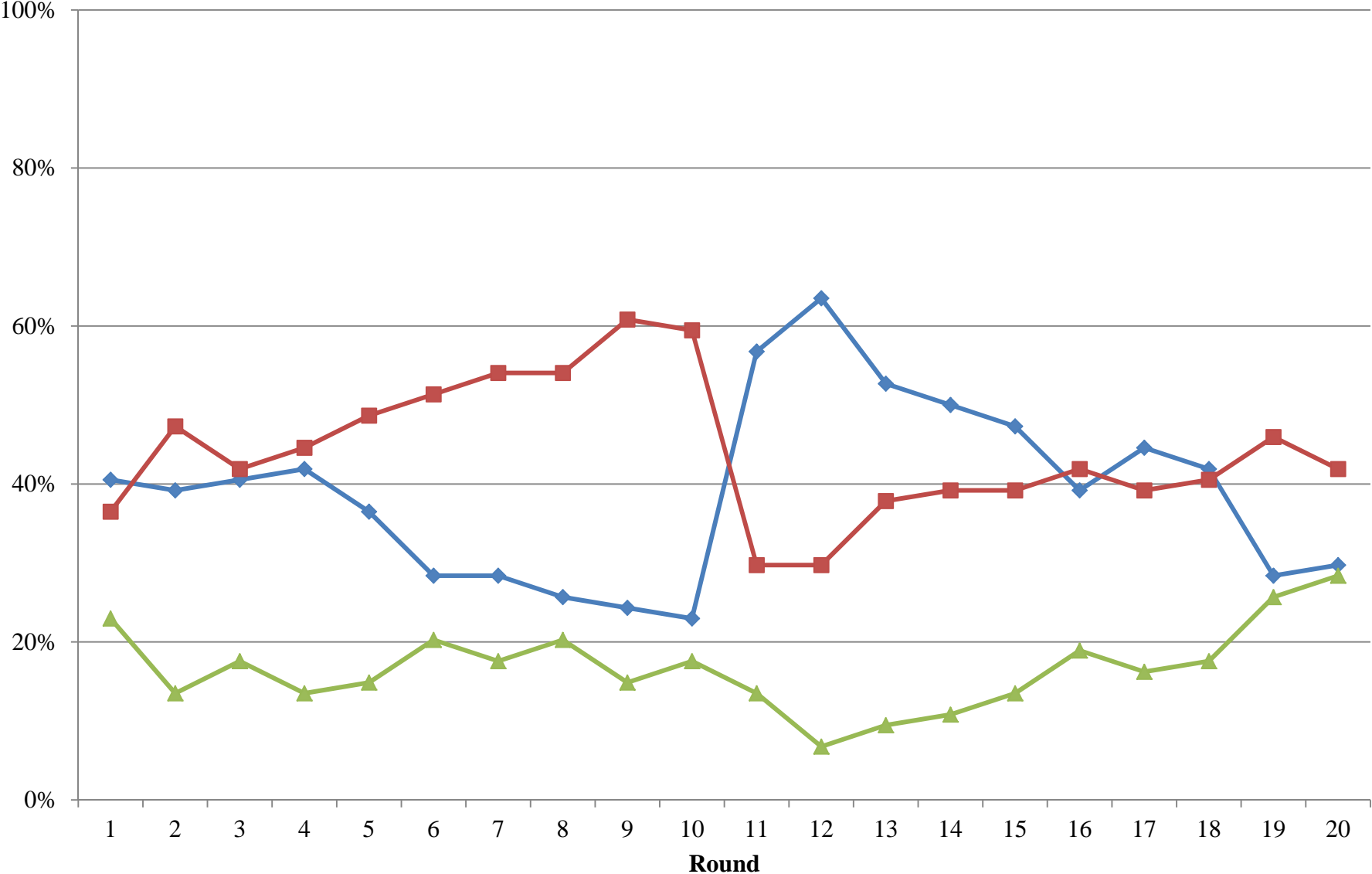


High Medium Low

**Period 2 Play, P1 Treatment**

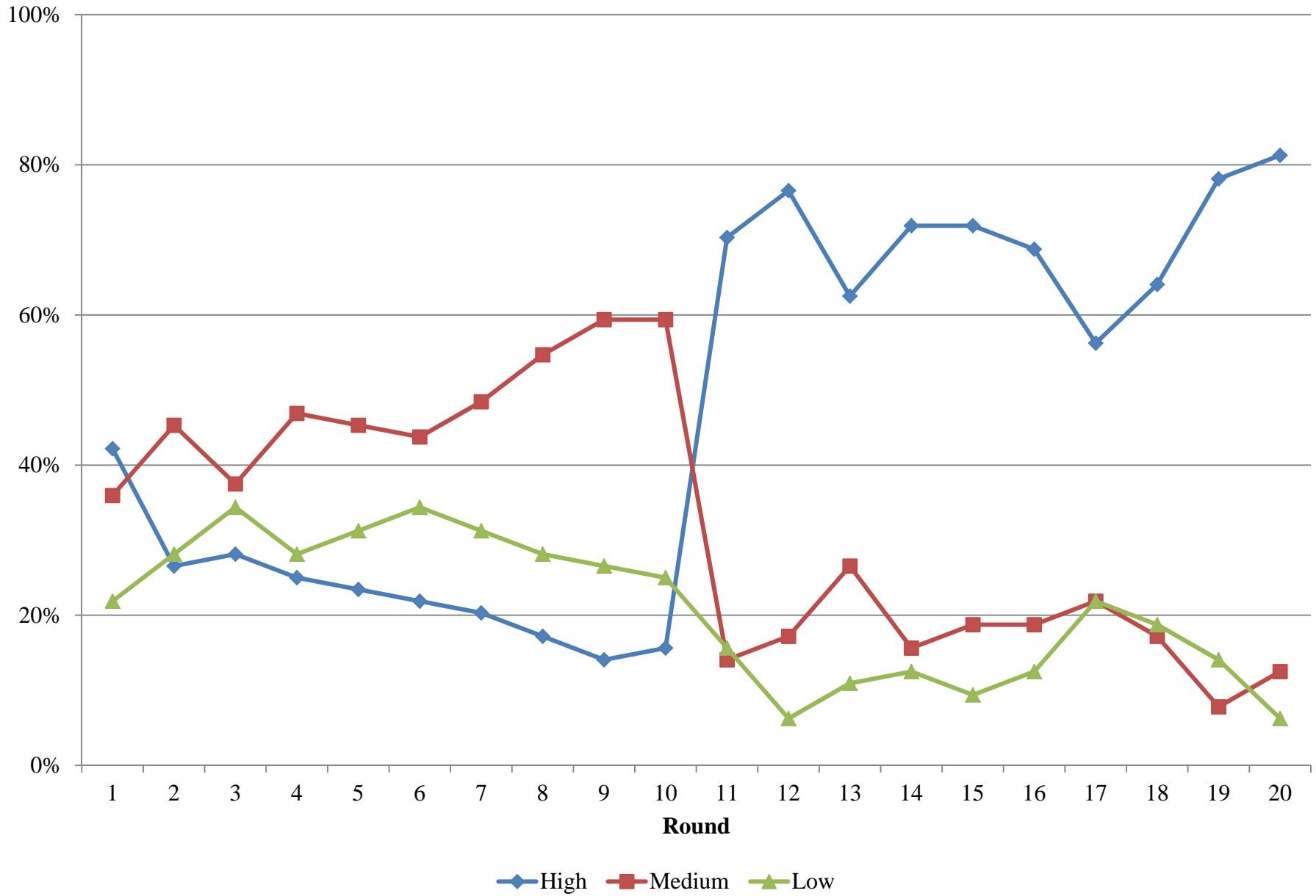


Period 2 Play, P1C Treatment



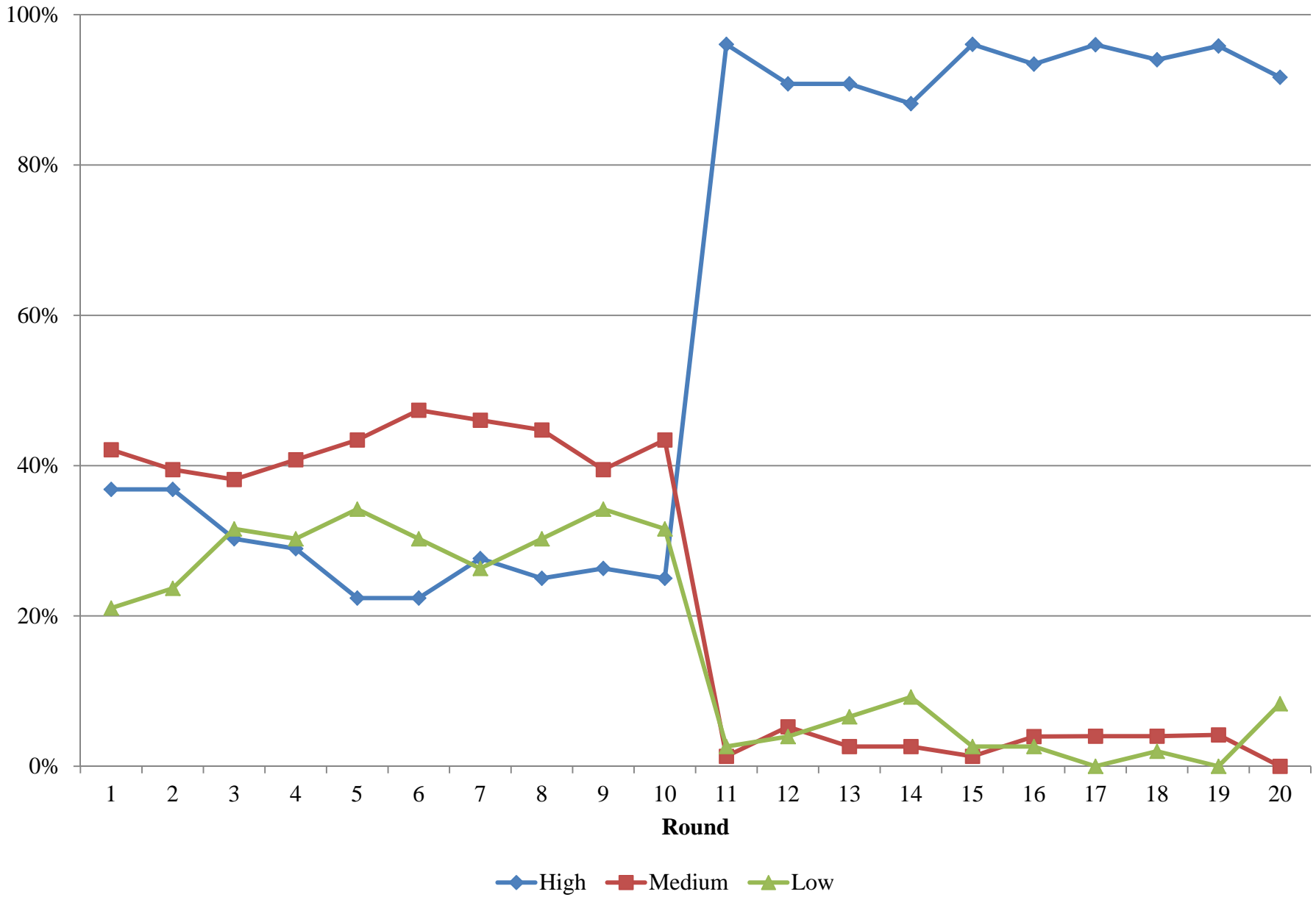
◆ High    ■ Medium    ▲ Low

**Period 2 Play, PChat Treatment**





**Period 2 Play, RChat Treatment**



## Appendix E: Screen Shots of Instructions

**Participant IDs:** Please enter a six digit ID number before continuing.

The ID number may only contain up to six digits.

No letters, spaces, or dashes.

Use something you can remember as this number will be used to pay you if we have a computer failure.

Participant Number:

Continue

**Introduction:** Today you are participating in a decision making experiment. These instructions describe a game that you will play 20 times. To make money in this experiment you must follow the instructions closely. Your payoffs in this experiment will depend on the choices made by you and the other players you are matched with. You will be given \$6.00 for coming on time. This \$6.00 and any money that you earn during the experiment will be paid to you, in cash, at the end of the experiment. You should feel free to make as much money as possible.

If you have any questions while these instructions are being read, please raise your hand and we will attempt to answer your questions. Please do not talk with the other subjects, even to ask questions about the instructions. *If we hear you talking at any point in the experiment, other than to talk with me or one of my assistants, or see you using electronic devices such as a cell phone or pager you will be given a warning. Upon a second incident you will be asked to leave the experiment.*

Please click "Continue" when the experimenter asks you to do so. If you have a question, please raise your hand and wait for the experimenter.

Continue

**Matching:** For each round of play you will be randomly and anonymously paired with another player. In other words, you are NOT playing the same person in different rounds. At no point, either during the experiment or following its conclusion, will we tell you who you were matched with in any round. Likewise, your identity will not be revealed to any of the people you are matched with.

**Experimental Currency:** All experimental payoffs are denominated in experimental currency units (ECUs). Your ECU earnings will be converted to dollars at the end of the experiment at a conversion rate of 130 ECUs equal one dollar. For example, suppose you have earned 4000 ECUs in the experiment. This would be divided by 130 to give you a monetary payoff of \$30.77. With your show-up fee of \$6.00 dollars, this would give you total earnings of \$36.77 for the session.

Please click "Continue" when the experimenter asks you to do so. If you have a question, please raise your hand and wait for the experimenter.

Continue

**Rounds and Periods:** Each round of the experiment contains two periods. You are matched with the same person for both periods of a round. In each period you will play a game against the person you are matched with. You are matched with a different person in each round. You should have received a paper with the payoff tables for both periods in Rounds 1 - 10. Please raise your hand if you do not have a copy of these tables. These payoff tables are identical for all participants in today's experiment.

Please click "Continue" when the experimenter asks you to do so. If you have a question, please raise your hand and wait for the experimenter.

Continue

**Period 1 Game:** In Period 1 you and the person you are matched with will separately choose between three options, A, B, and C. You will not know the other person's choice for Period 1 when you make your decision for Period 1 and they will not know your choice when they make their Period 1 decision.

Your payoff for Period 1 depends on your choice for Period 1 and the other person's choice for Period 1. The payoff table below gives your payoff for Period 1 in ECUs given the choices made by you and the other person. Remember, the other person has the same payoff table as you do. Please look at the overhead screen as we go through an example on how to read the payoff table.

You will have 60 seconds to make a choice for Period 1. To make a choice, use the radio buttons and then click on the button labeled "Continue." You may change your decision as many times as you like, but your decision is final when you click "Continue". If you have not made a choice at the end of 60 seconds, the computer will randomly make a choice for you (each option is equally likely to be chosen).

		Other's Choice		
		A	B	C
My Choice	A	15	54	54
	B	-24	45	114
	C	-24	-24	60

Please click "Continue" when the experimenter asks you to do so. If you have a question, please raise your hand and wait for the experimenter.

Continue

**Period 2 Game:** In Period 2 you and the person you are matched with will separately choose between three options, D, E, and F. You will be shown all Period 1 choices before making a choice in Period 2, but you will not know the other person's choice for Period 2 when you make your decision for Period 2.

Your payoff for Period 2 depends on your choice for Period 2 and the other person's choice for Period 2. The payoff table below gives your payoff for Period 2 in ECUs given the choices made by you and the other person. This is a different payoff table than the payoff table for Period 1. Your payoff for the round is the sum of your payoff for Periods 1 and 2. Please look at the overhead screen as we go through an example of calculating your payoffs.

The interface for making a decision for Period 2 works exactly like the interface for Period 1.

		Others Choice		
		D	E	F
My Choice	D	30	56	56
	E	4	90	96
	F	4	4	120

Please click "Continue" when the experimenter asks you to do so. If you have a question, please raise your hand and wait for the experimenter.

Continue

**Feedback:** At the end of each round you will be shown the choices made by you and the other person for Periods 1 and 2, the payoffs for you and the other person (in ECUs) for Periods 1 and 2, and your total payoff for the round. A summary of this information will be available in subsequent rounds.

**Payoff in Dollars:** At the end of the experiment, your ECU earnings for the entire experiment will be converted to dollars. The conversion rate of ECU's to the dollar is 130 to 1. You will then be paid your converted earnings plus your \$6.00 show-up fee. You will be paid in cash at the conclusion of the experiment. You will be paid privately, and no other player will be told what you earned for the experiment. It is possible, although highly unlikely, that your total ECU earnings at the end of twenty rounds will be negative. If so, your losses will be deducted from your 6.00 payment for arriving on time.

Please click "Continue" when the experimenter asks you to do so. If you have a question, please raise your hand and wait for the experimenter.

Continue



**Summary:** The experiment will consist of 20 rounds. In each round you will be randomly matched with another player. For Rounds 1 - 10, you and the person you are matched with will play two periods in each round. Your payoff in each period will be determined by the choices made by you and the person you are matched with. Your payoff for a round is the sum of your payoffs from the two periods. You will be given additional instructions for Rounds 11 - 20. At the end of the experiment, you will be paid your earnings (converted from ECUs to dollars) plus your \$6.00 show-up fee. You will be paid in cash at the end of the experiment. All information about your choices and payoffs in this experiment will be kept strictly confidential.

Please do not talk with the other subjects at any point during the experiment, even to ask questions about the instructions. If we hear you talking at any point in the experiment other than to talk with me or one of my assistants, you will receive a warning. Upon a second occurrence you will be removed from the experiment.

If you have any questions about any part of the instructions, this would be a good time to raise your hand. We want everyone to understand the instructions before we begin the experiment.

Please click "Continue" when the experimenter asks you to do so. If you have a question, please raise your hand and wait for the experimenter.

Continue

**General Quiz on Instructions:** For the following questions, imagine that you are playing a round of the game. Assume that the following choices are made. In Period 1, you choose C and the other player chooses A. In period 2, you choose D and the other player chooses F.

Your payoff for Period 1 in ECUs is:

The other person's payoff in ECUs for Period 1 is:

Your payoff for Period 2 in ECUs is:

The other person's payoff in ECUs for Period 2 is:

My total payoff for the round is:

The other person's total payoff for the round is:

**Please refer to your payoff charts on the separate piece of paper to answer these questions.**

Please click "Continue" when ready.

Continue

**General Quiz on Instructions:** Please answer the following true/false questions about the instructions.

You are being matched with the same person in every round.

- True
- False

You are matched with the same person for both periods of a round.

- True
- False

Please click "Continue" when ready.

Continue


**Chat:** In Rounds 11-20, you and the person you are matched with for the round will have the option to send messages back and forth. A copy of the screen for sending messages is shown below. This screen becomes available as soon as either period within a round starts. Please look at the overhead screen for more instructions.

No other subject will be able to see your messages. The server will record the messages as part of the dataset. Except for the following restrictions, you can send whatever messages you like to the other player: (1) Please do not identify yourself or send any information that could be used to identify you (e.g. age, race, background, etc.). (2) Please refrain from using obscene or offensive language.

The messages you send prior to making a choice for either Period 1 or Period 2 do not affect how payoffs are determined for either Period 1 or Period 2. Your payoff in Period 1 depends on the choices made by you and the other person for Period 1 and your payoff in Period 2 depends on the choices made by you and the other person for Period 2.

Unlike Rounds 1 - 10, there is no time limit for making a decision in either Period 1 or Period 2. In other words, you have as much time as you want to type messages.

Your Chat ID is: 2038832258



Please click "Continue" when the experimenter asks you to do so. If you have a question, please raise your hand and wait for the experimenter.

Continue

**General Quiz on Chat:** Please answer the following true/false questions about sending messages.

You can send any message you want other than messages which identify yourself, are obscene, or are offensive

- True
- False

You must send at least one message to the other player.

- True
- False

Your payoff for Period 1 is determined by the choices made in Period 1 by yourself and the other player. Your payoff is not determined by the messages sent by yourself or the other player prior to the beginning of Period 1.

- True
- False

Your payoff for Period 2 is determined by the choices made in Period 2 by yourself and the other player. Your payoff is not determined by the messages sent by yourself or the other player prior to the beginning of either Period 1 or Period 2.

- True
- False

Please click "Continue" when ready.

**Continue**

# Example: Period 1 Payoff Table

		Other's Choice		
		A	B	C
My Choice	A	15	54	54
	B	-24	45	114
	C	-24	-24	60

- Suppose you choose "B" and the person you are matched with chooses "C" for Period 1.

# Example: Period 1 Payoff Table

		Other's Choice		
		A	B	C
My Choice	A	15	54	54
	B	-24	45	114
	C	-24	-24	60

- Suppose you choose "B" and the person you are matched with chooses "C" for Period 1.
  - Your choice determines the row of the payoff table.

# Example: Period 1 Payoff Table

		Other's Choice		
		A	B	C
My Choice	A	15	54	54
	B	-24	45	114
	C	-24	-24	60

- Suppose you choose "B" and the person you are matched with chooses "C" for Period 1.
  - Your choice determines the row of the payoff table.
  - The other player's choice determines the column of the payoff table.



# Example: Period 1 Payoff Table

		Other's Choice		
		A	B	C
My Choice	A	15	54	54
	B	-24	45	114
	C	-24	-24	60

- Suppose you choose "B" and the person you are matched with chooses "C" for Period 1.
  - Your choice determines the row of the payoff table.
  - The other player's choice determines the column of the payoff table.
  - Your payoff is given by the cell where the row and column intersect – the third column of the second row. You have earned 114 ECUs for the first period.

# Example: Period 1 Payoff Table

		Other's Choice		
		A	B	C
My Choice	A	15	54	54
	B	-24	45	114
	C	-24	-24	60

- Suppose you choose "B" and the person you are matched with chooses "C" for Period 1.
  - Your choice determines the row of the payoff table.
  - The other player's choice determines the column of the payoff table.
  - Your payoff is given by the cell where the row and column intersect – the third column of the second row. You have earned 114 ECUs for the first period.
  - The other player is looking at the same payoff table as you. From his point of view, the payoff is given by the second column of the third row. He has earned -24 ECUs for the first period.

# Example: Period 2 Payoff Table

		Other's Choice		
		D	E	F
My Choice	D	30	56	56
	E	4	90	96
	F	4	4	120

- Suppose you choose "F" and the person you are matched with chooses "E" for Period 2.
  - Once again, your choice determines the row and the other player's choice determines the column. Your payoff is given by the cell where the row and column intersect – the second column of the third row. You have earned 4 ECUs for the second period.

# Example: Period 2 Payoff Table

		Other's Choice		
		D	E	F
My Choice	D	30	56	56
	E	4	90	96
	F	4	4	120

- Suppose you choose "F" and the person you are matched with chooses "E" for Period 2.
  - Once again, your choice determines the row and the other player's choice determines the column. Your payoff is given by the cell where the row and column intersect – the second column of the third row. You have earned 4 ECUs for the second period.
  - The other player is looking at the same payoff table as you. From his point of view, the payoff is given by the third column of the second row. He has earned 96 ECUs for the second period.

# Example: Period 2 Payoff Table

		Other's Choice		
		D	E	F
My Choice	D	30	56	56
	E	4	90	96
	F	4	4	120

- Your payoff for the round is the sum of your payoffs from the two periods.
  - If you earned 114 ECUs in Period 1 and 4 ECUs in Period 2, then your total payoff for the round is 118 ECUs.
  - If the person you are matched with earned -24 ECUs in Period 1 and 96 ECUs in Period 2, then their total payoff for the round is 72 ECUs.

# Example: Sending Messages

Round

1 out of 20

Remaining Time [sec]: 34

ID# 222  
Period 1 Decision Screen  
Please refer to the separate payoff sheets while working on this screen

Your Chat ID is: 1221018517

- Sending messages works like an IM program. There is a text entry box below the message screen for you to enter text. You can type as much as you like on this line – it will automatically wrap on the recipients screen. You can edit your messages after you type them, but once you hit "Enter" your message will show up on your message screen and the other person's message screen.
- Please type the message "How are you" and hit enter now.

# Example: Sending Messages

The screenshot shows a chat window with a light beige background. At the top left, it says "Round 1 out of 20". At the top right, it says "Remaining Time [sec]: 356". In the center, it displays "ID# 222", "Period 1 Decision Screen", and "Please refer to the separate payoff sheets while working on this screen". Below this, it says "Your Chat ID is: 4638548803". The main chat area contains two messages: "4638548803: How are you" and "7044198022: How are you". At the bottom of the chat area, there is a blue input field with a cursor.

- You should now see two messages appearing in your message screen. One is the message you typed and one is the message from the subject you are matched with for these instructions. Please type “I am fine.” You should see your response as well as the other person’s appear in this window.
- Notice that above your message screen you have a chat ID. This is a randomly generated number. Your messages will always be labeled with your chat ID. The messages of the person you are matched with for a round will be labeled with their chat ID.

# Example: Sending Messages

The screenshot shows a chat window with a header bar. The left side of the header bar displays "Round 1 out of 20" and the right side displays "Remaining Time [sec]: 311". The main chat area contains the following text:

ID# 222  
Period 1 Decision Screen  
Please refer to the separate payoff sheets while working on this screen

Your Chat ID is: 367574838

5878579999: How are you  
5878579999: Are you a student at Case  
367574838: Yes, I am  
367574838: Do you think that blue is a good color  
5878579999: No, I prefer Azure.  
5878579999: Do you think Barca will win la Liga?  
367574838: No, I think this is the year for Sevilla  
367574838: How much wood could a wood chuck chuck?  
5878579999: If a woodchuck could chuck wood  
5878579999: If you are happy and you know it  
367574838: Clap your hands  
367574838: And now  
5878579999: For the traditional ending  
5878579999: To wandering conversations by mad computers  
367574838: Daisy, daisy...

At the bottom of the chat area, there is a light blue input field for sending messages.

- You and the other person can send as many (or few) messages as you like until either you or the other person makes a choice for the period. If you and the person matched with you fill up the screen with messages, a scroll bar will appear so you can still see the entire conversation.
- Once a choice has been made by either person for the period, messaging is not available for the rest of the period. When you make a choice for the period, as a courtesy please send a short note saying “I’m making my choice” before you finalize your decision. Otherwise, the other person may continue to send messages, not realizing that you can’t see them or answer.