HARVARD | BUSINESS | SCHOOL

Understanding Conformity: An Experimental Investigation

B. Douglas Bernheim
Christine L. Exley

Working Paper 16-070

Understanding Conformity: An Experimental Investigation

B. Douglas Bernheim
Stanford University

Christine L. Exley
Harvard Business School

Working Paper 16-070

Understanding Conformity: An Experimental Investigation

B. Douglas Bernheim and Christine L. Exley *

December 10, 2015

Abstract

Some theories of conformity hold that social equilibrium either standardizes inferences or promotes a shared understanding of conventions and norms among individuals with fixed heterogeneous preferences (*belief mechanisms*). Others depict tastes as fluid and hence subject to social influences (*preference mechanisms*). Belief mechanisms dominate discussions of conformity within economics, but preference mechanisms receive significant attention in other social sciences. This paper seeks to determine whether conformity is attributable to belief mechanisms or preference mechanisms by exploiting their distinctive implications for the process of convergence. Laboratory experiments suggest that economists have focused too narrowly on explanations for conformity involving belief mechanisms.

Keywords: conformity; norms; image motivation; prosocial behavior;

*Bernheim: Stanford University, bernheim@stanford.edu; Exley: Harvard Business School, clexley@hbs.edu

1 Introduction

Accumulating evidence from both the field and the laboratory demonstrates that people often adjust their behavior to conform with the choices of others, either partially or fully.[1] Economic theories variously attribute this tendency to factors such as community sanctions (Akerlof, 1980), social signaling (Bernheim, 1994), and the information conveyed by others' choices (Banerjee, 1992; Bikhchandani, Hirshleifer and Welch, 1992). In all of these theories, preferences are fixed, and the homogenization of behavior involves what we will call *belief mechanisms*: social equilibrium either standardizes inferences or promotes a shared understanding of social conventions and norms.

Many psychologists, sociologists, and anthropologists (as well as some economists) have challenged the premise that preferences are fixed and immutable.[2] They maintain instead that tastes are fluid and hence subject to a variety of social influences. Accordingly, while recognizing the importance of belief mechanisms, they also envision a separate route to conformity involving the convergence of preferences (what we will call *preference mechanisms*). For example, one leading theory of conformity envisions a "frequency-dependent bias," defined as the tendency to evaluate available options naively based on the frequency with which they are chosen within a social group, without regard to the practical or inferential implications of that frequency (Boyd and Richerson, 1985; Efferson et al., 2008; Mesoudi and Lycett, 2009; Durham, Boyd and Richerson, 2013). Formal models of this bias relate the likelihood that someone adopts a particular preference to the observed prevalence of that

[1] For instance, the field experiments in Cialdini, Reno and Kallgren (1990) and Frey and Meier (2004) show that people are more likely to engage in antisocial behavior (littering) and prosocial behavior (donating to charity) when they learn that others do so. Likewise, Chen et al. (2010) show that voluntary contributions to an online community increase (or decrease) in response to learning that contributions fall below (or above) the median. In laboratory studies, people often adjust their behavior to more closely align with others' choices. The classic reference is Asch (1956); more recent contributions include Carpenter (2004), Krupka and Weber (2009), and Zafar (2011). For an earlier and broader discussion of the empirical literature on conformity, see Bikhchandani, Hirshleifer and Welch (1998).

[2] For example, one prominent line of psychological research argues that, instead of accessing existing preferences, people often construct their preferences *de novo* when they encounter decision problems (see, for example, Lichtenstein and Slovic (2006)).

preference within the social group (Bowles, 1998; Carpenter, 2004; Hwang and Bowles, 2011; Di Giovinazzo and Naimzada., 2012).

The literature offers several possible psychological explanations for preference mechanisms. One theory involves what is called the "exposure effect." An important branch of the literature, beginning with Zajonc (1968), points out that simple repeated exposure to a neutrally or positively regarded alternative tends to enhance its perceived attractiveness (see also Monahan, Murphy and Zajonc, 2000; Zajonc, 2001; Judd and Brauer, 2014).[3] This tendency naturally generates behavioral convergence in social settings (Bowles and Polania-Reyes, 2012). A second explanation emphasizes the role of "tension systems" (Festinger, 1954). According to this view, people inherently dislike being in a state of disagreement with other members of their social group, and respond to the resulting tension in one of three ways: either they modify their own attitudes, attempt to alter others' attitudes, or change the group's composition. Initially, those adopting the first strategy may simply mimic observed manifestations of the predominant attitude, but that creates unpleasant dissonance between their actions and true attitudes. Often they resolve this tension by bringing their outlook in line with their behavior. Thus a predominant attitude is eventually internalized, and becomes a general motivation for behavior. As an example, in a community that values truthfulness, people acquire and internalize an aversion to lying. Bowles (1998) likens the process to the acquisition of an accent.

The empirical literature on conformity documents various instances of convergent behavior and, in some instances, provides evidence concerning the operation of particular mechanisms. For instance, Andreoni and Bernheim (2009) demonstrate that social signaling contributes to an equal division norm in simple allocation problem, and the theory of informational cascades has been tested in laboratory settings designed to mimic canonical models (see Anderson and Holt, 1997; Çelen and Kariv, 2004, 2005). Even so, little is known about the relative importance of belief mechanisms and preference mechanisms.[4]

[3] A related phenomenon involves the effect of repeated exposure to an advertising message on belief in the message's claim; see Hawkins, Hoch and Meyers-Levy (2001).

[4] In some cases, the questions posed are orthogonal to the one examined here. For in-

The main objective of this paper is to determine whether conformity is primarily attributable to belief mechanisms or preference mechanisms in a collection of settings where behavioral convergence is observed. This is an important issue because, to date, economists have have largely ignored preference mechanisms, instead focusing almost entirely on belief mechanisms, even though the appropriateness of that focus has not been evaluated. To be clear, the paper does not attempt to identify the specific mechanism behind convergence (for example, whether a belief mechanism involves sanctions, signaling, or informational cascades), but it does shed some light on that question.

As others have emphasized (e.g., Efferson et al., 2008), many theories can explain the same basic fact patterns concerning conformity, so our task is a challenging one. It is particularly hard to see how one could distinguish between these classes of theories once behavior converges. The key insight exploited in this paper is that these mechanisms have distinctive implications for the process of convergence. As a general matter, with belief mechanisms, behavior evolves when experience proves that pertinent beliefs are incorrect and in need of revision. We call this an *expectations-adjustment effect*. In contrast, with preference mechanisms, repeated exposure to others' choices can pull deviant group members closer to a prevalent mode of behavior even when beliefs are accurate. We call this a *gravity effect*. Accordingly, our strategy is to track beliefs during the process of convergence, and to determine whether the evolution of behavior involves expectations-adjustment effects, gravity effects, or both.

All of the settings we examine experimentally have a common structure. Sessions consist of 16 to 22 participants who independently make a sequence of ten decisions. Each decision involves a provisional commitment to expend effort at a level of the participant's choosing in order to obtain some bene-

stance, psychologists distinguish between the effects of "focusing" (that is, thinking about a norm) and "information" (that is, knowledge of others' choices); see the literature summarized in Krupka and Weber (2009), as well as their experimental analysis, which documents the existence of both. The distinction between focusing and information effects, as that literature defines them, does not align with the distinction between belief mechanisms and preference mechanisms.

fit either for themselves or others, according to a known schedule exhibiting decreasing returns. The ten decisions differ only superficially, and hence are plausibly governed by a single norm, if one materializes. However, the setting is one for which no preexisting norm prevails; moreover, we structure the tasks so as to avoid creating ex ante focal alternatives that might serve as obvious norms. Thus, participants start out in disequilibrium, with diverse conjectures about each others' choices. After each round, we use an incentive-compatible procedure to elicit each participant's belief concerning the median choice of other participants during that round, then we reveal the true answer. At the end of the session, we select one round and one participant at random and implement the associated decision.

It is important to bear in mind that different choice settings may differentially activate the mechanisms of conformity. For instance, the feasibility of social signaling depends on the nature of the task and the observability of choices. We thus examine a collection of settings that differ along those two dimensions. Tasks vary according to whether the benefits of effort flow to those in need (charity), the participant (self), or the participants collectively (group). In some sessions, all decisions for the selected round are prominently revealed (public choice); in others, anonymity is maintained (private choice). We find that both the degree of behavioral convergence and the nature of the dominant mechanism – that is, whether it gives rise to expectations-adjustment effects or gravity effects – differ considerably across these treatments.

First consider the charity treatments. Based on the leading economic models of conformity, one would make the following predictions. Settings with public choices should induce conformity by activating belief mechanisms involving social sanctions and signaling. Anonymizing choices should deactivate those mechanisms, dampening convergence. Some conformist tendencies may remain because people may still draw inferences from each others' choices, for instance concerning the value of charity.

We indeed observe significant behavioral convergence when choices are public and benefits flow to charity. We also find that it is primarily driven by a belief mechanism. Anonymizing choices shuts this mechanism down (which

tells us that it likely involves social signaling or implicit sanctions rather than simple inference). In these respects, our findings are consistent with the perspective generally adopted in the economics literature. The surprise here is that anonymity does *not* attenuate conformity when benefits flow to charity. Although expectations-adjustment effects vanish, gravity effects take their place. A possible explanation for this finding is that the belief mechanism activated by the publicness of choice crowds out the effects of preference mechanisms. We find this explanation plausible. Assuming intrinsic preferences over charitable contributions are relatively weak, people may naturally look to others for indications of what they ought to do. When choices are public, concerns about social image may dominate their attention. When choices are anonymous, attention may simply shift to preference construction, thereby activating a different but equally powerful mechanism.

Next consider the self treatments. Based on the leading economic models of conformity, one would make the following predictions. Assuming people are familiar with the consequences of their choices, settings with anonymous decisions should activate no belief mechanisms, and hence one should observe little or no behavioral convergence. Making choices public could give rise to a degree of conformity if people are concerned with signaling characteristics such as diligence. However, one would expect this effect to be weaker than for decisions with social consequences, which implicate broader signaling objectives and potentially activate mechanisms involving social sanctions.

We indeed find almost no behavioral convergence when choices are private and benefits flow to the participant. Once anonymity is removed, we observe significant convergence. In these respects, our findings are consistent with the perspective generally adopted in the economics literature. Once again, however, there are surprises. First, in the treatment with public choices, we detect strong gravity effects, but no expectations-adjustment effects. It follows that conformity is likely attributable to preference mechanisms rather than belief mechanisms. Second, while there is less convergence in the self-public treatment than in the charity-public treatment, the difference is not dramatic, and in any case it is attributable in large part to the fact that the dispersion of

effort is initially greater when it benefits charity rather than the participant.

An interesting feature of these results is that publicness activates a belief mechanism in the context of choices benefiting charity, but activates a preference mechanism in the context of choices benefiting the participant. The first finding is intuitive (assuming the mechanism involves sanctions or signaling); the second is a bit puzzling. A possible explanation is that the strength of preference mechanisms likely depends on the attention paid to others' choices. When choices benefit a charity, people may attend to each others' choices even when they make decisions anonymously because their initial preferences within that domain are ill-formed, and they are looking for guidance. In contrast, when choices benefit the participant, people may not attend closely to others' choices unless publicness makes them salient.

Finally, consider the group treatments. Based on the leading economic models of conformity, one might expect groups to enforce norms that promote common purpose and thereby ameliorate incentive problems in teams, at least when choices are public. These settings may also activate signaling motives. Thus, one would anticipate observing reasonably strong behavioral convergence driven by belief mechanisms. In fact, conformist tendencies are weaker for tasks that benefit groups than for those that benefit the individual participants. Furthermore, we detect only gravity effects, which points to preference mechanisms rather than belief mechanisms.

Taken together, these results imply that the economics literature has to date focused too narrowly on explanations for conformity involving belief mechanisms. On the one hand, in the setting where we find the strongest conformist tendencies, we detect strong expectations-adjustment effects, which points to belief mechanisms. On the other hand, we observe nearly as much convergence when anonymization of choices deactivates these mechanisms, apparently because preference mechanisms largely take their place. Moreover, in the other two settings where we observe significant behavioral convergence, gravity effects rather than expectations-adjustment effects play the dominant role. Thus, a broad understanding of conformity would appear to require much greater attention to preference mechanisms.

It is worth emphasizing that we have reached this conclusion despite the fact that our experimental setting favors belief mechanisms. We say this because beliefs are initially quite heterogeneous but demonstrably converge within the span of a single session. It is entirely possible that preference effects involving the internalization of others' perspectives evolve over a much longer time frame.

The remainder of this paper is organized as follows. Section 2 lays out a conceptual framework that allows us to state the issues and hypotheses with some precision. Section 3 sets forth our experimental design and describes implementation. Section 4 examines evidence on the degree of convergence to behavioral norms. Section 5 studies convergence of beliefs. We distinguish between expectations-adjustment effects and gravity effects in Section 6. Section 7 concludes.

2 Conceptual framework

The purpose of this section is to provide a more precise understanding of belief mechanisms and preference mechanisms, and to explain how they are linked to expectations-adjustment effects and gravity effects.

2.1 Belief mechanisms and expectations-adjustment effects

We are concerned with modeling the choice of a scalar action $c_i \in C \subseteq R$, where $i \in I$ denotes a particular individual within the social group I. We assume i has preferences corresponding to a utility function $u(c_i, s_i, \tau_i)$, where s_i is social consumption and τ_i is a preference parameter.

Social consumption is not chosen directly. Instead, it depends on how others react to decisions. For expositional simplicity, we write the set of possible relationships between actions and social consumption as $s_i = S(c_i, \theta)$, where $\theta \in \Theta$ is a high-dimensional parameter that encompasses i's understanding of the social situation. To capture uncertainty about the social interaction, we can assume that i's beliefs about θ correspond to some CDF, F_i. In this setting, i's optimal choice solves $\max_c E_{\theta_i} u(c, S(c, \theta_i), \tau_i)$.

What determines social consumption? Each individual $k \in I \backslash i$ has a reaction to i's choice, $r_{ik} = \rho(c_i, \tau_k, \theta_k)$. Notice that we allow the reaction to depend on k's type, as well as k's understanding of the social context. Social consumption is a function of these reactions: $s_i = R(r_{i,-i})$, where $r_{i,-i} \equiv (r_{i,k})_{k \in I \backslash i}$.

In equilibrium, each individual reaches an understanding of the social situation, θ_i^*, that encompasses correct forecasts of others' choices, and that provides an appreciation of the true relationship between actions and social consumption. Accordingly, for all individuals $i \in I$ and actions $c \in C$ we have $S(c, \theta_i^*) = R(\rho(c, \tau_k, \theta_k^*)_{k \neq i})$.[5] Obviously, in the absence of additional assumptions, an equilibrium need not give rise to conformity. That said, standard economic models of conformity are special cases of this framework. Because they generate conformity through equilibration of the belief parameters, we say they involve *belief mechanisms*.

Our interest here lies in what occurs outside of equilibrium. Accordingly, we will assume that each individual makes essentially identical decisions in a sequence of periods, $t = 0, 1, 2, ...$ Choices are publicly observed after each period t – in other words, everyone learns $c_t \equiv (c_{jt})_{j \in I}$. Based on these observations, individual i arrives at beliefs F_{it}, and chooses c_{it} to solve $\max_c E_{\theta_i}^t u(c, S(c, \theta_i), \tau_i)$. We assume that each individual ignores the potential effects of her choices on the evolution of beliefs about the social situation. This assumption is reasonable in most settings with large social groups.

The process governing the evolution of F_{it} is potentially complicated. We cannot simply assume that it involves Bayesian learning because the social situation depends on others' beliefs, and those beliefs evolve simultaneously, rendering any "rational" learning mechanism self-referential. Even so, this class of models generally give rise to *expectations-adjustment effects*, meaning that changes in beliefs ($F_{it} \neq F_{i,t+1}$) cause the changes in actions between periods $t-1$ and t. As long as we measure beliefs directly, we can potentially determine whether expectations-adjustment effects are present and thereby detect the operation of belief mechanisms, even if we do not understand the

[5] In a setting where everyone observes the reactions of individual group members rather than social consumption, one would have a similar condition for each peer.

learning process.

To illustrate, assume for simplicity that θ_{it} represents i's understanding of the social situation in period t. Based on that understanding, he expects to observe a particular distribution of actions among members of his group. Let μ_{it} denote some important characteristic of that distribution such as the mean, and let m_t denote the corresponding characteristic of the realized distribution. Theory tells us that $c_{it} - c_{i,t-1}$ should depend on $\mu_{it} - \mu_{i,t-1}$, because the latter captures one important aspect of the change in beliefs between periods $t-1$ and t. For example, if i expects group members to choose higher values of the action variable in period t than in period $t-1$ ($\mu_{it} > \mu_{i,t-1}$), most models of conformity would imply that i will revise his choice upward.

That said, we cannot draw inferences about the operation of belief mechanisms simply by studying the relationship between $c_{it} - c_{i,t-1}$ and $\mu_{it} - \mu_{i,t-1}$. Contemporaneous correlations between revisions of actions and revisions of beliefs may arise for spurious reasons. For example, they are present in any setting where causality flows from current actions to current beliefs (as would occur if people attributed their own views to others), rather than the other way around.

A better strategy is to examine the relationship between revisions of actions and expectational errors in the previous period. Intuitively, we would expect people to revise beliefs in response to observed errors, creating a strong relationship between $\mu_{it} - \mu_{i,t-1}$ and $m_{i,t-1} - \mu_{i,t-1}$. Indeed, our data bear out that expectation. Furthermore, spurious factors that contribute to the action revision between periods $t-1$ and t, $c_{it} - c_{i,t-1}$, do not plausibly effect the expectational error in period $t-1$, $m_{i,t-1} - \mu_{i,t-1}$. To detect the operation of belief mechanisms, we therefore ask whether behavior changes in response to a "belief gap." Formally, we estimate regressions relating $c_{it} - c_{i,t-1}$ to $m_{i,t-1} - \mu_{i,t-1}$ and other variables. One can think of this as the second stage of an IV regression of $c_{it} - c_{i,t-1}$ on $\mu_{it} - \mu_{i,t-1}$, where $m_{i,t-1} - \mu_{i,t-1}$ serves as the instrument for $\mu_{it} - \mu_{i,t-1}$.

2.2 Preference mechanisms and gravity effects

We now consider an alternative formulation in which i's preferences are given by a utility function $u(c_i, \tau_i, h, w_i)$, where h is a behavioral benchmark, and $w_i \in [0.1]$ is the weight i attaches to that benchmark. For the sake of tractability, we will assume

$$u(c_i, h, \tau_i, w_i) = -w\left(c_i - h\right)^2 - (1 - w_i)\left(c_i - \tau_i\right)^2.$$

Optimization then implies

$$c_i = w_i h + (1 - w_i)\tau_i.$$

In this context, dynamics are driven by changes in the benchmark and changes in the weight. To model these effects, we will suppose that members of the group make a series of independent and otherwise identical decisions in periods $t = 0, 1, 2, ...$ The behavioral benchmark for period t is derived from observations of actions taken in previous periods; accordingly, we write it as h_{t-1}. For example, it might be the average action selected in period $t - 1$. Generally we expect the benchmarks to converge over time to some stable value, h^*. Consistent with the psychological theories mentioned in Section 1, we will assume that the weight placed on the benchmark increases with repeated exposure:[6]

$$w_{it} = (1 - \lambda^t)w^*.$$

Notice that $w_{i0} = 0$, which is appropriate given that there is as yet no benchmark in period 0.

For this model, repetition mechanically produces behavioral convergence among any group with a shared and stable benchmark. Because conformity emerges through a process that homogenizes preferences, we say that it involves a *preference mechanism*.

[6] A feature of this formulation is that the weight increases even when the benchmark changes. As an alternative, one could assume that the weight remains constant, or even decreases, when $h^t \neq h^{t-1}$. Because changes in the benchmark turn out to be small in our experimental setting, the formulation in the text strikes us as most reasonable.

Some algebra reveals that the evolution of i's choices is governed by the following equation:

$$c_{it} - c_{i,t-1} = \eta\left(h_{t-1} - a_{i,t-1}\right) + \kappa_i + \gamma_t, \tag{1}$$

where

$$\eta = 1 - \lambda,$$
$$\kappa_i = (1-\lambda)\left(h^* - \tau_i\right)(1 - w^*), \text{ and}$$
$$\gamma_t = \lambda(1-\lambda^{t-1})w^*\left(h_{t-1} - h_{t-2}\right) - (1-\lambda)\left(h_{t-1} - h^*\right)(1-w^*).$$

In the special case where the benchmark is stable, γ_t vanishes, and this becomes a standard partial adjustment model: i's action converges geometrically at the rate η to its limiting value, $c_i^* = h_{t-1} + \kappa_i/\eta$. We say that this model (and others like it) gives rise to *gravity effects* because repeated exposure to others' choices steadily pulls deviant group members closer to a prevalent mode of behavior irrespective of whether beliefs are accurate.

3 Experimental Design and Implementation

To distinguish between belief mechanisms and preference mechanisms, we designed an experiment that allows us to measure the strength of expectations-adjustment effects and gravity effects. This section summarizes the experiment.

3.1 Common Structure

All sessions share a common structure. Each includes 16 to 22 participants, who independently make a sequence of ten decisions in ten rounds. The rounds are substantively similar, and hence plausibly governed by a single norm, but they are also superficially differentiated. The purpose of the differentiation is to reduce the likelihood that a participant will rigidly adhere to their initial choices. Every decision involves the selection of a number between zero and 35. As explained in detail below, this number represents a provisional commitment to expend effort at the end of the experiment; the greater the number, the greater the effort. We will call this the *intended effort level*.

After making each choice, participants state their beliefs about the median choice of other participants in the same round. These predictions are incentivized; see below for details. We reveal the correct answer at the outset of the next round.[7]

Once the final round is complete, a single round and a single participant are selected at random. The decision of the selected participant in the selected round is implemented. Each participant receives a $20 show-up fee plus any additional payments owed to them according to the rules of their session. We add $3 to the payment of any participant whose stated belief matches the median of other participants' choices in the selected round. Thus, participants have incentives to make decisions that reflect their actual preferences, and to report their beliefs about others' choices truthfully. All participants complete an exit survey, which we use to collect information on various control variables, such as demographics. Participants who are not selected are allowed to leave immediately thereafter, and are not required to wait while the decision of the selected participant is implemented.

By choosing an effort level in a given round, the participant agrees to stay for additional minutes at the end of the study if that decision is implemented. During that time, the participant must sit quietly, awake but doing nothing. To ensure that participants appreciate the tedium of complete inactivity, we require them to "practice" for three minutes prior to the first round. As we discovered, the vast majority of participants find prolonged periods of inactivity unpleasant.[8]

Table 1 shows how effort translates into monetary rewards. (The recipient of the reward varies according to the treatment, as explained in the next subsection.) Participants view the information in this table when making their decisions. Two features of the reward schedule merit emphasis. First, the schedule exhibits decreasing returns to effort. For example, the incremental

[7] In providing information on the median choices made previously by others, we follow Chen et al. (2010).

[8] Wilson et al. (2014) document a strong aversion to inactivity. In one of their experiments, many subject "preferred to administer electric shocks to themselves instead of being left alone with their thoughts."

Table 1: Additional Payoffs

0m=$0.00	6m=$9.42	12m=$13.47	18m=$15.72	24m=$16.41	30m=$16.62
1m=$3.72	7m=$10.22	13m=$13.97	19m=$15.92	25m=$16.47	31m=$16.62
2m=$5.72	8m=$10.97	14m=$14.42	20m=$16.07	26m=$16.52	32m=$16.63
3m=$6.72	9m=$11.67	15m=$14.82	21m=$16.17	27m=$16.56	33m=$16.63
4m=$7.67	10m=$12.32	16m=$15.17	22m=$16.26	28m=$16.59	34m=$16.63
5m=$8.57	11m=$12.92	17m=$15.47	23m=$16.34	29m=$16.61	35m=$16.64

Participants stayed 0 - 35 minutes to earn additional payoffs. This table shows how these additional payoffs varied with the length of time they chose to stay.

reward from waiting is $8.57 for the first five minutes, $3.75 for the second five minutes, $2.50 for the third five minutes, $1.25 for the fourth five minutes, $0.40 for the fifth five minutes, $0.15 for the sixth five minutes, and $0.02 for the seventh five minutes. Our objective in choosing such a schedule was to induce interior choices. Second, none of the payments are round amounts. Through this feature, we ensure that the payments do not render any of the choices particularly salient. Naturally, there is nevertheless some tendency for participants to choose effort levels that are even multiples of five.

Because participants learn something about each others' choices after each round, repeated-game considerations potentially shape behavior. Whether this should be construed as a potential confound is unclear: one view is that this is simply another mechanism that may in some circumstances cause choices to converge to an effective norm. However, our design likely eliminates this possibility, or at least substantially attenuates repeated-game effects, for three reasons. First, participants only learn the median choice of others. Defections from equilibrium choices are detectable only if they cross the median, and often not even then if two or more participants make the median choice. Second, participants complete the experiment only once, and are not allowed to discuss their decisions at any point. Hence it is difficult to see how they could arrive at a cooperative understanding, particularly given the subtle challenges they would face as a consequence of the first point. Third, participants know they will make only ten decisions. Even if they could arrive at a cooperative understanding and sustain an agreement in early rounds, one would

expect to see the agreement break down in the final rounds. Yet we observe no apparent "endgame" effects. Moreover, if cooperation sustains conformity, such effects would produce a pattern opposite the one we observe: conformity should decline in later rounds, not increase.

3.2 Choice Domains

We examine three choice domains, distinguished according to who receives the monetary rewards flowing from the selected participant's effort. In principle, each domain could activate a different set of mechanisms.

In the first domain ("charity"), monetary rewards are donated to Make-A-Wish Foundation, a 501(c)(3) charitable organization. Their website (http://wish.org) describes their activities as follows: "We grant the wishes of children with life-threatening medical conditions to enrich the human experience with hope, strength, and joy." In order to avoid repeating precisely the same decision task every round, we direct the funds toward children in different cities in different rounds. However, to avoid introducing potentially large geographical biases that could disrupt an emerging norm, we use cities in a single state (Texas). In each round, participants respond to a question of the following form:

> How many minutes (X) would you like to stay and earn money for Make-A-Wish Foundation, when any money you earn will be directed towards helping children in [NAME OF CITY]?

From round to round, we change the question only by inserting the name of different cities. The cities named are as follows: Amarillo, Austin, El Paso, Fort Worth, Houston, Irving, Lubbock, Midland, San Antonio, and Tyler.

We note that varying the recipient city across rounds may create an experimenter demand effect; e.g., participants may manufacture responses to the knowledge that funds will benefit children in one city rather than another. However, this possibility is not problematic for our purposes. At most, the effect of manufactured city-specific preferences would be to introduce round-specific level effects across participants, plus noise; we make inferences about conformity from other patterns. We are more concerned that feedback about

others' choices might produce conformity as an experimenter demand effect. From that perspective, superficial variation in the context of the donation may redirect demand effects in an innocuous direction.

In the second domain ("self"), monetary rewards are added to the participant's compensation. In each round, participants respond to the following question:

> How many minutes (X) would you like to stay and earn money for yourself, if this is the selected round?

In this case, the decision does not change from round to round. However, we introduce superficial distinctions by informing participants that we will make a fixed donation to Make-A-Wish Foundation if the round is selected, with the city of the recipients differing precisely as in the charity treatment. Specifically, participants receive the following message:

> If this turns out to be the selected round, the study leader will donate $10 to Make-A-Wish Foundation towards helping children in [NAME OF CITY].

The donation is of course unrelated to the participant's decision, but changing the named city alters the contextual framing of a participant's choice, and therefore nudges the participant to revisit her thinking. We use this particular strategy for introducing superficial differentiation across rounds because, to some degree, it homogenizes the contextual framing of decisions across choice domains.

In the third domain ("group"), monetary rewards are added to the compensation of everyone participating in the session. In each round, participants respond to the following question:

> How many minutes (X) would you like to stay and earn money for everyone, if this is the selected round and you are the selected participant?

To be clear, every member of the group receives the reward listed in Table 1; that amount is not divided between them. Also, members are paid immediately upon completing their portion of the experiment based on the promise

made by the selected participant; their payment is not conditional upon that participant's actual performance (which would require them to wait as well).[9] All other features of these sessions (including the donation framing) are identical to those of the sessions involving rewards to self.

3.3 Publicness and Privateness

The second dimension along which sessions differ concerns the degree of anonymity provided to participants concerning their decisions. Comparisons across this dimension allow us to evaluate the importance of an audience in determining the degree and nature of conformity.

Some sessions involve public revelation of participant-level choices made in the selected round; we call these "public" sessions (even though choices made in all other rounds remain private). Once all ten rounds are complete and one round is selected at random, participants prominently reveal their choice for that round to other participants through the following procedure. First, they write the number of minutes they selected (0 to 35) on a name tag, and affix the tag in a visible location on their shirt or jacket. The study leader monitors this process to ensure accurate compliance. She then asks the participants to come to the front of the room in groups according to the numbers on their tags, beginning with those who wrote zero and progressing incrementally to those who wrote 35. Participants line up in order, with those choosing the lowest effort level at one end, and those choosing the highest at the other. One participant is then selected at random, and her decision is implemented.

Other sessions involve no revelation of participant-level choices; we call these "private" sessions. Practically speaking, we simply skip the revelation procedure described above.

We study public treatments for all three choice domains, and private treatments for the charity and self domains. Accordingly, our experiment consists of five main treatments. Because the public-group treatment yielded only modest behavioral convergence and no evidence of belief mechanisms, we did not

[9] In fact, none of the selected subjects attempted to leave before waiting for the amount of time they specified.

field a private-group treatment, in which these tendencies would presumably have been even weaker.

3.4 Feedback

All of the five main treatments described above have the feature that participants learn the median choice made by others after the end of each round. To the extent we observe behavioral convergence, we attribute it to this feedback. However, other features of this environment could in principle produce convergence for reasons that have nothing to do with conformity. For instance, imagine that each subject i has an ideal effort level, E_i, that is fixed over rounds, but that requires thought to assess. In the first round, after minimal thought, i chooses $E_i + \epsilon_i$, where ϵ_i is random noise; subsequently, in round r, as the result of further contemplation, i chooses $E_i + \theta(r)\epsilon_i$, where $\theta(r)$ is decreasing in r. Assuming E_i and ϵ_i are uncorrelated, one would then observe a decline in the cross-subject variance of choices as subjects proceed from one round to the next, which one could misinterpret as conformity.

To rule out these types of spurious possibilities, we also study a supplemental treatment with no feedback, wherein subjects learn nothing about others' choices in previous rounds. We focus on the setting that generates the most conformity: public choices with benefits to charity. As reported below, our results show that no convergence is detectable without feedback. Thus, any convergence observed in the corresponding sessions with feedback is plainly a consequence of the feedback. While we did not confirm that this same result obtains for the other settings, we see no reason to anticipate that they would be any different.

3.5 Implementation

We ran two sessions for each of the five treatments involving feedback, and one session for the single no-feedback treatment. Each session involved 16 to 22 participants. Thus our experiment consisted of 11 sessions involving a total of 214 participants, distributed across the treatments as follows: Charity-Public-Feedback (n=40), Charity-Private-Feedback (n=40), Self-Public-Feedback (n=40), Self-Private-Feedback (n=36), Group-Public-Feedback (n=40), and Charity-

Public-No-Feedback (n=16).

When studying group interactions, it is sometimes necessary to examine a reasonably large number of groups per treatment. For example, that is typically the case when one is studying group-level outcomes, such as negotiated choices, for which each session provides only a single observation. In contrast, we focus on participants' independent responses to information about the group. Thus it is the number of participants, rather that the number of groups, that is pertinent for analysis.

We close this section with a few logistical details. We conducted the experiment at the Stanford Economics Research Laboratory (SERL) within the guidelines of an IRB-approved human subjects protocol. Participants' instructions appear in the Appendix C. Prior to the first round of decision making, the study leader distributed printed copies to all participants, and then read them out loud. The instructions informed participants of all consequential design features. Each participant had to correctly answer several questions that gauged her understanding of the experimental design before proceeding. Participants made all other responses using a computer interface programmed in Z-tree (Fischbacher, 2007).

4 Convergence of Choices

As a threshold question, we begin by asking whether choices change meaningfully from one round to the next, given that the decision problems differ only superficially across rounds. Table 2 provides descriptive statistics on these changes for each treatment. For each participant i and each round t (other than the first), we compute the difference between the effort level chosen in that round and the previous one, denoted $\Delta c_{i,t} \equiv c_{i,t} - c_{i,t-1}$. The table reports the fraction of choices for which the change is non-zero, and breaks those down between increases and decreases. It also reports the average changes, denoted $\overline{\Delta c_{i,t}}$, among those for whom the intended effort increased, and among those for whom it decreased. In addition to pooling across all rounds, these statistics are presented separately for round 2 (the first possible change), rounds 3 through 6 (the next four), and rounds 7 through 10 (the last four).

Table 2: Descriptive Statistics on Change in Choices $\Delta c_{i,t}$

	Round t:							
	All	2	3-6	7-10	All	2	3-6	7-10
	Charity-Public-Feedback				Charity-Private-Feedback			
Fraction of $\Delta c_{i,t} \neq 0$	0.26	0.55	0.29	0.17	0.23	0.45	0.26	0.16
Fraction of $\Delta c_{i,t} < 0$	0.14	0.33	0.16	0.08	0.13	0.20	0.15	0.09
Fraction of $\Delta c_{i,t} > 0$	0.12	0.23	0.12	0.09	0.11	0.25	0.11	0.07
$\overline{\Delta c_{i,t}}$ given $\Delta c_{i,t} < 0$	-3.44	-4.62	-3.04	-3.08	-4.37	-6.50	-4.04	-3.71
$\overline{\Delta c_{i,t}}$ given $\Delta c_{i,t} > 0$	2.60	3.11	2.25	2.79	3.47	3.10	2.88	4.73
N	360	40	160	160	360	40	160	160
	Self-Public-Feedback				Self-Private-Feedback			
Fraction of $\Delta c_{i,t} \neq 0$	0.18	0.30	0.19	0.14	0.12	0.39	0.11	0.06
Fraction of $\Delta c_{i,t} < 0$	0.08	0.10	0.09	0.06	0.05	0.08	0.06	0.02
Fraction of $\Delta c_{i,t} > 0$	0.10	0.20	0.09	0.08	0.07	0.31	0.05	0.03
$\overline{\Delta c_{i,t}}$ given $\Delta c_{i,t} < 0$	-4.66	-6.00	-3.67	-5.60	-2.67	-1.00	-3.44	-2.00
$\overline{\Delta c_{i,t}}$ given $\Delta c_{i,t} > 0$	3.69	5.00	3.00	3.69	2.35	2.55	2.86	1.20
N	360	40	160	160	324	36	144	144
	Group-Public-Feedback				Charity-Public-No-Feedback			
Fraction of $\Delta c_{i,t} \neq 0$	0.29	0.40	0.33	0.23	0.40	0.56	0.42	0.34
Fraction of $\Delta c_{i,t} < 0$	0.15	0.15	0.18	0.12	0.22	0.19	0.23	0.22
Fraction of $\Delta c_{i,t} > 0$	0.14	0.25	0.15	0.11	0.18	0.38	0.19	0.12
$\overline{\Delta c_{i,t}}$ given $\Delta c_{i,t} < 0$	-2.96	-3.83	-2.66	-3.15	-5.81	-5.00	-5.53	-6.29
$\overline{\Delta c_{i,t}}$ given $\Delta c_{i,t} > 0$	2.78	3.30	2.46	2.94	5.73	3.33	4.17	9.88
N	360	40	160	160	144	16	64	64

Data on individual i – round t level, where $c_{i,t} \equiv i$'s choice in round t, and $\Delta c_{i,t} \equiv c_{i,t} - c_{i,t-1}$.

The most important message emerging from this table is that changes are reasonably frequent and substantial. Focusing on public treatments with feedback, the overall frequency of changes is highest in the Group domain (29%), and only slightly lower in the Charity domain (26%). Even in the Self domain, changes occur with reasonably high frequency (18%). To gauge the magnitudes of the average changes, it is useful to bear in mind that intended effort levels averaged between 7 and 17 minutes, depending on the session and round (see Appendix Table A.1). In comparison, the absolute values of the changes, which fall between 2.35 and 5.81 minutes, are quite large. Plainly, there is something substantial here to analyze.

Several other patterns are notable. First, privateness lowers the frequency

of changes, though not dramatically, from 26% to 23% in the Charity domain, and from 18% to 12% in the Self domain. This finding is consistent with the view that some changes in behavior are connected to the observability of choice. Second, in all treatments, the frequency of changes starts out quite high, but then declines sharply across rounds – e.g., from an initial level of 55% to 17% in the final four rounds for the Charity-Public-Feedback treatment. That pattern is consistent with the development of norms, but it could also arise for other reasons (e.g., if a participant's views "settle down" with continued consideration). Conditional on observing a change, there is no tendency for the average magnitudes of the change to decline across rounds. Third, focusing on public charitable decisions, the overall frequency of changes was higher in the absence of feedback (40% versus 26%); it started out about the same (56% versus 55%), which is a bit of a surprise, but did not decline as rapidly, and ended up twice as high (34% versus 17%). Unlike the absolute decline, this differential decline cannot be attributed to participants' views settling down, but rather is an indication that the emergence of a norm helps stabilize choices. Finally, the changes are fairly symmetric. As a result, mean and median choices were reasonably stable within sessions. That said, the mean effort level declined noticeably for all five Charity sessions, particularly in the session with no feedback (which is inconsistent with the view that the decline is an endgame phenomenon in a repeated game). For round-by-round statistics, see Appendix Tables A.1 (for means) and A.2 (for medians).

As a second threshold question, we ask whether effort levels tend to move in the direction of the median choice made by other participants in the preceding round (which participants observe in all Feedback sessions). Accordingly, we define a new variable, $cgap_{i,t-1} = c^{\text{med}}_{i,t-1} - c_{i,t-1}$, as the difference between the median choice of participants other than i and i's choice in round $t-1$. Thus, when $cgap_{i,t-1} > 0$, i's choice is below the median of others' choices; conversely when $cgap_{i,t-1} < 0$. For Table 3, we classify each participant-round pair $(i, t-1)$ for $t \in 2, ..., 10$, according to whether $cgap_{i,t-1}$ is positive, negative, or zero. Then, for each of these three groups, we pool across rounds, and calculate the fractions of cases in which the participant increased, decreased, or maintained

her effort level in the next round (i.e., $\Delta c_{i,t} > 0$, $\Delta c_{i,t} < 0$, or $\Delta c_{i,t} = 0$). Generally, we find that the frequency with which participants increase their intended effort levels in the next round is lower, and the frequency with which they reduce it is higher, when their previous effort level is above, rather than below, the median choice made by others. More precisely, for those with $cgap_{i,t-1} < 0$, we find a higher frequency of $\Delta c_{i,t} < 0$ and a lower frequency of $\Delta c_{i,t} > 0$ than for those with $cgap_{i,t-1} > 0$.

Table 3: Descriptive Statistics on Change in Choices $\Delta c_{i,t}$, relative to Choice Gap $cgap_{i,t-1}$

	Sample restricted to:					
	$cgap_{i,t-1} = 0$	$cgap_{i,t-1} < 0$	$cgap_{i,t-1} > 0$	$cgap_{i,t-1} = 0$	$cgap_{i,t-1} < 0$	$cgap_{i,t-1} > 0$
	Charity-Public-Feedback			Charity-Private-Feedback		
Fraction of $\Delta c_{i,t} = 0$	0.81	0.67	0.77	0.80	0.73	0.79
Fraction of $\Delta c_{i,t} < 0$	0.10	0.23	0.08	0.02	0.23	0.07
Fraction of $\Delta c_{i,t} > 0$	0.09	0.10	0.15	0.18	0.04	0.14
N	67	150	143	50	148	162
	Self-Public-Feedback			Self-Private-Feedback		
Fraction of $\Delta c_{i,t} = 0$	0.96	0.77	0.70	0.96	0.95	0.76
Fraction of $\Delta c_{i,t} < 0$	0.01	0.17	0.08	0.03	0.04	0.07
Fraction of $\Delta c_{i,t} > 0$	0.03	0.06	0.22	0.01	0.01	0.17
N	132	113	115	67	141	116
	Group-Public-Feedback			Charity-Public-No-Feedback		
Fraction of $\Delta c_{i,t} = 0$	0.83	0.70	0.69	0.57	0.60	0.60
Fraction of $\Delta c_{i,t} < 0$	0.04	0.21	0.11	0.00	0.32	0.17
Fraction of $\Delta c_{i,t} > 0$	0.13	0.08	0.20	0.43	0.08	0.23
N	23	168	169	14	65	65

Data on individual i – round t level, where $c_{i,t} \equiv i$'s choice in round t, $c_{i,t}^{\text{med}} \equiv i$'s actual median in round t, $\Delta c_{i,t} \equiv c_{i,t} - c_{i,t-1}$, and $cgap_{i,t-1} \equiv c_{i,t-1}^{\text{med}} - c_{i,t-1}$.

It is important to understand that the pattern discussed in the previous paragraph does not establish the existence of conformism. It is consistent with conformism, but there are other possible explanations. When a participant's intended effort level is higher than the median for others, it is also probably high relative to that participant's own average. As a result, regression to the mean can create the impression that participants tend to move toward others' choices. Plainly, this must be part of the explanation for the patterns noted in Table 3, because they are also present in the No Feedback treatment,

where conformism is infeasible. However, it is likely not the entire explanation. Notice that, in all the sessions with feedback, the fraction of individuals who left their intended effort level unchanged was higher when their previous choice coincided with the median for others, than when their previous choice was either higher or lower than the median for others. For example, in the Self-Public-Feedback treatment, the fraction of participants with $\Delta c_{i,t} = 0$ was 96% among those whose previous choice coincided with the median for others, compared with 77% when it was higher and 70% when it was lower. Significantly, participants in the corresponding No-Feedback treatment did not exhibit this pattern.[10] These findings suggest that participants are more comfortable with their own selection if they know it matches others' choices.

If the tendency to move toward the median choice made by others in the previous round is driven by conformism, then the dispersion of choices should decline across rounds. Table 4 reports some simple regressions designed to detect this pattern. For the dependent variables, we use two measures of dispersion, $cgap_{i,t}^2$ and $|cgap_{i,t}|$. For the first and third regressions shown in each block, we regress dispersion on t, the round. A shortcoming of this linear specification is that it is unable to capture convergence to an asymptote; indeed, if taken literally, it could imply that $cgap_{i,t}^2$ or $|cgap_{i,t}|$ would eventually become negative, which is infeasible. Accordingly, for the second and fourth regressions in each block, we regress dispersion on $\frac{1}{t}$ (which means convergence entails a positive coefficient instead of a negative one). For all regression results reported in this study, we cluster standard errors at the participant level.

Beginning with the Charity-Public-Feedback treatment, all four specifications imply an economically and statistically significant degree of convergence among choices. The positive constant terms in the regressions that control for $\frac{1}{t}$ reflect the fact that convergence is not complete. Notably, evidence of convergence vanishes completely in the absence of feedback; see in particular the

[10] Indeed, conditional on observing $cgap_{i,t-1} = 0$, the fraction of participants with $\Delta c_{i,t} = 0$ is 0.235 higher in the Charity-Public-Feedback session than in the Charity-Public-No Feedback session. We reject equality of these fractions ($p = 0.059$) even though the number of observations in the latter treatment with $cgap_{i,t-1} = 0$ is relatively small.

results for the Charity-Public-No-Feedback treatment.[11] While we do not find this surprising, the comparison of the Feedback and No Feedback treatments is important because it links the dynamics of behavioral convergence, and hence the emergence of a norm, to the availability of aggregated information concerning the recent choices of peers.

Table 4: OLS of $cgap^2_{i,t}$ or $|cgap_{i,t}|$ on t or $\frac{1}{t}$

	Dependent Variable is							
	$cgap^2_{i,t}$	$cgap^2_{i,t}$	$\|cgap_{i,t}\|$	$\|cgap_{i,t}\|$	$cgap^2_{i,t}$	$cgap^2_{i,t}$	$\|cgap_{i,t}\|$	$\|cgap_{i,t}\|$
	Charity-Public-Feedback				Charity-Private-Feedback			
t	-1.88**		-0.13***		-2.37*		-0.14**	
	(0.75)		(0.04)		(1.38)		(0.06)	
$\frac{1}{t}$		32.40**		2.01***		41.45**		2.74***
		(13.44)		(0.52)		(18.55)		(0.80)
constant	80.06***	60.25**	6.14***	4.83***	58.12***	32.97***	6.09***	4.53***
	(27.76)	(27.07)	(1.01)	(0.99)	(12.86)	(8.04)	(0.66)	(0.63)
N	400	400	400	400	400	400	400	400
	Self-Public-Feedback				Self-Private-Feedback			
t	-1.76*		-0.12**		-0.18		-0.03	
	(0.97)		(0.05)		(0.18)		(0.02)	
$\frac{1}{t}$		20.91		1.50**		3.43		0.50*
		(13.62)		(0.70)		(2.25)		(0.27)
constant	50.02***	34.23***	4.66***	3.59***	29.43***	27.43***	3.95***	3.64***
	(14.87)	(12.44)	(0.80)	(0.78)	(7.26)	(7.27)	(0.61)	(0.64)
N	400	400	400	400	360	360	360	360
	Group-Public-Feedback				Charity-Public-No-Feedback			
t	-1.45*		-0.10**		0.72		-0.01	
	(0.73)		(0.04)		(1.39)		(0.08)	
$\frac{1}{t}$		11.17**		1.01***		-23.93		-0.53
		(5.20)		(0.36)		(23.22)		(1.32)
constant	43.28***	32.06***	4.97***	4.11***	77.27**	88.23*	6.50***	6.62***
	(13.26)	(10.28)	(0.69)	(0.56)	(30.17)	(41.95)	(1.26)	(1.56)
N	400	400	400	400	160	160	160	160

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Standard errors are clustered at the individual level and shown in parentheses. Results from OLS regressions of : (1) $cgap^2_{i,t} = \beta_0 + \beta_1 t + \epsilon_i$, (2) $cgap^2_{i,t} = \beta_0 + \beta_1 \frac{1}{t} + \epsilon_i$, (3) $|cgap_{i,t}| = \beta_0 + \beta_1 t + \epsilon_i$, and (4) $|cgap_{i,t}| = \beta_0 + \beta_1 \frac{1}{t} + \epsilon_i$, where $cgap^2_{i,t} \equiv (c^{\text{med}}_{i,t} - c_{i,t})^2$, and $|cgap_{i,t}| \equiv |c^{\text{med}}_{i,t} - c_{i,t}|$. The data are from rounds 1-10 for the participants in the indicated treatment group.

[11] Notice that our finding for the Charity-Public-No-Feedback treatment allows us to rule out a wide variety of confounds; e.g., that apparent convergence might be attributable to the particular order in which cities are presented.

In light of previous findings such as those in Andreoni and Bernheim (2009) and Fehr and Fischbacher (2004), it is natural to suspect that the conformism mentioned in the previous paragraph is attributable to belief mechanisms involving image concerns or social sanctions. And yet, according to Table 4, the Charity-Private-Feedback treatment exhibits essentially the same degree of convergence as the Charity-Public-Feedback treatment. This finding would appear to support theories of conformity based either on preference mechanisms or on belief mechanisms wherein people infer the intrinsic benefits of particular alternatives from others' choices. Consistent with this possibility, mean effort levels are no higher in the Charity-Public-Feedback treatment than in the Charity-Private-Feedback treatment (see Appendix Table A.1). However, we will see in Section 6 that matters are more subtle: it appears that anonymizing choices deactivates a belief mechanism while strengthening a preference mechanism.

Turning next to the Self-Public-Feedback treatment, we also see an economically and (in three of the four specifications) statistically significant degree of convergence among choices. The estimated degree of convergence is lower than for the Charity-Public-Feedback treatment, but the differences are not dramatic, particularly given the level of statistical precision. Notably, switching from public to private choices in the Self domain dramatically attenuates convergence. We do not observe economically nor (except for in one of the four specifications) statistically significant evidence for convergence in the Self-Private-Feedback treatment. We find this result surprising in light of the fact that no such attenuation is observed in the Charity domain, where theories of conformity involving signaling and/or social sanctions are more intuitively compelling. One possibility is that people place a high value on signaling some socially desirable characteristic such as diligence; another is that publicness focuses attention on peers, thereby increasing the salience of their choices in the process of preference construction. As we will see in Section 5, an analysis of choice dynamics casts doubt on the first of these explanations, as well as any other mechanism wherein behavioral convergence would be driven by the evolution of beliefs about peers.

Finally, we turn to the Group-Public-Feedback treatment. This domain potentially activates many of the same mechanisms at work in both the Charity and Self domains. To the extent these mechanisms reinforce each other, we would expect to observe an even greater overall degree of behavioral convergence. An economically and statistically significant degree of convergence among choices is indeed discernible here as well, but to our surprise it is smaller than in the other domains.

In summary, we observe conformity in all choice domains when decisions are public. However, the domain matters less than one may expect, and in ways that are counterintuitive if choices are driven solely by self-image concerns or community sanctions. Anonymizing choices disrupts convergence in the Self domain, but has essentially no effect in the Charity domain.[12] These patterns suggest to us that conformity may be a multifaceted phenomenon, and that it may be traceable to different mechanisms in different contexts. Further investigation of the mechanisms is clearly warranted, and it is to that task that we turn next.

5 Convergence of beliefs

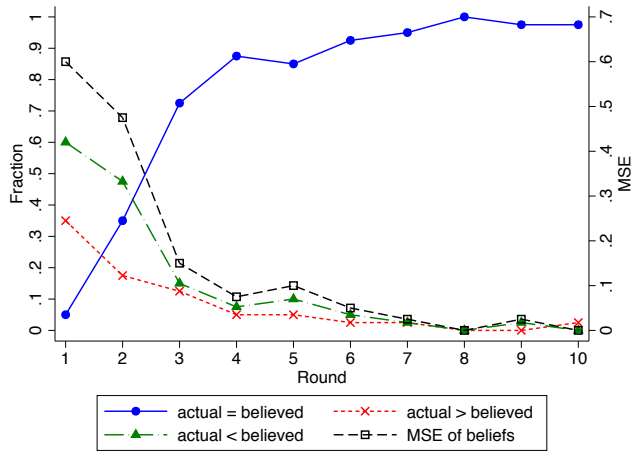
As discussed in Section 2, theories of conformity featuring belief mechanisms have the implication that behavior evolves along with beliefs and stabilizes once beliefs converge. Accordingly, in the section we examine the trajectory of beliefs to determine whether they converge to the truth, and, if so, how fast.

In all of the treatments with feedback, participants largely converged to correct beliefs rather quickly. Figure 1 illustrates this finding for the Charity-Public-Feedback treatment. In the first round, only 5% of participants held correct beliefs. This fraction jumped to 35% in the second round, more than 72.5% in the third, and nearly 87.5% in the fourth. Convergence continued through the eighth round; in the last few rounds, incorrect beliefs occurred less than 3% of the time. The figure also shows the mean-squared error (MSE)

[12] All of these patterns are also apparent in Appendix Table A.3, which shows how the variance of choices changed from one round to the next during each session.

of beliefs, which paints the same picture. Errors were initially skewed toward crediting others with too much generosity, but became roughly symmetric by the third round.

Figure 1: Public-Charity-Feedback Treatment: Beliefs

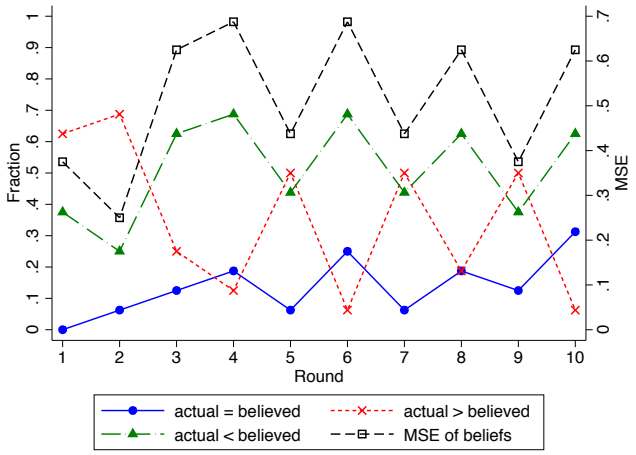


The data are from rounds 1-10 for the participants in the Public-Charity-Feedback treatment. The left y-axis displays the fraction of participants with beliefs that were equal to, greater than, or less than the median choice made by others. The right y-axis displays the mean-squared error (MSE) of beliefs.

Not surprisingly, the convergence of beliefs observed in Figure 1 is a direct consequence of feedback. A much different picture emerges when no feedback is provided. Figure 2 shows the same outcome measures for the Charity-Public-No-Feedback treatment. Curiously, the fraction of participants with correct beliefs does rise a bit over the course of the experiment, but the MSE does not decline.

Corresponding figures for the other treatments appear in the Appendix Figures B.1- B.4. We observe qualitatively similar patterns for all treatments with Feedback. The degree and speed of convergence are somewhat less striking in Private than in Public treatments for both the Charity and Self domains, and in the Group-Public-Feedback treatment. To some degree, these differences are likely attributable to the fact that the median choice was more stable

Figure 2: Public-Charity-No-Feedback Treatment: Beliefs



The data are from rounds 1-10 for the participants in the Public-Charity-No Feedback treatment. The left y-axis displays the fraction of participants with beliefs that were equal to, greater than, or less than the median choice made by others. The right y-axis displays the mean-squared error (MSE) of beliefs.

across rounds in some treatments than in others; changes in the median from round to round render the prediction task more difficult.

To evaluate whether there are economically meaningful differences in learning across treatments, we estimate some simple partial-adjustment models of belief formation. Let $b_{i,t}$ denote a participant i's belief about the median choice made by others in round t, and let $\Delta b_{i,t} = b_{i,t} - b_{i,t-1}$. We will use $bgap_{i,t} = c_{i,t}^{\text{med}} - b_{i,t}$. The partial-adjustment model takes the following form:

$$\Delta b_{i,t} = \beta_0 + \beta_1 bgap_{i,t-1} + \epsilon_i.$$

At one extreme, $\beta_1 = 1$ (along with $\beta_0 = 0$) implies that participants immediately adjust their beliefs to match the previous period's outcome; at the other extreme, $\beta_1 = 0$ implies no adjustment. Results appear in Table 5. One is immediately struck by the tight clustering of estimates for the three Public-Feedback treatments: β_1 is 0.86 for the Charity domain, 0.86 for the

Self domain, and 0.87 for the Group domain. These values plainly imply rapid convergence. The adjustment parameters are a bit lower for the two private treatments, but the differences are not statistically significant.[13]

In contrast, β_1 is much lower (0.24) for the Charity-Public-No-Feedback treatment. Even so, we strongly reject the hypothesis that it is zero. This surprising finding sounds an important cautionary note: beliefs (and hence choices) may converge to some degree over time for reasons that have nothing to do with norms and conformity. For example, participants' initial reactions to any new decision problem may be idiosyncratic, and hence more diverse than the outlooks to which they converge after they have had more time to think.

Table 5: OLS of $\Delta b_{i,t}$ on $bgap_{i,t-1}$

	Dependent Variable is $bgap_{i,t-1}$					
	Public Charity Feedback	Private Charity Feedback	Public Self Feedback	Private Self Feedback	Public Group Feedback	Public Charity No-Feedback
$bgap_{i,t-1}$	0.86***	0.74***	0.86***	0.81***	0.87***	0.24***
	(0.09)	(0.08)	(0.06)	(0.05)	(0.05)	(0.07)
constant	-0.01	-0.05	0.04	-0.02	0.07*	0.24
	(0.11)	(0.12)	(0.08)	(0.03)	(0.04)	(0.29)
N	360	360	360	324	360	144

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Standard errors are clustered at the individual level and shown in parentheses. Results from OLS regressions of $\Delta b_{i,t} = \beta_0 + \beta_1 bgap_{i,t-1} + \epsilon_i$, where $\Delta b_{i,t} = b_{i,t} - b_{i,t-1}$ and $bgap_{i,t} = c_{i,t}^{\text{med}} - b_{i,t}$. The data are from rounds 2-10 for the participants in the indicated treatment groups.

6 Expectations-Adjustment Effects versus Gravity Effects

We turn next to the paper's main objective: determining whether conformity is primarily attributable to belief mechanisms or preference mechanisms.

[13] Specifically, based on a Wald test, one does not reject the hypothesis that the relationship is identical for the five Feedback treatments ($p = 0.6619$).

Our strategy is to estimate regressions of the form

$$\Delta c_{i,t} = \beta_0 + \beta_1 bgap_{i,t-1} + \beta_2 cgap_{i,t-1} + (controls) + \varepsilon_{i,t} \tag{2}$$

One can think of this specification as equation (1) under the assumption that the median choice in each period becomes the behavioral benchmark for the following period. Following the logic of Section 2.1, we have also augmented that equation with the variable $bgap_{i,t-1}$ to allow for expectation-adjustment effects. In effect, we run a "horse race" between $bgap_{i,t-1}$ and $cgap_{i,t-1}$ to determine whether exception-adjustment effects, gravity effects, or both govern the evolution of choices.

One possibility is to estimate (2) with no additional controls. The virtue of this approach is that it parameterizes both effects with comparable parsimony, which makes for a fair horse race. Adding individual and round-specific controls improves the match between equation (2) and equation (1), but then the data may appear to favor gravity effects simply because they are specified more flexibly. Our solution is to examine multiple specifications. Our basic specification regresses $\Delta c_{i,t}$ on $bgap_{i,t-1}$, $cgap_{i,t-1}$, a session fixed effect, and a constant. We then add controls for participant characteristics and round-specific fixed effects.[14]

A limitation of our specification is that it only captures expectations-adjustment effects pertaining to the median choice. Changes in other features of the belief distribution may also be relevant. For example, even when $bgap_{i,t} = 0$, subsequent realizations may convey information that increases the participant's confidence in her prediction. In that case, a belief-based mechanism could cause further migration of $c_{i,t}$ toward c_{it}^{med} even after beliefs concerning the median converge. Thus, in settings where we find evidence of expectation-adjustment effects ($\beta_1 > 0$), it is possible that some portion of β_2 also involves an expectation-adjustment effect, rather than a gravity effect. That said, we are not concerned that expectation-adjustment effects

[14] Consistent with equation (1), we include fixed effects for all rounds in which $h_{t-1} \neq h_{t-2}$ or $h_{t-1}, h_{t-2} \neq h^*$. Including a complete set of round-specific fixed effects generally yields similar results.

contaminate β_2 when $\beta_1 = 0$: the possibility that belief mechanisms would generate expectations-adjustment effects involving precision but not involving the median is implausible.

One could also address this issue by supplementing the specification with a measure of the change in the participant's confidence in his or her prediction. Reliably eliciting this type of information through an incentive-compatible procedure can be challenging. Instead, we use the change in the dispersion of predictions across the session's participants, $\sigma_{b,t} - \sigma_{b,t-1}$, as proxy for the change in confidence. Our reasoning is that greater diffusion of beliefs indicates that the participants have formed their beliefs based on less informative signals, which implies that they should hold those beliefs with less confidence. We interact this variable with $cgap_{i,t-1}$ so that an increase in confidence can draw the participants toward the behavioral norm. This is not an ideal solution because, as noted previously, contemporaneous beliefs are potentially endogenous: if people base their beliefs on their actions, a reduction in the dispersion of choices may cause a reduction in the dispersion of predictions. However, endogeneity would lead to an overstatement of expectation-adjustment effects involving degrees of confidence. Critically, one cannot attribute the *absence* of a measured effect to endogeneity.

6.1 Treatments in which benefits flow to charity

Results for the Charity-Public-Feedback and Charity-Private-Feedback treatments appear in Table 6. The first six columns report regressions of $\Delta c_{i,t}$ on $bgap_{i,t-1}$ and $cgap_{i,t-1}$, without other controls. Columns (1) and (2) pool data across all sessions. For (1), we use all of the data; for (2) we exclude participants who never changed their intended effort level (our object being to make inferences about the nature of conformity from the behavior of those who actually conform to some degree). Columns (3) and (4) are identical to (1) and (2) except that they only use data from the first session; similarly, columns (5) and (6) only use data from the second session. Columns (7) and (8) augment the regressions in column (1) and (2) with additional controls for individual characteristics. Columns (9) and (10) include round fixed effects,

while columns (11) and (12) add our proxy for confidence in the predictions.

For the Charity-Public-Feedback treatment, we find strong and robust evidence for an expectations-adjustment effect, and comparatively weaker evidence for a gravity effect (see the first panel in Table 6). In column (1), the coefficient of $bgap_{i,t-1}$ is highly statistically significant. Its magnitude implies that, if a participant's beliefs are off by five minutes, she subsequently changes her intended effort level in the direction of the previous median for others by, on average, just over one minute. This is an economically substantial response. In comparison, the coefficient of $cgap_{i,t-1}$ is much smaller and only marginally significant. Its magnitude implies that, if a participant's choice differs from the median for others by five minutes, she subsequently changes her intended effort level in the direction of the previous median for others by, on average, roughly 10 seconds. Not surprisingly, both effects are noticeably stronger among participants who vary their effort levels (column (2)). Reassuringly, the same pattern emerges in each session (columns (3) through (6)), though of course standard errors are larger for these specifications. Adding other control variables (columns (7) and (8)) and round fixed effects (columns (9) and (10)) has little effect on our conclusions. Including an interaction between $cgap_{i,t-1}$ and our confidence proxy reduces the size and statistical significance of the coefficient for *bgap*. However, the coefficients for the two belief-mechanism variables remain *jointly* significant ($p = 0.011$ in column (11) and $p = 0.001$ in column (12)); they simply divide up the expectations-adjustment effect. The estimated gravity effect shrinks, but this may reflect endogeneity of the confidence proxy.

We know from the results in Section 4 that anonymizing choice does not reduce the degree of conformity observed in the Charity domain. This finding suggests that the mechanism at work in this domain is not audience-dependent, and hence that we will observe the same mix of expectation-adjustment and gravity effects in the Charity-Private-Feedback treatment as in the Charity-Public-Feedback treatment. That conjecture proves false. Instead, anonymization appears to shut down a mechanism involving expectation-adjustment effects, and to enable or strengthen a mechanism involving gravity effects. Possi-

Table 6: OLS of $\Delta c_{i,t}$ on $bgap_{i,t-1}$ and $cgap_{i,t-1}$

	Dependent Variable is $\Delta c_{i,t}$											
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	A: Public-Charity-Feedback											
$bgap_{i,t-1}$	0.22***	0.34***	0.20**	0.29**	0.25**	0.42**	0.22***	0.33***	0.20***	0.33***	0.14*	0.19
	(0.07)	(0.10)	(0.09)	(0.13)	(0.11)	(0.17)	(0.08)	(0.10)	(0.07)	(0.11)	(0.07)	(0.13)
$cgap_{i,t-1}$	0.03*	0.14***	0.04	0.19***	0.02	0.09***	0.04**	0.16***	0.03*	0.13***	0.02	0.10**
	(0.02)	(0.03)	(0.03)	(0.05)	(0.02)	(0.02)	(0.02)	(0.03)	(0.02)	(0.03)	(0.01)	(0.04)
$cgap_{i,t-1} * (\sigma_{b,t} - \sigma_{b,t-1})$											-0.03	-0.06*
											(0.02)	(0.03)
constant	0.08	0.42*	-0.12	-0.25	0.07	0.34*	-2.55	0.25	-0.02	-0.00	0.04	0.31
	(0.08)	(0.22)	(0.14)	(0.23)	(0.08)	(0.18)	(3.07)	(6.83)	(0.10)	(0.17)	(0.08)	(0.21)
N	360	234	198	144	162	90	360	234	360	234	360	234
	B: Private-Charity-Feedback											
$bgap_{i,t-1}$	0.04	-0.00	0.07	0.03	-0.01	-0.04	0.03	-0.01	0.08	0.05	0.00	-0.03
	(0.08)	(0.14)	(0.10)	(0.20)	(0.12)	(0.22)	(0.08)	(0.15)	(0.09)	(0.15)	(0.08)	(0.13)
$cgap_{i,t-1}$	0.09**	0.22**	0.07	0.19*	0.14*	0.27*	0.10**	0.27***	0.08*	0.20**	0.07*	0.18*
	(0.04)	(0.08)	(0.05)	(0.10)	(0.08)	(0.14)	(0.05)	(0.08)	(0.04)	(0.09)	(0.04)	(0.09)
$cgap_{i,t-1} * (\sigma_{b,t} - \sigma_{b,t-1})$											-0.03*	-0.06
											(0.02)	(0.04)
constant	-0.33*	-0.01	-0.21	-0.34	-0.36	0.05	3.59	13.35*	-0.16	-0.12	-0.32**	-0.03
	(0.17)	(0.28)	(0.18)	(0.37)	(0.22)	(0.33)	(2.89)	(7.56)	(0.13)	(0.25)	(0.16)	(0.26)
N	360	243	198	117	162	126	360	243	360	243	360	243
Controls	no	no	no	no	no	no	yes	yes	no	no	no	no
Fixed Effects	session	session	none	none	none	none	session	session	session -round	session -round	session	session
Exclude if $\Delta c_{i,t} = 0, \forall t$	no	yes	no	yes	no	yes	no	yes	no	yes	no	yes
Sessions	both	both	first	first	second	second	both	both	both	both	both	both

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Standard errors are clustered at the individual level and shown in parentheses. Results from OLS regressions of $\Delta c_{i,t} = \beta_0 + \beta_1 bgap_{i,t-1} + \beta_2 cgap_{i,t-1} (+controls) + \epsilon_i$, where $\Delta c_{i,t} \equiv c_{i,t} - c_{i,t-1}$, $bgap_{i,t-1} \equiv c^{\text{med}}_{i,t-1} - b_{i,t-1}$, and $cgap_{i,t-1} \equiv c^{\text{med}}_{i,t-1} - c_{i,t-1}$. Controls include participants' ages and indicators for the participants being male, being in the engineering school, being in the humanities school, majoring in economics, and class years. Fixed effects include an indicator for the first session if there are session fixed effects, or indicators for the particular rounds in each session implied by equation (1) if there are session-round fixed effects. The data are from rounds 2-10 for the participants in the indicated treatment groups.

bly publicness activates signaling or sanctioning motives that divert attention from preference construction; the net effect on conformity may be approximately zero because one mechanism crowds out the other.

These conclusions follow from an examination of the results in the second panel of Table 6. The coefficients of $bgap_{i,t-1}$ are economically small and statistically indistinguishable from zero.[15] Indeed, many of these coefficients are negative. In contrast, the coefficients of $cgap_{i,t-1}$ are economically substantial (particularly when attention is confined to participants who vary their choices) and generally statistically significant. Again, the patterns are similar across sessions and robust with respect to the inclusion of other controls.

6.2 Treatments in which benefits flow to the participant

An entirely different pattern emerges in the Self domain (see Table 7). Starting with the Self-Public-Feedback treatment (top panel), we find strong and robust evidence for a gravity effect, and much weaker evidence for a belief effect. In column (1), the coefficient of $bgap_{i,t-1}$ is fairly small and statistically insignificant. In comparison, the coefficient of $cgap_{i,t-1}$ is substantial and highly statistically significant. Its magnitude implies that, if a participant's choice differs from the median for others by five minutes, she subsequently changes her intended effort level in the direction of the previous median for others by, on average, roughly half a minute. As in the Charity domain, both effects are noticeably stronger among participants who vary their effort levels (column (2)), but the belief effect remains statistically insignificant. These results are generally robust across sessions and with respect to the addition of other controls, with the one qualification that the coefficient of $bgap_{i,t-1}$ becomes large and extremely imprecise in column (6) (second session only, restricted to participants who varied their choices). Notably, in columns (11) and (12), the coefficients for the two belief-mechanism variables are jointly insignificant ($p = 0.648$ and $p = 0.672$).

[15] To the extent our measures of beliefs are noisy, attenuation bias could reduce the magnitudes of these coefficients. However, given our findings for the Charity-Public-Feedback treatment, we see no reason to think the noise is substantial or the resulting bias is problematic.

Table 7: OLS of $\Delta c_{i,t}$ on $bgap_{i,t-1}$ and $cgap_{i,t-1}$

	Dependent Variable is $\Delta c_{i,t}$											
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	A: Public-Self-Feedback											
$bgap_{i,t-1}$	0.07	0.11	0.09	0.09	0.04	0.26	0.07	0.13	0.06	0.11	0.04	0.07
	(0.08)	(0.14)	(0.14)	(0.16)	(0.06)	(0.26)	(0.08)	(0.13)	(0.08)	(0.14)	(0.06)	(0.12)
$cgap_{i,t-1}$	0.10**	0.16**	0.11*	0.14*	0.09	0.19	0.11**	0.19**	0.10**	0.16**	0.09**	0.15**
	(0.04)	(0.07)	(0.05)	(0.08)	(0.07)	(0.15)	(0.05)	(0.07)	(0.04)	(0.07)	(0.04)	(0.07)
$cgap_{i,t-1} * (\sigma_{b,t} - \sigma_{b,t-1})$											-0.01	-0.02
											(0.02)	(0.02)
constant	0.11	0.07	-0.06	0.02	0.10	0.04	-0.31	-0.56	0.02	0.05	0.11	0.07
	(0.15)	(0.26)	(0.20)	(0.30)	(0.14)	(0.35)	(1.90)	(3.93)	(0.12)	(0.22)	(0.15)	(0.25)
N	360	207	198	117	162	90	360	207	360	207	360	207
	B: Private-Self-Feedback											
$bgap_{i,t-1}$	-0.00	-0.01	0.01	0.01	-0.02	-0.06	-0.00	-0.01	-0.00	-0.01	-0.03	-0.13*
	(0.03)	(0.05)	(0.04)	(0.07)	(0.03)	(0.07)	(0.03)	(0.05)	(0.03)	(0.05)	(0.04)	(0.07)
$cgap_{i,t-1}$	0.03*	0.05	0.02	0.02	0.04	0.13	0.03*	0.10	0.03*	0.04	0.01	0.02
	(0.01)	(0.03)	(0.01)	(0.02)	(0.03)	(0.09)	(0.01)	(0.06)	(0.01)	(0.03)	(0.01)	(0.03)
$cgap_{i,t-1} * (\sigma_{b,t} - \sigma_{b,t-1})$											-0.03*	-0.06**
											(0.02)	(0.03)
constant	-0.03	-0.10	0.07	0.10	-0.03	-0.16	0.76	-3.17	0.11**	0.16	-0.01	-0.01
	(0.06)	(0.14)	(0.04)	(0.07)	(0.08)	(0.26)	(1.02)	(3.33)	(0.05)	(0.09)	(0.07)	(0.15)
N	324	153	180	90	144	63	324	153	324	153	324	153
Controls	no	no	no	no	no	no	yes	yes	no	no	no	no
Fixed Effects	session	session	none	none	none	none	session	session	session -round	session -round	session	session
Exclude if $\Delta c_{i,t} = 0, \forall t$	no	yes	no	yes	no	yes	no	yes	no	yes	no	yes
Sessions	both	both	first	first	second	second	both	both	both	both	both	both

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Standard errors are clustered at the individual level and shown in parentheses. Results from OLS regressions of $\Delta c_{i,t} = \beta_0 + \beta_1 bgap_{i,t-1} + \beta_2 cgap_{i,t-1} (+controls) + \epsilon_i$, where $\Delta c_{i,t} \equiv c_{i,t} - c_{i,t-1}$, $bgap_{i,t-1} \equiv c^{\text{med}}_{i,t-1} - b_{i,t-1}$, and $cgap_{i,t-1} \equiv c^{\text{med}}_{i,t-1} - c_{i,t-1}$. Controls include participants' ages and indicators for the participants being male, being in the engineering school, being in the humanities school, majoring in economics, and class years. Fixed effects include an indicator for the first session if there are session fixed effects, or indicators for the particular rounds in each session implied by equation (1) if there are session-round fixed effects. The data are from rounds 2-10 for the participants in the indicated treatment groups.

We know from the results in Section 4 that anonymizing choice dramatically attenuates the degree of conformity observed in the Self domain. Not surprisingly, we find no evidence of an expectation-adjustment effect, and only weak evidence of a very small gravity effect (see the lower panel of Table 7).[16] A natural interpretation is that, in this setting, anonymization weakens the mechanism that generates conformity without altering its nature. For example, the choices of others may be salient in this domain only when all decisions are public.

6.3 Treatments in which benefits flow to the group

Results for the Group-Public-Feedback treatment appear in Table 8. Conceptually, this domain involves features found in both the Charity and Self domains. However, the observed patterns most closely resemble those found in the Self domain: the evidence for gravity effects is strong, and the evidence for expectation-adjustment effects is weak. Specifically, in Table 8, the coefficients of $cgap_{i,t-1}$ are robustly large economically and statistically significant, while the coefficients of $bgap_{i,t-1}$ are not.[17] This finding suggests that the mechanisms governing the formation of norms involving behavior toward others may depend on the identities of the recipients. For instance, participants may be more concerned about signaling generosity to deserving beneficiaries of charity than to peers. Alternatively, the fact that participants personally receive monetary payoffs in return for effort may be the more salient feature of the Group domain, and participants may therefore act on the same motivations as in the Self domain.

7 Conclusions

We have examined the dynamics of behavioral convergence in several choice settings that give rise to conformity. Our main objective was to distinguish

[16] In specifications (11) and (12), the coefficients for the two belief-mechanism variables are jointly insignificant ($p = 0.185$ and $p = 0.134$). Specification (12) is anomalous in that both coefficients are statistically when evaluated individually rather than jointly. Note, however, that $bgap_{i,t-1}$ enters with a counterintuitive sign.

[17] Once again, in columns (11) and (12), the coefficients of the two belief-mechanism variables are jointly insignificant ($p = 0.773$ and $p = 0.705$).

Table 8: OLS of $\Delta c_{i,t}$ on $cgap_{i,t-1}$ and $cgap_{i,t-1}$

	Dependent Variable is $\Delta c_{i,t}$											
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	A: Public-Group-Feedback											
$bgap_{i,t-1}$	0.03	0.06	-0.01	-0.02	0.08	0.17	0.03	0.05	-0.01	0.01	0.05	0.07
	(0.09)	(0.11)	(0.09)	(0.11)	(0.14)	(0.20)	(0.09)	(0.12)	(0.09)	(0.12)	(0.09)	(0.12)
$cgap_{i,t-1}$	0.13**	0.16**	0.08***	0.09***	0.15	0.20	0.15**	0.21**	0.13**	0.16**	0.14**	0.17**
	(0.06)	(0.07)	(0.02)	(0.03)	(0.09)	(0.12)	(0.06)	(0.09)	(0.06)	(0.07)	(0.06)	(0.08)
$cgap_{i,t-1} * (\sigma_{b,t} - \sigma_{b,t-1})$											0.02	0.02
											(0.03)	(0.04)
constant	-0.05	0.10	-0.16**	-0.18*	-0.06	0.13	-4.32	-4.99	-0.07	-0.04	-0.05	0.11
	(0.16)	(0.22)	(0.08)	(0.09)	(0.20)	(0.28)	(4.30)	(5.57)	(0.14)	(0.20)	(0.16)	(0.22)
N	360	279	198	162	162	117	360	279	360	279	360	279
Controls	no	no	no	no	no	no	yes	yes	no	no	no	no
Fixed Effects	session	session	none	none	none	none	session	session	session -round	session -round	session	session
Exclude if $\Delta c_{i,t} = 0, \forall t$	no	yes	no	yes	no	yes	no	yes	no	yes	no	yes
Sessions	both	both	first	first	second	second	both	both	both	both	both	both

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Standard errors are clustered at the individual level and shown in parentheses. Results from OLS regressions of $\Delta c_{i,t} = \beta_0 + \beta_1 bgap_{i,t-1} + \beta_2 cgap_{i,t-1} (+controls) + \epsilon_i$, where $\Delta c_{i,t} \equiv c_{i,t} - c_{i,t-1}$, $bgap_{i,t-1} \equiv c^{\text{med}}_{i,t-1} - b_{i,t-1}$, and $cgap_{i,t-1} \equiv c^{\text{med}}_{i,t-1} - c_{i,t-1}$. Controls include participants' ages and indicators for the participants being male, being in the engineering school, being in the humanities school, majoring in economics, and class years. Fixed effects include an indicator for the first session if there are session fixed effects, or indicators for the particular rounds in each session implied by equation (1) if there are session-round fixed effects. The data are from rounds 2-10 for the participants in the indicated treatment groups.

between belief mechanisms, which posit that social equilibrium either standardizes inferences or promotes a shared understanding of conventions and norms, and preference mechanisms, which depict tastes as fluid and hence subject to social influences. We have drawn this distinction by asking whether the process of convergence manifests expectation-adjustment effects or gravity effects.

The setting most likely to activate the types of belief mechanisms featured in the economics literature involves public decisions to work on behalf of a charity. We find strong evidence of expectation-adjustment effects and comparatively weak evidence of gravity effects. Accordingly, for this setting, we conclude that conformity is primarily attributable to belief mechanisms. We also show that anonymizing choices shuts down this mechanism. However, to our considerable surprise, it does not appreciably reduce the degree of conformity. Instead, we observe gravity effects, which points to preference mechanisms. Thus, belief mechanisms come into play when charitable effort is publicly observed, but their activation crowds out preference mechanisms of roughly equal potency.

We also find evidence of conformity in settings where the benefits of effort flow to the participant, but only if choices are public. Similarly, we find a modest degree of conformity when public effort benefits all participants in a session. In these settings, we detect gravity effects but no expectation-adjustment effects. Preference mechanisms therefore emerge as the leading explanations for the observed conformity.

These findings are important because, to date, economists studying conformity have focused almost exclusively on belief mechanisms, and have largely ignored preference mechanisms. In light of our results, this focus is likely too narrow. The notion that conformity results in part from the fluidity and endogeneity of preferences is widely accepted in other social science disciplines, and it merits more serious consideration within economics.

References

Akerlof, George A. 1980. "A theory of social custom, of which unemployment may be one consequence." *The Quarterly Journal of Economics*, 749–775.

Anderson, Lisa R, and Charles A Holt. 1997. "Information cascades in the laboratory." *The American Economic Review*, 847–862.

Andreoni, James, and B. Douglas Bernheim. 2009. "Social Image and the 50–50 Norm: A Theoretical and Experimental Analysis of Audience Effects." *Econometrica*, 77(5): 1607–1636.

Asch, Solomon E. 1956. "Studies of independence and conformity: I. A minority of one against a unanimous majority." *Psychological Monographs: General and Applied*, 70(9).

Banerjee, Abhijit V. 1992. "A simple model of herd behavior." *The Quarterly Journal of Economics*, 797–817.

Bernheim, B. Douglas. 1994. "A Theory of Conformity." *Journal of Political Economy*, 102(5): pp. 841–877.

Bikhchandani, Sushil, David Hirshleifer, and Ivo Welch. 1992. "A Theory of Fads, Fashion, Custom, and Cultural Change as Informational Cascades." *Journal of Political Economy*, 100(5): 992–1026.

Bikhchandani, Sushil, David Hirshleifer, and Ivo Welch. 1998. "Learning from the Behavior of Others: Conformity, Fads, and Informational Cascades." *The Journal of Economic Perspectives*, 12(3): 151–170.

Bowles, Samuel. 1998. "Endogenous preferences: The cultural consequences of markets and other economic institutions." *Journal of economic literature*, 75–111.

Bowles, Samuel, and Sandra Polania-Reyes. 2012. "Economic incentives and social preferences: substitutes or complements?" *Journal of Economic Literature*, 368-425.

Boyd, Robert, and Peter J. Richerson. 1985. *Culture and the evolutionary process.* University of Chicago Press.

Carpenter, Jeffrey P. 2004. "When in Rome: conformity and the provision of public goods." *The Journal of Socio-Economics*, 33(4): 395–408.

Çelen, Boğaçhan, and Shachar Kariv. 2004. "Distinguishing informational cascades from herd behavior in the laboratory." *American Economic Review*, 484–498.

Çelen, Boğaçhan, and Shachar Kariv. 2005. "An experimental test of observational learning under imperfect information." *Economic Theory*, 26(3): 677–699.

Chen, Yan, F. Maxwell Harper, Joseph Konstan, and Sherry Xin Li. 2010. "Social Comparisons and Contributions to Online Communities: A Field Experiment on MovieLens." *The American Economic Review*, 100(4): 1358–1398.

Cialdini, Robert B, Raymond R Reno, and Carl A Kallgren. 1990. "A focus theory of normative conduct: recycling the concept of norms to reduce littering in public places." *Journal of personality and social psychology*, 58(6).

Di Giovinazzo, Viviana, and Ahmad Naimzada. 2012. "... Do as the Romans do. A model of conformity with the endogenous formation of preferences." *The Journal of Socio-Economics*, 41(5): 654–658.

Durham, William H., Robert Boyd, and Peter J. Richerson. 2013. "Human by Nature: Between Biology and the Social Sciences." , ed. Peter Weingart, Sandra D. Mitchell, Peter J. Richerson and Sabine Maasen., Chapter Models and Forces of Cultural Evolution. Psychology Press.

Efferson, Charles, Rafael Lalive, Peter J. Richerson, Richard McElreath, and Mark Lubell. 2008. "Conformists and mavericks: the empirics of frequency-dependent cultural transmission." *Evolution and Human Behavior*, 29(1): 56–64.

Fehr, Ernst, and Urs Fischbacher. 2004. "Third-party punishment and social norms." *Evolution and human behavior*, 25(2): 63–87.

Festinger, Leon. 1954. "A theory of social comparison processes." *Human relations*, 7(2): 117–140.

Fischbacher, Urs. 2007. "z-Tree: Zurich Toolbox for Ready-made Economic experiments." *Experimental Economics*, 10(2): 171–178.

Frey, Bruno S., and Stephan Meier. 2004. "Social Comparisons and Pro-Social Behavior: Testing "Conditional Cooperation" in a Field Experiment." *American Economic Review*, 94(5): 1717–1722.

Hawkins, Scott A., Stephen J. Hoch, and Joan Meyers-Levy. 2001. "Low-involvement learning: Repetition and coherence in familiarity and belief." *Journal of Consumer Psychology*, 11(1): 1–11.

Hwang, Sung-Ha, and Samuel Bowles. 2011. "The sophisticated planner's dilemma: optimal incentives with endogenous preferences." *Working Paper*.

Judd, Charles M., and Markus Brauer. 2014. "Attitude strength: Antecedents and consequences." , ed. Richard E. Petty and Jon A. Krosnick Vol. 4, Chapter Repetition and evaluative extremity. Psychology Press.

Krupka, Erin, and Roberto A Weber. 2009. "The focusing and informational effects of norms on pro-social behavior." *Journal of Economic Psychology*, 30(3): 307–320.

Lichtenstein, Sarah, and Paul Slovic. 2006. *The construction of preference.* Cambridge University Press.

Mesoudi, Alex, and Stephen J. Lycett. 2009. "Random copying, frequency-dependent copying and culture change." *Evolution and Human Behavior*, 30(1): 41–48.

Monahan, Jennifer L., Sheila T. Murphy, and Robert B. Zajonc. 2000. "Subliminal mere exposure: Specific, general, and diffuse effects." *Psychological Science*, 11(6): 462–466.

Wilson, Timothy D., David A. Reinhard, Erin C. Westgate, Daniel T. Gilbert, Nicole Ellerbeck, Cheryl Hahn, Casey L. Brown, and Adi Shaked. 2014. "Just think: The challenges of the disengaged mind." *Science*, 345(6192): 75–77.

Zafar, Basit. 2011. "An experimental investigation of why individuals conform." *European Economic Review*, 55(6): 774–798.

Zajonc, Robert B. 1968. "Attitudinal effects of mere exposure." *Journal of personality and social psychology*, 9(2 part 2).

Zajonc, Robert B. 2001. "Mere exposure: A gateway to the subliminal." *Current directions in psychological science*, 10(6): 224–228.

Appendixes (For Online Publication)

A Tables

Table A.1: Mean of Choices $c_{i,t}$

	Round t									
	1	2	3	4	5	6	7	8	9	10
A: Public-Charity-Feedback										
Session 1: $\overline{c_{i,t}}$	12.82	12.41	11.95	11.14	11.91	11.45	11.14	11.73	11.77	10.91
Session 2: $\overline{c_{i,t}}$	9.33	8.06	7.56	7.61	7.39	7.33	7.28	7.33	7.22	7.94
B: Private-Charity-Feedback										
Session 1: $\overline{c_{i,t}}$	12.50	12.41	11.36	11.05	11.00	11.09	11.23	11.23	10.86	11.23
Session 2: $\overline{c_{i,t}}$	10.33	9.28	9.00	8.94	9.17	8.22	8.50	9.06	8.00	8.06
C: Public-Self-Feedback										
Session 1: $\overline{c_{i,t}}$	15.32	15.36	14.59	15.14	15.00	15.45	14.95	14.77	15.00	15.05
Session 2: $\overline{c_{i,t}}$	16.56	17.39	17.44	17.67	16.67	16.72	15.83	16.89	16.72	16.78
D: Private-Self-Feedback										
Session 1: $\overline{c_{i,t}}$	13.05	14.10	13.85	13.90	14.05	13.90	13.95	13.90	13.85	13.90
Session 2: $\overline{c_{i,t}}$	14.94	15.19	15.44	14.81	15.38	14.75	14.75	14.81	14.94	14.75
E: Public-Group-Feedback										
Session 1: $\overline{c_{i,t}}$	13.45	13.45	13.82	13.36	13.32	13.05	13.05	12.82	12.95	12.95
Session 2: $\overline{c_{i,t}}$	13.61	14.17	15.33	14.61	13.83	13.67	13.56	15.00	13.94	13.06
F: Public-Charity-No-Feedback										
Session 1: $\overline{c_{i,t}}$	10.12	10.44	10.12	8.19	8.75	8.38	10.38	7.69	9.69	7.81

$\overline{c_{i,t}}$ shows the mean choice made by participants in round t. The data is shown for each round of each session of each treatment group.

Table A.2: Median of Choices $c_{i,t}$

	Round t									
	1	2	3	4	5	6	7	8	9	10
A: Public-Charity-Feedback										
Session 1: $\widetilde{c_{i,t}}$	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
Session 2: $\widetilde{c_{i,t}}$	5.50	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
B: Private-Charity-Feedback										
Session 1: $\widetilde{c_{i,t}}$	13.00	11.50	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
Session 2: $\widetilde{c_{i,t}}$	11.00	10.00	10.00	10.00	10.00	9.00	9.00	10.00	9.00	10.00
C: Public-Self-Feedback										
Session 1: $\widetilde{c_{i,t}}$	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
Session 2: $\widetilde{c_{i,t}}$	16.00	16.00	16.00	16.00	16.00	16.00	16.00	16.00	16.00	16.00
D: Private-Self-Feedback										
Session 1: $\widetilde{c_{i,t}}$	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
Session 2: $\widetilde{c_{i,t}}$	15.50	15.00	15.50	15.50	16.00	15.50	15.50	15.50	15.50	15.00
E: Public-Group-Feedback										
Session 1: $\widetilde{c_{i,t}}$	15.00	15.00	15.00	15.00	14.50	14.00	14.50	14.50	14.50	14.50
Session 2: $\widetilde{c_{i,t}}$	14.50	15.00	15.00	14.00	13.50	13.50	13.50	13.50	14.00	14.00
F: Public-Charity-No-Feedback										
Session 1: $\widetilde{c_{i,t}}$	10.00	10.00	6.00	5.00	6.50	5.00	7.50	5.00	8.00	5.00

$\widetilde{c_{i,t}}$ shows the median choice made by participants in round t. The data is shown for each round of each session of each treatment group.

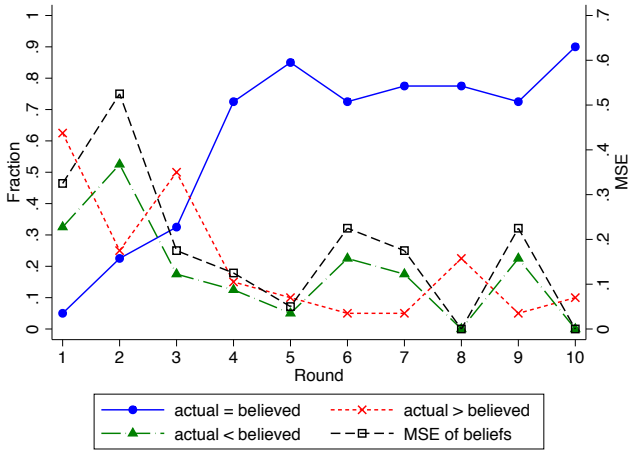
Table A.3: Standard Deviation of Choices $c_{i,t}$

	Round t									
	1	2	3	4	5	6	7	8	9	10
A: Public-Charity-Feedback										
Session 1: $\sigma(c\_i, t)$	8.62	7.79	7.65	8.14	7.61	7.78	8.03	7.91	7.67	7.67
Session 2: $\sigma(c\_i, t)$	10.02	8.89	8.27	8.61	8.22	8.32	8.27	8.32	8.47	8.75
B: Private-Charity-Feedback										
Session 1: $\sigma(c\_i, t)$	8.34	8.54	6.95	6.84	6.68	6.74	7.13	7.13	6.86	7.13
Session 2: $\sigma(c\_i, t)$	6.52	5.64	5.38	5.59	5.33	4.76	5.12	5.26	5.56	5.36
C: Public-Self-Feedback										
Session 1: $\sigma(c\_i, t)$	7.32	6.57	6.43	6.29	5.54	5.39	5.56	6.35	5.54	5.54
Session 2: $\sigma(c\_i, t)$	7.64	7.48	7.27	7.02	6.24	6.19	7.66	6.70	6.26	6.67
D: Private-Self-Feedback										
Session 1: $\sigma(c\_i, t)$	6.04	5.66	5.68	5.68	5.75	5.68	5.66	5.77	5.79	5.77
Session 2: $\sigma(c\_i, t)$	4.63	4.56	4.49	4.96	4.50	4.73	4.73	4.62	4.45	4.43
E: Public-Group-Feedback										
Session 1: $\sigma(c\_i, t)$	5.56	4.86	4.46	4.82	4.59	3.76	4.12	4.23	3.98	4.13
Session 2: $\sigma(c\_i, t)$	7.08	7.11	8.38	7.28	6.78	6.57	6.76	8.24	6.52	4.37
F: Public-Charity-No-Feedback										
Session 1: $\sigma(c\_i, t)$	8.29	7.91	9.48	7.98	7.59	7.61	10.25	7.94	8.56	7.38

$\sigma(c_{i,t})$ shows the standard deviation of the choices made by participants in round t. The data is shown for each round of each session of each treatment group.

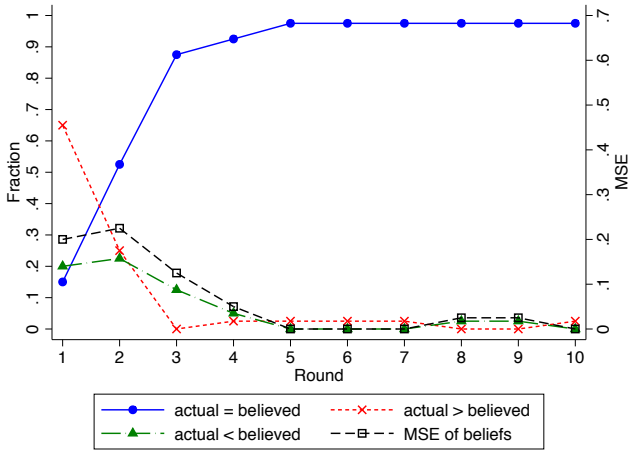
B Figures

Figure B.1: Private-Charity-Feedback: Beliefs



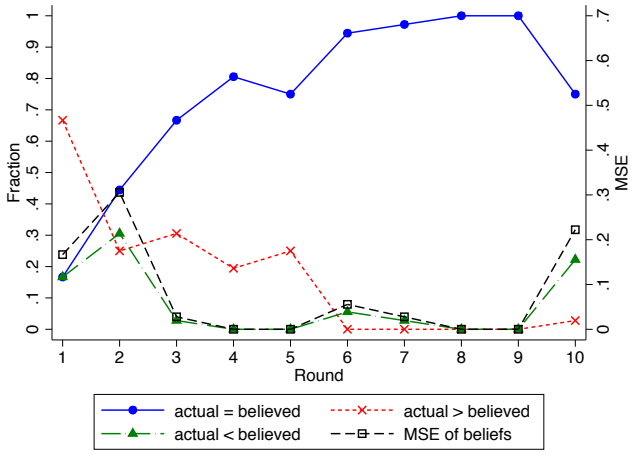
The data are from rounds 1-10 for the participants in the Private-Charity-Feedback group. The left y-axis displays the fraction of participants with beliefs that were equal to, greater than, or less than the median choice made by others. The right y-axis displays the mean-squared error (MSE) of beliefs.

Figure B.2: Public-Self-Feedback: Beliefs



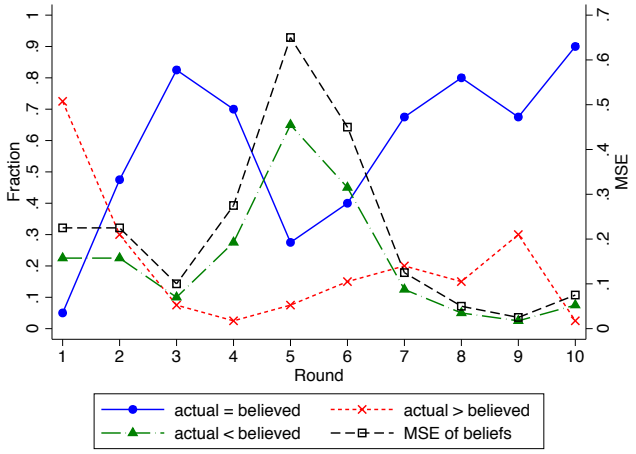
The data are from rounds 1-10 for the participants in the Public-Self-Feedback group. The left y-axis displays the fraction of participants with beliefs that were equal to, greater than, or less than the median choice made by others. The right y-axis displays the mean-squared error (MSE) of beliefs.

Figure B.3: Private-Self-Feedback: Beliefs



The data are from rounds 1-10 for the participants in the Private-Self-Feedback group. The left y-axis displays the fraction of participants with beliefs that were equal to, greater than, or less than the median choice made by others. The right y-axis displays the mean-squared error (MSE) of beliefs.

Figure B.4: Public-Group-Feedback: Beliefs



The data are from rounds 1-10 for the participants in the Public-Group-Feedback group. The left y-axis displays the fraction of participants with beliefs that were equal to, greater than, or less than the median choice made by others. The right y-axis displays the mean-squared error (MSE) of beliefs.

C Instructions

Charity-Public-Feedback

This is a study on decision-making. Please turn off and refrain from using any electronic devices throughout today's study, including your cell phones. If you have a question, please raise your hand and a study leader will come to answer you in private.

Make-A-Wish

The choices you make in today's study will involve Make-A-Wish Foundation, a 501(c)(3) charitable organization that organizes and funds "wishes" for children with life-threatening medical conditions. On their website (http://wish.org), Make-A-Wish describes their activities as follows: "We grant the wishes of children with life-threatening medical conditions to enrich the human experience with hope, strength and joy […] Most wish requests fall into four major categories:

- **I wish to go:** Some wish kids want to travel to their favorite theme park, while others want to visit an exotic beach, go on a cruise, see snow for the first time, or attend a major sporting event or concert.
- **I wish to be:** Children search the depths of their imagination when they wish to be someone for a day— a firefighter, a police officer or a model.
- **I wish to meet:** Many want to meet their favorite athlete, recording artist, television personality, movie star, politician or public figure.
- **I wish to have:** Children often wish for a special gift, such as a computer, a tree house, a shopping spree or something that they have coveted for a long time."

Rounds

There will be 10 rounds in this study.

Selected Round and Selected Participant

In each round, you will make a decision by answering a question, which we describe below. At the end of the experiment, the computer will randomly select one round (out of the 10 rounds) and one participant (out of the participants in this study session). We will call these the **selected round** and the **selected participant**, respectively. The decision made by the selected participant in the selected round will be implemented for payment. No other decisions, by non-selected participants or by the selected participant in non-selected rounds, will be implemented for payment. However, since any one of your decisions may actually be the one that is selected and hence implemented for payment, you should make each decision carefully and seriously, as if it is the one that actually counts.

Decisions

In each round, you will have to make the following decision:

> "*How many minutes (X) would you like to stay and earn money for Make-A-Wish Foundation, when any money you earn will be directed towards helping children in [NAME OF CITY]?"*

Your choice of X can be from 0 – 35 minutes, and will correspond to Make-A-Wish Foundation being given a particular amount of money (you will be told the exact amounts for each possible choice of X). Across rounds, the above question will only change by naming different cities in Texas.

Imagine you are the selected participant and you chose to stay Y minutes in the selected round. Then:

- You will stay in this room for an additional Y minutes at the end of the study. Even if Y = 35 minutes, you will still complete the study within the advertised time. During this Y minutes, you will NOT be allowed to participate in any other activity, such as using a cell phone, and instead must just quietly wait with your eyes open (you will not be allowed to nap, and the study leader will remind you if you try).
- Note that the longer you choose to stay in the selected round (i.e., the higher Y is), the more money Make-A-Wish Foundation will receive.
- For instance, if you choose Y = 3, then you will have to stay 3 minutes and Make-A-Wish Foundation will receive the corresponding donation. Or, if you choose Y = 6 minutes, then you will have to stay 6 minutes and Make-A-Wish Foundation will receive the corresponding donation.

State Belief on Others' Decisions

In each round, on the same screen that you make your above decisions, you will also be asked your belief about others' decisions. In particular, you will be asked:

> *"What is the MEDIAN number of minutes YOU BELIEVE others (excluding you) will stay and earn money for Make-A-Wish Foundation, when any money one earns will be directed towards helping children in [NAME OF CITY]?"*

If you correctly state the median number of minutes that others (excluding you) chose in the randomly selected round, then you will receive an ADDITIONAL bonus payment of $3. Thus, it is in your interest to carefully guess the median number of minutes that other people chose to the best of your ability. Note that your own decision will NOT impact this median that you are trying to guess.

Charity-Public-Feedback

Note: The median represents the 50th percentile. That is, if you have a series of numbers and order them from the lowest to the highest, then the median is the number in the middle. For instance, the median of {1, 3, 4, 9, 10} is 4.

Information on Others' Decisions
During Round 1, you will not receive any information on participants' decisions.

During Rounds 2 to 10, you will learn the **median amount** of time other participants in this room (excluding you) chose to stay in the previous round. For instance, in Round 2, you will learn the median amount of time other participants in this room chose to stay in Round 1. Similarly, in Round 7, you will learn the median amount of time other participants in this room chose to stay in Round 6. Note that your own decisions will NOT impact this median that you are shown.

Recall that after you have made your decisions for all 10 rounds, one round will be randomly selected. **Everyone will learn how long everyone else chose to stay in the selected round** (in other words, not just the median or the choice of the selected participant, but the number of minutes chosen to stay by every person in this room for that round). First, you will have to write how many minutes, from 0 – 35, you chose to stay on a nametag, and then place that nametag on a visible location on your shirt/jacket. You will have to keep this nametag on for the duration of the study. Second, the study leader will ask people to come up to the front of the room in groups according to how long they chose to stay (which corresponds to the number on their nametag), from 0 to 35 minutes. That is, when directed, you will come up to the front of the room along with anyone else who chose to stay the same amount of time as you. The study leader will order these groups into a line at the front of the room such that people who chose the least amount of time will be on the left and people who chose to stay the most amount of time will be on the right. For instance, if you chose 0 minutes, then you would be in the first group called up to the front of the room and will stand to the left. On the other hand, if you chose 35 minutes, then you would be in the last group called up to the front of the room and will stand on the right. The study leader will check to make sure that you come up to the front of the room at the correct time.

Payments
Your payment will be your $20 show-up fee plus any additional payments you may earn.

Final Notes
Throughout the study, please push OK on the computer screen to continue or to submit answers. When you are waiting for the experiment to continue, please quietly wait at your seat and refrain from using any electronic devices or partaking in any other activity. If you ever have a question, please raise your hand. Thank you!

To summarize:

- In each of 10 rounds, you will decide how many minutes you want to volunteer to make money for Make-A-Wish Foundation to help children in a particular city in Texas. You will also make your best guess concerning the median number of minutes the other subjects will choose to volunteer in that round.
- At the start of every round after the first, you will be told the median number of minutes chosen by other subjects in the previous round.
- At the end of all 10 rounds, one round will be chosen at random. Everyone will reveal the number of minutes they decided to volunteer in that round to everyone else, by wearing nametags with that information, and by lining up in the front of the room from lowest to highest number of minutes.
- One person will be chosen at random from the selected round, and their choice will be implemented: they will have to wait for the amount of time they indicated, and we will make the associated contribution to Make-A-Wish-Foundation.
- You will receive a $3 bonus on top of your $20 participation fee if, for the selected round, you guessed the median number of minutes for the other participants correctly.

Thank you!

Charity-Private-Feedback

This is a study on decision-making. Please turn off and refrain from using any electronic devices throughout today's study, including your cell phones. If you have a question, please raise your hand and a study leader will come to answer you in private.

Make-A-Wish

The choices you make in today's study will involve Make-A-Wish Foundation, a 501(c)(3) charitable organization that organizes and funds "wishes" for children with life-threatening medical conditions. On their website (http://wish.org), Make-A-Wish describes their activities as follows: "We grant the wishes of children with life-threatening medical conditions to enrich the human experience with hope, strength and joy […] Most wish requests fall into four major categories:

- **I wish to go:** Some wish kids want to travel to their favorite theme park, while others want to visit an exotic beach, go on a cruise, see snow for the first time, or attend a major sporting event or concert.
- **I wish to be:** Children search the depths of their imagination when they wish to be someone for a day— a firefighter, a police officer or a model.
- **I wish to meet:** Many want to meet their favorite athlete, recording artist, television personality, movie star, politician or public figure.
- **I wish to have:** Children often wish for a special gift, such as a computer, a tree house, a shopping spree or something that they have coveted for a long time."

Rounds

There will be 10 rounds in this study.

Selected Round and Selected Participant

In each round, you will make a decision by answering a question, which we describe below. At the end of the experiment, the computer will randomly select one round (out of the 10 rounds) and one participant (out of the participants in this study session). We will call these the **selected round** and the **selected participant**, respectively. The decision made by the selected participant in the selected round will be implemented for payment. No other decisions, by non-selected participants or by the selected participant in non-selected rounds, will be implemented for payment. However, since any one of your decisions may actually be the one that is selected and hence implemented for payment, you should make each decision carefully and seriously, as if it is the one that actually counts.

Decisions

In each round, you will have to make the following decision:

> "*How many minutes (X) would you like to stay and earn money for Make-A-Wish Foundation, when any money you earn will be directed towards helping children in [NAME OF CITY]?"*

Your choice of X can be from 0 – 35 minutes, and will correspond to Make-A-Wish Foundation being given a particular amount of money (you will be told the exact amounts for each possible choice of X). Across rounds, the above question will only change by naming different cities in Texas.

Imagine you are the selected participant and you chose to stay Y minutes in the selected round. Then:

- You will stay in this room for an additional Y minutes at the end of the study. Even if Y = 35 minutes, you will still complete the study within the advertised time. During this Y minutes, you will NOT be allowed to participate in any other activity, such as using a cell phone, and instead must just quietly wait with your eyes open (you will not be allowed to nap, and the study leader will remind you if you try).
- Note that the longer you choose to stay in the selected round (i.e., the higher Y is), the more money Make-A-Wish Foundation will receive.
- For instance, if you choose Y = 3, then you will have to stay 3 minutes and Make-A-Wish Foundation will receive the corresponding donation. Or, if you choose Y = 6 minutes, then you will have to stay 6 minutes and Make-A-Wish Foundation will receive the corresponding donation.

State Belief on Others' Decisions

In each round, on the same screen that you make your above decisions, you will also be asked your belief about others' decisions. In particular, you will be asked:

> *"What is the MEDIAN number of minutes YOU BELIEVE others (excluding you) will stay and earn money for Make-A-Wish Foundation, when any money one earns will be directed towards helping children in [NAME OF CITY]?"*

If you correctly state the median number of minutes that others (excluding you) chose in the randomly selected round, then you will receive an ADDITIONAL bonus payment of $3. Thus, it is in your interest to carefully guess the median number of minutes that other people chose to the best of your ability. Note that your own decision will NOT impact this median that you are trying to guess.

Charity-Private-Feedback

Note: The median represents the 50th percentile. That is, if you have a series of numbers and order them from the lowest to the highest, then the median is the number in the middle. For example, the median of {1,3,4,9,10} is 4.

Information on Others' Decisions
During Round 1, you will not receive any information on participants' decisions.

During Rounds 2 to 10, you will learn the **median amount** of time other participants in this room (excluding you) chose to stay in the previous round. For instance, in Round 2, you will learn the median amount of time other participants in this room chose to stay in Round 1. Similarly, in Round 7, you will learn the median amount of time other participants in this room chose to stay in Round 6. Note that your own decisions will NOT impact this median that you are shown. Aside from this information on the median, you will NOT learn any information about how long others choose to stay. **That is, all participants' decisions will remain anonymous.**

Payments
Your payment will be your $20 show-up fee plus any additional payments you may earn.

Final Notes
Throughout the study, please push OK on the computer screen to continue or to submit answers. When you are waiting for the experiment to continue, please quietly wait at your seat and refrain from using any electronic devices or partaking in any other activity. If you ever have a question, please raise your hand. Thank you!

To summarize:

- In each of 10 rounds, you will decide how many minutes you want to volunteer to make money for Make-A-Wish Foundation to help children in a particular city in Texas. You will also make your best guess concerning the median number of minutes the other subjects will choose to volunteer in that round.
- At the start of every round after the first, you will be told the median number of minutes chosen by other subjects in the previous round.
- Everyone's decisions about how long they chose to stay will remain anonymous.
- One person will be chosen at random from the selected round, and their choice will be implemented: they will have to wait for the amount of time they indicated, and we will make the associated contribution to Make-A-Wish-Foundation.
- You will receive a $3 bonus on top of your $20 participation fee if, for the selected round, you guessed the median number of minutes for the other participants correctly.

Thank you!

Work-Public-Feedback

This is a study on decision-making. Please turn off and refrain from using any electronic devices throughout today's study, including your cell phones. If you have a question, please raise your hand and a study leader will come to answer you in private.

Rounds
There will be 10 rounds in this study.

Selected Round and Selected Participant
In each round, you will make a decision by answering a question, which we describe below. At the end of the experiment, the computer will randomly select one round (out of the 10 rounds) and one participant (out of the participants in this study session). We will call these the **selected round** and the **selected participant**, respectively. The decision made by the selected participant in the selected round will be implemented for payment. No other decisions, by non-selected participants or by the selected participant in non-selected rounds, will be implemented for payment. However, since any one of your decisions may actually be the one that is selected and hence implemented for payment, you should make each decision carefully and seriously, as if it is the one that actually counts.

Decisions
In each round, you will have to make the following decision:

"*How many minutes (X) would you like to stay and earn money for yourself, if this is the selected round?"*

Your choice of X can be from 0 – 35 minutes, and will correspond to you being given a particular amount of additional payment (you will be told the exact amounts for each possible choice of X).

When you are asked to make this decision, you will also receive a message of the following form:

"If this turns out to be the selected round, the study leader will donate $10 to Make-A-Wish Foundation towards helping children in [NAME OF CITY]?"

Across rounds, the above message will only change by naming different cities in Texas. Note that the study leader donating $10 to Make-A-Wish Foundation will NOT impact your payments in any way, and your choices will NOT impact the donation. Information about Make-A-Wish Foundation appears below.

Imagine you are the selected participant and you chose to stay Y minutes in the selected round. Then:

- You will stay in this room for an additional Y minutes at the end of the study. Even if Y = 35 minutes, you will still complete the study within the advertised time. During this Y minutes, you will NOT be allowed to participate in any other activity, such as using a cell phone, and instead must just quietly wait with your eyes open (you will not be allowed to nap, and the study leader will remind you if you try).
- Note that the longer you choose to stay in the selected round (i.e., the higher Y is), the more money you will receive.
- For instance, if you choose Y = 3, then you will have to stay 3 minutes and you will receive the corresponding additional payment. Or, if you choose Y = 6 minutes, then you will have to stay 6 minutes and you will receive the corresponding additional payment.

State Belief on Others' Decisions
In each round, on the same screen that you make your above decisions, you will also be asked your belief about others' decisions. In particular, you will be asked:

"What is the MEDIAN number of minutes YOU BELIEVE others (excluding you) will stay and earn money for themselves in this round?"

If you correctly state the median number of minutes that others (excluding you) chose in the randomly selected round, then you will receive an ADDITIONAL bonus payment of $3. Thus, it is in your interest to carefully guess the median number of minutes that other people chose to the best of your ability. Note that your own decision will NOT impact this median that you are trying to guess.

Note: The median represents the 50th percentile. That is, if you have a series of numbers and order them from the lowest to the highest, then the median is the number in the middle. For instance, the median of {1, 3, 4, 9, 10} is 4.

Information on Others' Decisions
During Round 1, you will not receive any information on participants' decisions.

During Rounds 2 to 10, you will learn the **median amount** of time other participants in this room (excluding you) chose to stay in the previous round. For instance, in Round 2, you will learn the median amount of time other participants in this room chose to stay in Round 1. Similarly, in Round 7, you will learn the median amount of time other participants in this room chose to stay

in Round 6. Note that your own decisions will NOT impact this median that you are shown.

Recall that after you have made your decisions for all 10 rounds, one round will be randomly selected. **Everyone will learn how long everyone else chose to stay in the selected round** (in other words, not just the median or the choice of the selected participant, but the number of minutes chosen to stay by every person in this room for that round). First, you will have to write how many minutes, from 0 – 35, you chose to stay on a nametag, and then place that nametag on a visible location on your shirt/jacket. You will have to keep this nametag on for the duration of the study. Second, the study leader will ask people to come up to the front of the room in groups according to how long they chose to stay (which corresponds to the number on their nametag), from 0 to 35 minutes. That is, when directed, you will come up to the front of the room along with anyone else who chose to stay the same amount of time as you. The study leader will order these groups into a line at the front of the room such that people who chose the least amount of time will be on the left and people who chose to stay the most amount of time will be on the right. For instance, if you chose 0 minutes, then you would be in the first group called up to the front of the room and will stand to the left. On the other hand, if you chose 35 minutes, then you would be in the last group called up to the front of the room and will stand on the right. The study leader will check to make sure that you come up to the front of the room at the correct time.

Payments
Your payment will be your $20 show-up fee plus any additional payments you may earn.

Make-A-Wish Foundation
Make-A-Wish Foundation is a 501(c)(3) charitable organization that organizes and funds "wishes" for children with life-threatening medical conditions. On their website (http://wish.org), Make-A-Wish describes their activities as follows: "We grant the wishes of children with life-threatening medical conditions to enrich the human experience with hope, strength and joy […] Most wish requests fall into four major categories:

- **I wish to go:** Some wish kids want to travel to their favorite theme park, while others want to visit an exotic beach, go on a cruise, see snow for the first time, or attend a major sporting event or concert.
- **I wish to be:** Children search the depths of their imagination when they wish to be someone for a day— a firefighter, a police officer or a model.
- **I wish to meet:** Many want to meet their favorite athlete, recording artist, television personality, movie star, politician or public figure.
- **I wish to have:** Children often wish for a special gift, such as a computer, a tree house, a shopping spree or something that they have coveted for a long time."

Final Notes
Throughout the study, please push OK on the computer screen to continue or to submit answers. When you are waiting for the experiment to continue, please quietly wait at your seat and refrain from using any electronic devices or partaking in any other activity. If you ever have a question, please raise your hand.

To summarize:

- In each of 10 rounds, you will decide how many minutes you want to stay to earn money for yourself. You will also make your best guess concerning the median number of minutes the other subjects will choose to stay in that round.
- At the start of every round after the first, you will be told the median number of minutes chosen by other subjects in the previous round.
- At the end of all 10 rounds, one round will be chosen at random. Everyone will reveal the number of minutes they decided to stay in that round to everyone else, by wearing nametags with that information, and by lining up in the front of the room from lowest to highest number of minutes.
- One person will be chosen at random from the selected round, and their choice will be implemented: they will have to wait for the amount of time they indicated, and they will then receive the corresponding additional payment. Also, the study leader will donate $10 to Make-A-Wish Foundation towards helping children in the particular city listed in that round.
- You will receive a $3 bonus on top of your $20 participation fee if, for the selected round, you guessed the median number of minutes for the other participants correctly.

Thank you!

Work-Private-Feedback

This is a study on decision-making. Please turn off and refrain from using any electronic devices throughout today's study, including your cell phones. If you have a question, please raise your hand and a study leader will come to answer you in private.

Rounds
There will be 10 rounds in this study.

Selected Round and Selected Participant
In each round, you will make a decision by answering a question, which we describe below. At the end of the experiment, the computer will randomly select one round (out of the 10 rounds) and one participant (out of the participants in this study session). We will call these the **selected round** and the **selected participant**, respectively. The decision made by the selected participant in the selected round will be implemented for payment. No other decisions, by non-selected participants or by the selected participant in non-selected rounds, will be implemented for payment. However, since any one of your decisions may actually be the one that is selected and hence implemented for payment, you should make each decision carefully and seriously, as if it is the one that actually counts.

Decisions
In each round, you will have to make the following decision:

"*How many minutes (X) would you like to stay and earn money for yourself, if this is the selected round?"*

Your choice of X can be from 0 – 35 minutes, and will correspond to you being given a particular amount of additional payment (you will be told the exact amounts for each possible choice of X).

When you are asked to make this decision, you will also receive a message of the following form:

"If this turns out to be the selected round, the study leader will donate $10 to Make-A-Wish Foundation towards helping children in [NAME OF CITY]?"

Across rounds, the above message will only change by naming different cities in Texas. Note that the study leader donating $10 to Make-A-Wish Foundation will NOT impact your payments in any way, and your choices will NOT impact the donation. Information about Make-A-Wish Foundation appears below.

Imagine you are the selected participant and you chose to stay Y minutes in the selected round. Then:

- You will stay in this room for an additional Y minutes at the end of the study. Even if Y = 35 minutes, you will still complete the study within the advertised time. During this Y minutes, you will NOT be allowed to participate in any other activity, such as using a cell phone, and instead must just quietly wait with your eyes open (you will not be allowed to nap, and the study leader will remind you if you try).
- Note that the longer you choose to stay in the selected round (i.e., the higher Y is), the more money you will receive.
- For instance, if you choose Y = 3, then you will have to stay 3 minutes and you will receive the corresponding additional payment. Or, if you choose Y = 6 minutes, then you will have to stay 6 minutes and you will receive the corresponding additional payment.

State Belief on Others' Decisions
In each round, on the same screen that you make your above decisions, you will also be asked your belief about others' decisions. In particular, you will be asked:

"What is the MEDIAN number of minutes YOU BELIEVE others (excluding you) will stay and earn money for themselves in this round?"

If you correctly state the median number of minutes that others (excluding you) chose in the randomly selected round, then you will receive an ADDITIONAL bonus payment of $3. Thus, it is in your interest to carefully guess the median number of minutes that other people chose to the best of your ability. Note that your own decision will NOT impact this median that you are trying to guess.

Note: The median represents the 50^{th} percentile. That is, if you have a series of numbers and order them from the lowest to the highest, then the median is the number in the middle. For instance, the median of {1, 3, 4, 9, 10} is 4.

Information on Others' Decisions
During Round 1, you will not receive any information on participants' decisions.

During Rounds 2 to 10, you will learn the **median amount** of time other participants in this room (excluding you) chose to stay in the previous round. For instance, in Round 2, you will learn the median amount of time other participants in this room chose to stay in Round 1. Similarly, in Round 7, you will learn the median amount of time other participants in this room chose to stay

in Round 6. Note that your own decisions will NOT impact this median that you are shown. Aside from this information on the median, you will NOT learn any information about how long others choose to stay. **That is, all participants' decisions will remain anonymous.**

Payments
Your payment will be your $20 show-up fee plus any additional payments you may earn.

Make-A-Wish Foundation
Make-A-Wish Foundation is a 501(c)(3) charitable organization that organizes and funds "wishes" for children with life-threatening medical conditions. On their website (http://wish.org), Make-A-Wish describes their activities as follows: "We grant the wishes of children with life-threatening medical conditions to enrich the human experience with hope, strength and joy […] Most wish requests fall into four major categories:

- **I wish to go:** Some wish kids want to travel to their favorite theme park, while others want to visit an exotic beach, go on a cruise, see snow for the first time, or attend a major sporting event or concert.
- **I wish to be:** Children search the depths of their imagination when they wish to be someone for a day— a firefighter, a police officer or a model.
- **I wish to meet:** Many want to meet their favorite athlete, recording artist, television personality, movie star, politician or public figure.
- **I wish to have:** Children often wish for a special gift, such as a computer, a tree house, a shopping spree or something that they have coveted for a long time."

Final Notes
Throughout the study, please push OK on the computer screen to continue or to submit answers. When you are waiting for the experiment to continue, please quietly wait at your seat and refrain from using any electronic devices or partaking in any other activity. If you ever have a question, please raise your hand.

To summarize:

- In each of 10 rounds, you will decide how many minutes you want to stay to earn money for yourself. You will also make your best guess concerning the median number of minutes the other subjects will choose to stay in that round.
- At the start of every round after the first, you will be told the median number of minutes chosen by other subjects in the previous round.
- Everyone's decisions about how long they chose to stay will remain anonymous.
- One person will be chosen at random from the selected round, and their choice will be implemented: they will have to wait for the amount of time they indicated, and they will then receive the corresponding additional payment. Also, the study leader will donate $10 to Make-A-Wish Foundation towards helping children in the particular city listed in that round.
- You will receive a $3 bonus on top of your $20 participation fee if, for the selected round, you guessed the median number of minutes for the other participants correctly.

Thank you!

Group Working-Public-Feedback

This is a study on decision-making. Please turn off and refrain from using any electronic devices throughout today's study, including your cell phones. If you have a question, please raise your hand and a study leader will come to answer you in private.

Rounds
There will be 10 rounds in this study.

Selected Round and Selected Participant
In each round, you will make a decision by answering a question, which we describe below. At the end of the experiment, the computer will randomly select one round (out of the 10 rounds) and one participant (out of the participants in this study session). We will call these the **selected round** and the **selected participant**, respectively. The decision made by the selected participant in the selected round will be implemented for payment. No other decisions, by non-selected participants or by the selected participant in non-selected rounds, will be implemented for payment. However, since any one of your decisions may actually be the one that is selected and hence implemented for payment, you should make each decision carefully and seriously, as if it is the one that actually counts.

Decisions
In each round, you will have to make the following decision:

> "*How many minutes (X) would you to stay and earn money for everyone, if this is the selected round and you are the selected participant?"*

Your choice of X can be from 0 – 35 minutes, and will correspond to each participant being given a particular amount of additional payment (you will be told the exact amounts for each possible choice of X).

When you are asked to make this decision, you will also receive a message of the following form:

> *"If this turns out to be the selected round, the study leader will donate $10 to Make-A-Wish Foundation towards helping children in [NAME OF CITY]?"*

Across rounds, the above message will only change by naming different cities in Texas. Note that the study leader donating $10 to Make-A-Wish Foundation will NOT impact your payments in any way, and your choices will NOT impact the donation. Information about Make-A-Wish Foundation appears below.

Imagine you are the selected participant and you chose to stay Y minutes in the selected round. Then:

- You will stay in this room for an additional Y minutes at the end of the study. Even if Y = 35 minutes, you will still complete the study within the advertised time. During this Y minutes, you will NOT be allowed to participate in any other activity, such as using a cell phone, and instead must just quietly wait with your eyes open (you will not be allowed to nap, and the study leader will remind you if you try).
- Note that the longer you choose to stay in the selected round (i.e., the higher Y is), the more money each participant, including you, will receive.
- For instance, if you choose Y = 3, then you will have to stay 3 minutes and each participant will receive the corresponding additional payment. Or, if you choose Y = 6 minutes, then you will have to stay 6 minutes and each participant will receive the corresponding additional payment.

Imagine you are NOT the selected participant, and that the selected participant has chosen to stay Y minutes in the selected round. Then:

- You will be allowed to leave right away. You will NOT have to wait with the selected participant. However, the amount you receive will depend on the amount of time, Y, that the selected participant chose to wait.
- Note that the longer the selected participant chooses to stay in the selected round (i.e., the higher Y is), the more money each participant, including you, will receive.
- For instance, if the selected participant chooses Y = 3, then he or she will have to stay 3 minutes and each participant will receive the corresponding additional payment. Or, if the selected participant chooses Y = 6 minutes, then he or she will have to stay 6 minutes and each participant will receive the corresponding additional payment.

State Belief on Others' Decisions
In each round, on the same screen that you make your above decisions, you will also be asked your belief about others' decisions. In particular, you will be asked:

> *"What is the MEDIAN number of minutes YOU BELIEVE others (excluding you) will choose to stay and earn money for everyone in this round?"*

If you correctly state the median number of minutes that others (excluding you) chose in the randomly selected round, then you will receive an ADDITIONAL bonus payment of $3. Thus, it is in your interest to carefully guess the median number of

minutes that other people chose to the best of your ability. Note that your own decision will NOT impact this median that you are trying to guess.

Note: The median represents the 50th percentile. That is, if you have a series of numbers and order them from the lowest to the highest, then the median is the number in the middle. For instance, the median of {1, 3, 4, 9, 10} is 4.

Information on Others' Decisions
During Round 1, you will not receive any information on participants' decisions.

During Rounds 2 to 10, you will learn the **median amount** of time other participants in this room (excluding you) chose in the previous round. For instance, in Round 2, you will learn the median amount of time other participants in this room chose in Round 1. Similarly, in Round 7, you will learn the median amount of time other participants in this room chose in Round 6. Note that your own decisions will NOT impact this median that you are shown.

Recall that after you have made your decisions for all 10 rounds, one round will be randomly selected. **Everyone will learn how long everyone else chose in the selected round** (in other words, not just the median or the choice of the selected participant, but the number of minutes chosen by every person in this room for that round). First, you will have to write how many minutes, from 0 – 35, you chose on a nametag, and then place that nametag on a visible location on your shirt/jacket. You will have to keep this nametag on for the duration of the study. Second, the study leader will ask people to come up to the front of the room in groups according to how long they chose (which corresponds to the number on their nametag), from 0 to 35 minutes. That is, when directed, you will come up to the front of the room along with anyone else who chose the same amount of time as you. The study leader will order these groups into a line at the front of the room such that people who chose the least amount of time will be on the left and people who chose the most amount of time will be on the right. For instance, if you chose 0 minutes, then you would be in the first group called up to the front of the room and will stand to the left. On the other hand, if you chose 35 minutes, then you would be in the last group called up to the front of the room and will stand on the right. The study leader will check to make sure that you come up to the front of the room at the correct time.

Payments
Your payment will be your $20 show-up fee plus any additional payments you may earn.

Make-A-Wish Foundation
Make-A-Wish Foundation is a 501(c)(3) charitable organization that organizes and funds "wishes" for children with life-threatening medical conditions. On their website (http://wish.org), Make-A-Wish describes their activities as follows: "We grant the wishes of children with life-threatening medical conditions to enrich the human experience with hope, strength and joy […] Most wish requests fall into four major categories:

- **I wish to go:** Some wish kids want to travel to their favorite theme park, while others want to visit an exotic beach, go on a cruise, see snow for the first time, or attend a major sporting event or concert.
- **I wish to be:** Children search the depths of their imagination when they wish to be someone for a day— a firefighter, a police officer or a model.
- **I wish to meet:** Many want to meet their favorite athlete, recording artist, television personality, movie star, politician or public figure.
- **I wish to have:** Children often wish for a special gift, such as a computer, a tree house, a shopping spree or something that they have coveted for a long time."

Final Notes
Throughout the study, please push OK on the computer screen to continue or to submit answers. When you are waiting for the experiment to continue, please quietly wait at your seat and refrain from using any electronic devices or partaking in any other activity. If you ever have a question, please raise your hand.

To summarize:

- In each of 10 rounds, you will decide how many minutes you want to stay to earn money for everyone. You will also make your best guess concerning the median number of minutes the other subjects will choose in that round.
- At the start of every round after the first, you will be told the median number of minutes chosen by other subjects in the previous round.
- At the end of all 10 rounds, one round will be chosen at random. Everyone will reveal the number of minutes they decided to stay in that round to everyone else, by wearing nametags with that information, and by lining up in the front of the room from lowest to highest number of minutes.
- One person will be chosen at random from the selected round, and their choice will be implemented: they will have to

wait for the amount of timey indicated, and each participant, including themselves, will receive the additional payment corresponding to the chosen person's decision. No one other than the chosen person will have to wait. Also, the study leader will donate $10 to Make-A-Wish Foundation towards helping children in the particular city listed in that round.

- You will receive a $3 bonus on top of your $20 participation fee if, for the selected round, you guessed the median number of minutes for the other participants correctly.

Thank you!

Charity-Public-No Feedback

This is a study on decision-making. Please turn off and refrain from using any electronic devices throughout today's study, including your cell phones. If you have a question, please raise your hand and a study leader will come to answer you in private.

Make-A-Wish

The choices you make in today's study will involve Make-A-Wish Foundation, a 501(c)(3) charitable organization that organizes and funds "wishes" for children with life-threatening medical conditions. On their website (http://wish.org), Make-A-Wish describes their activities as follows: "We grant the wishes of children with life-threatening medical conditions to enrich the human experience with hope, strength and joy […] Most wish requests fall into four major categories:

- **I wish to go:** Some wish kids want to travel to their favorite theme park, while others want to visit an exotic beach, go on a cruise, see snow for the first time, or attend a major sporting event or concert.
- **I wish to be:** Children search the depths of their imagination when they wish to be someone for a day— a firefighter, a police officer or a model.
- **I wish to meet:** Many want to meet their favorite athlete, recording artist, television personality, movie star, politician or public figure.
- **I wish to have:** Children often wish for a special gift, such as a computer, a tree house, a shopping spree or something that they have coveted for a long time."

Rounds

There will be 10 rounds in this study.

Selected Round and Selected Participant

In each round, you will make a decision by answering a question, which we describe below. At the end of the experiment, the computer will randomly select one round (out of the 10 rounds) and one participant (out of the participants in this study session). We will call these the **selected round** and the **selected participant**, respectively. The decision made by the selected participant in the selected round will be implemented for payment. No other decisions, by non-selected participants or by the selected participant in non-selected rounds, will be implemented for payment. However, since any one of your decisions may actually be the one that is selected and hence implemented for payment, you should make each decision carefully and seriously, as if it is the one that actually counts.

Decisions

In each round, you will have to make the following decision:

> "*How many minutes (X) would you like to stay and earn money for Make-A-Wish Foundation, when any money you earn will be directed towards helping children in [NAME OF CITY]?"*

Your choice of X can be from 0 – 35 minutes, and will correspond to Make-A-Wish Foundation being given a particular amount of money (you will be told the exact amounts for each possible choice of X). Across rounds, the above question will only change by naming different cities in Texas.

Imagine you are the selected participant and you chose to stay Y minutes in the selected round. Then:

- You will stay in this room for an additional Y minutes at the end of the study. Even if Y = 35 minutes, you will still complete the study within the advertised time. During this Y minutes, you will NOT be allowed to participate in any other activity, such as using a cell phone, and instead must just quietly wait with your eyes open (you will not be allowed to nap, and the study leader will remind you if you try).
- Note that the longer you choose to stay in the selected round (i.e., the higher Y is), the more money Make-A-Wish Foundation will receive.
- For instance, if you choose Y = 3, then you will have to stay 3 minutes and Make-A-Wish Foundation will receive the corresponding donation. Or, if you choose Y = 6 minutes, then you will have to stay 6 minutes and Make-A-Wish Foundation will receive the corresponding donation.

State Belief on Others' Decisions

In each round, on the same screen that you make your above decisions, you will also be asked your belief about others' decisions. In particular, you will be asked:

> *"What is the MEDIAN number of minutes YOU BELIEVE others (excluding you) will stay and earn money for Make-A-Wish Foundation, when any money one earns will be directed towards helping children in [NAME OF CITY]?"*

If you correctly state the median number of minutes that others (excluding you) chose in the randomly selected round, then you will receive an ADDITIONAL bonus payment of $3. Thus, it is in your interest to carefully guess the median number of minutes that other people chose to the best of your ability. Note that your own decision will NOT impact this median that you are trying to guess.

Charity-Public-No Feedback

Note: The median represents the 50th percentile. That is, if you have a series of numbers and order them from the lowest to the highest, then the median is the number in the middle. For instance, the median of {1, 3, 4, 9, 10} is 4.

Information on Others' Decisions
During Rounds 1 to 10, you will not receive any information on participants' decisions.

Recall that after you have made your decisions for all 10 rounds, one round will be randomly selected. **Everyone will learn how long everyone else chose to stay in the selected round** (in other words, not just the median or the choice of the selected participant, but the number of minutes chosen to stay by every person in this room for that round). First, you will have to write how many minutes, from 0 – 35, you chose to stay on a nametag, and then place that nametag on a visible location on your shirt/jacket. You will have to keep this nametag on for the duration of the study. Second, the study leader will ask people to come up to the front of the room in groups according to how long they chose to stay (which corresponds to the number on their nametag), from 0 to 35 minutes. That is, when directed, you will come up to the front of the room along with anyone else who chose to stay the same amount of time as you. The study leader will order these groups into a line at the front of the room such that people who chose the least amount of time will be on the left and people who chose to stay the most amount of time will be on the right. For instance, if you chose 0 minutes, then you would be in the first group called up to the front of the room and will stand to the left. On the other hand, if you chose 35 minutes, then you would be in the last group called up to the front of the room and will stand on the right. The study leader will check to make sure that you come up to the front of the room at the correct time.

Payments
Your payment will be your $20 show-up fee plus any additional payments you may earn.

Final Notes
Throughout the study, please push OK on the computer screen to continue or to submit answers. When you are waiting for the experiment to continue, please quietly wait at your seat and refrain from using any electronic devices or partaking in any other activity. If you ever have a question, please raise your hand. Thank you!

To summarize:

- In each of 10 rounds, you will decide how many minutes you want to volunteer to make money for Make-A-Wish Foundation to help children in a particular city in Texas. You will also make your best guess concerning the median number of minutes the other subjects will choose to volunteer in that round.
- At the end of all 10 rounds, one round will be chosen at random. Everyone will reveal the number of minutes they decided to volunteer in that round to everyone else, by wearing nametags with that information, and by lining up in the front of the room from lowest to highest number of minutes.
- One person will be chosen at random from the selected round, and their choice will be implemented: they will have to wait for the amount of time they indicated, and we will make the associated contribution to Make-A-Wish-Foundation.
- You will receive a $3 bonus on top of your $20 participation fee if, for the selected round, you guessed the median number of minutes for the other participants correctly.

Thank you!