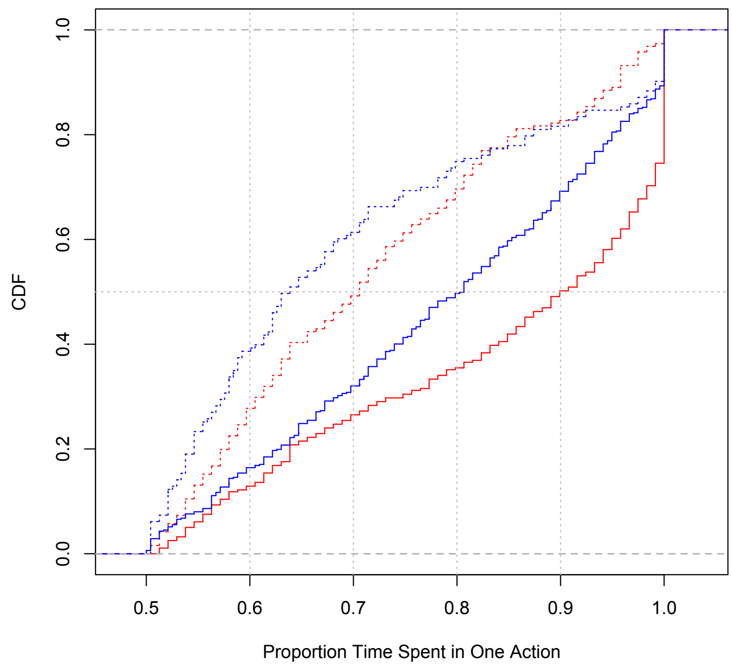

Figure 1: Cumulative distribution functions of specialization rates over last 5 periods. The dotted lines (blue for 1P treatment, red for 2P) show the fraction of time in Dove for subjects who played Dove more than half the time, while solid lines show the fraction of time in Hawk by the other subjects.

Appendix B: Additional Empirical Results

B.1 Mixing

Prediction 1 says, correctly, that in a one-population treatment, the overall fraction of Hawk play should stabilize at the symmetric MNE value of $\frac{2}{3}$, but it doesn't say how. Do all individuals try to employ the same mixed strategy $\frac{2}{3}H + \frac{1}{3}D$, say by choosing independently from the mix at regular intervals? Or by following a Markov switching process with a faster transition rate from D than from H? Or do different individuals specialize differently, with about twice as many consistently playing H as consistently playing D?[1]

Let us say that a player is a *strong specialist* if she spends at least 90% of the period in one

[1] Friedman [**?**] argues that his subjects in discrete time games mostly do specialize, and that near interior NE this can be understood as a variant Harsanyi's [**?**] notion of purification.

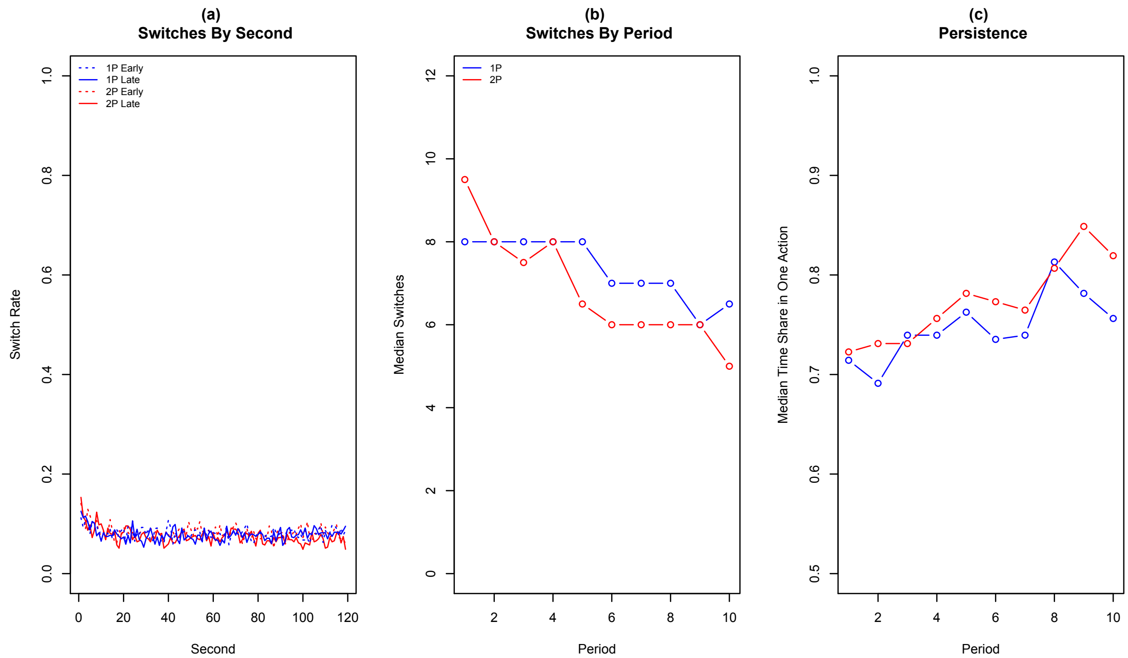

Figure 2: Switch rates within (Panel a) and across periods (Panels b and c). Blue (red) indicates 1P periods (2P periods).

of the strategies, and a *specialist* if the fraction is at least 80%. Figure 1 shows that half the Hawkish players in 2P are strong specialists and about 2/3 are specialists. Even in 1P, half the Hawkish players are specialists and about 1/3 are strong specialists. On the other hand, less than 1/5 of Dovish players are strong specialists in either treatment, and the median rate of D play among Dovish players is under 65% in 1P and just a bit over 70% in 2P. Since there are more Hawkish than Dovish players, we conclude that overall about half the players are specialists.

Although unlikely, it is possible that some specialists often switch strategies (but are are much quicker to switch out of one strategy than the other). It seems likely that some non-specialists switch quit often. Panel (a) of Figure 2 provides an overview of switching behavior. It shows that about 10 percent of subjects switch strategies in an average second in both population treatments and in both early and late periods, and that the switch rate is higher in the first few seconds of a typical period. Panel (b) shows falling switch rates in 2P—the median player switches 10 times in the first period, and only 5 times by the last—and a more modest decline in switch rates in 1P periods. Panel (c) shows the other side of the same coin, the median proportion of time a subject spends in their more favored action. This rises modestly over time and, as we have already seen, is a bit higher in 2P. Thus non-specialists switch fairly often, even in later periods when they become less common.

The main conclusions on individual switching behavior may be summarized as follows.

Result 6: *Individual player behavior is inconsistent with symmetric stationary mixing. Switching becomes less common in later periods, and eventually a majority of players specialize in Dove or (more commonly) Hawk.*

B.2 Non-Parametric Robustness Tests

	(1) **Hawk**	(2) **Separation**	(3) **Efficiency**	(4) **Gini**
Adjust Diff	0.008	0.008	0.008	0.008
End Diff	< 0.001	< 0.001	< 0.001	< 0.001

Table I: p-values from Wilcoxon test of differences in magnitude of adjustment across treatment (Adjust Diff) and the difference in end of period behavior across treatments (End Diff). In each case a single datapoint (a difference in means or difference in mean differences across treatments) is used for each session, ensuring completely independent observations.

Table **??** reports results from regressions examining the difference in the evolution of four key variables over the course of the period across the 1P and 2P treatments. We used these results to show that trends are significantly stronger in the 2P treatment than in the 1P treatment and that the two treatments generate significantly different end-of-period outcomes.

In this section we re-examine these key observations using highly conservative non-parametric techniques.

In Table I we run two non-parametric tests for each of the four response variables examined in Table **??**, treating each session as a single observation. The first row (Adjust Diff) of the table examines the difference in size of adjustment over the course of the period across treatments. For each session and treatment we calculate the difference between the mean in the first 30 and last 30 seconds. Then, for each session, we take the difference of this measure across treatments. We are left with a single, completely independent measure of Adjust Diff for each session. The predictions to be tested are that Adjust Diff will be positive for each such measure; the null hypothesis for each measure is that Adjust Diff is zero.

The second row (End Diff) examines the treatment difference in behavior during the final 30 seconds. For each session and treatment we calculate the mean of the dependent over the final 30 seconds, and take the difference across treatments. This statistic will be significantly different from zero under the research hypothesis and is zero under the null hypothesis.

For each measure we run non-parametric Wilcoxon tests with 8 independent observations, one for each session. Each cell of the table reports the two-sided p-value from the test.

These results confirm the main findings summarized in Table **??**. The magnitude of adjustment is indeed significantly greater in 2P than 1P for each measure. Moreover, end of period behavior differs substantially between the two treatments. These results are all highly significant using very conservative statistical tests. We conclude that the inferences reported in the paper are robust to a relaxation of the Gaussian assumption and hold even with a highly conservative treatment of dependence.

Appendix C: Experimental Instructions

Instructions (C)

Welcome. This is an experiment in the economics of decision-making. If you pay close attention to these instructions you may earn a significant amount of money that will be paid to you in cash at the end of the experiment.

The Basic Idea

In each of several periods, you will be able to choose one of two actions: A or B. Each period you will be matched with other players. Your earnings depend on the combination of your action and the other players actions that period.

The earnings possibilities will be represented in a GAME MATRIX like the one above. Your action will determine the row of the matrix (A or B) and each other players action will determine a column of the matrix (a or b). The cell corresponding to this combination of actions will determine your EARNINGS. In each cell are two numbers. The first of the two numbers (shown in bold) is your earnings from this action combination. The second is the other player's earnings. You earn points from each match, and the points are scaled down by the number of other players.

For example, if there are 7 other players and 4 of them chose A and 3 chose B, then your payoff would be (4*0 + 3*15)/7 = 45/7 = 6.43 if you chose A, and it would be (4*3 +3*9)/7 = 39/7 = 5.57 if you chose B.

You will not have to do this arithmetic yourself. The computer does the calculations and, as explained below, the bottom graph on your screen will display your earnings as you go along.

How to Play

There will be several periods. Each period will last 120 seconds and a counter at the top of the screen will show how much time is left. The computer randomly chooses the initial action, but you can change your action at any time by clicking the two radio buttons or by using the up and down arrow keys. The row corresponding to your chosen action be highlighted in blue as in the figure, and the columns will be shaded in blue according to the number of players currently choosing that action. You and the other players may change your actions as often as you like each period.

The numbers in the payoff matrix are the payoffs you would earn if you maintained the same action throughout the period. For instance if you played B for the entire period and all other players played b in the example above, then you would earn 9 points and the other players also would earn 9 points each.

If you played A for the first half of the period and B for the second half while the other players played b for the entire period, your earnings would be $\frac{1}{2}(15) + \frac{1}{2}(9) = 12$, while the other players earnings would be $\frac{1}{2}(3) + \frac{1}{2}(9) = 6$. This is because you spent half of the period in the upper right corner and half in the lower right corner of the payoff matrix.

In general, your payoffs in the period will depend on how much time is spent in each of the cells on the payoff matrix. The more time you spend in any one cell, the closer the final payoffs will be to the payoffs in that cell.

To the right of the screen are two graphs showing outcomes over the course of the period. The top graph shows your action (in blue) and the average action of all other players [with whom you are matched] (in red) over the period. The graph is labeled Percentage of A If this now reads 100 it means that at the moment you chose A. If it is 0 it means at that moment you chose B, and it switches between 0 and 100 as you switch actions.

The bottom graph shows your earnings over the course of the period in blue. The more area below your earnings curve, the more you have earned. In other words, the higher the blue line the more you are currently earning. The red line shows the corresponding average payoff for the other players.

Earnings

You will be paid at the end of the experiment based on the sum of point earnings throughout the experiment. These total earnings are displayed as the Total Payoff at the top of the screen.

Frequently Asked Questions

Q1. Is this some kind of psychology experiment with an agenda you haven't told us?

Answer. No. It is an economics experiment. If we do anything deceptive or don't pay you cash as described then you can complain to the campus Human Subjects Committee and we will be in serious trouble. These instructions are meant to clarify how you earn money, and our interest is in seeing how people make decisions.

Q2. If I choose the rows and the other players chooses the columns, does their screen look different than mine?

Answer. On everyone's screen, the same choices are shown as rows. For example if another player chooses row B then it shows up on your screen as a choice of column b. Of course, the payoff numbers for any choice combination are the same on both screens, but are shown in a different place.

Q3. Who am I matched with? Everyone else in the room?

Answer. Sometimes you are matched with all other players in the room. Sometimes we divide the players into two groups and we match you only with players in the other group.