Community trust reduces myopic decisions of low-income individuals

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Why do the poor make shortsighted choices in decisions that involve delayed payoffs? Foregoing immediate rewards for larger, later rewards requires that decision makers (*i*) believe future payoffs will occur and (*ii*) are not forced to take the immediate reward out of financial need. Low-income individuals may be both less likely to believe future payoffs will occur and less able to forego immediate rewards due to higher financial need; they may thus appear to discount the future more heavily. We propose that trust in one's community—which, unlike generalized trust, we find does not covary with levels of income—can partially offset the effects of low income on myopic decisions. Specifically, we hypothesize that low-income individuals with higher community trust make less myopic intertemporal decisions because they believe their community will buffer, or cushion, against their financial need. In archival data and laboratory studies, we find that higher levels of community trust among low-income individuals lead to less myopic decisions. We also test our predictions with a 2-y community trust intervention in rural Bangladesh involving 121 union councils (the smallest rural administrative and local government unit) and find that residents in treated union councils show higher levels of community trust and make less myopic intertemporal choices than residents in control union councils. We discuss the implications of these results for the design of domestic and global policy interventions to help the poor make decisions that could alleviate poverty.

temporal discounting | poverty alleviation | trust | decision making | community

Low-income individuals are more likely to make myopic decisions that favor the short-term but neglect long-term outcomes (1, 2). People living in poverty are more likely to discount future payoffs compared with wealthier individuals, which can in part be attributed to the specific environment in which these decisions are made. From US households (3) to rural Ethiopian farmers (4), lower wealth predicts higher temporal discount rates. A myopic orientation, in turn, makes it less likely individuals escape poverty as they fail to engage in behaviors that benefit them in the long term, such as investing in education, health, and finances (1, 5, 6). This creates a vicious cycle: Poverty leads to short-sighted choices that in turn lead to poverty (7). But why are the poor more likely to make myopic decisions, and what interventions can be designed to shift their decisions toward the long term?

Three broad theoretical perspectives address why poor people appear myopic. An economic perspective views the poor as people who, like the rest of society, engage in actions that align with their goals in a rational manner (8, 9). Poor people make myopic decisions, then, because they lack the opportunities to alleviate their impoverished situation. They do the best they can, given their circumstances. A sociological perspective describes the decisions of the poor as emanating from a "culture of poverty" that often entails misguided goals and motives (10, 11). Low-income individuals make decisions contrary to their long-term interests because they value different ends. Finally, a recently proposed psychological perspective suggests that poverty affects how the poor process information (7). Because poverty-related concerns consume mental resources, they leave less capacity for other tasks. This in turn promotes higher discounting because poor people are not able to adequately plan for the future (1, 2). Common to all three perspectives is the assumption that low- and high-income individuals share a similar calculating logic when trading off intertemporal choices. They differ in the reasons provided for why this logic gets skewed, proposing a lack of opportunities, a lack of education, or limited mental bandwidth (1, 2, 8, 10–12).

We suggest a related but different possibility, namely that the poor are engaged in a different kind of mental calculus. To even consider accepting a delayed payoff requires both a belief that the delayed payoff will occur (13, 14) and the ability to forego the immediate payoff (15). Hence, whereas high-income individuals may ask, "Is a delayed payoff of $100 worth $85 today?", low-income individuals may instead ask, "Do I think I will really get the delayed payoff?" and "Can I afford to forego the immediate payoff?" Such pessimism or skepticism may have multiple origins: adverse past experience with delayed payoffs failing to materialize or the absence of good experiences to draw from (16) and the tendency for low-income individuals to worry more about their immediate needs because these needs loom larger (17). Intertemporal choice thus not only is a question of discounting delayed payoffs for their distance in time, but also depends on (*i*) trusting that delayed payoffs will occur and (*ii*) trusting that needs are sufficiently met to enable foregoing the immediate payoff.

Hence, we focus on a different, currently understudied, element of intertemporal decisions—trust—and use it to offer an alternative explanation that helps integrate and reconcile the

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Significance

More than 1.5 billion people worldwide live in poverty. Even in the United States, 14% live below the poverty line. Despite many policies and programs, poverty remains a domestic and global challenge; the number of US households earning less than $2/d nearly doubled in the last 15 y. One reason why the poor remain poor is their tendency to make myopic decisions. With reduced temporal discounting, low-income individuals could invest more in forward-looking educational, financial, and social activities that could alleviate their impoverished situation. We show that increased community trust can decrease temporal discounting in low-income populations and test this mechanism in a 2-y field intervention in rural Bangladesh through a low-cost and scalable method that builds community trust.

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three approaches above. Specifically, we argue that choosing delayed outcomes in intertemporal decisions requires trusting that future payoffs will occur, as well as trusting that immediate financial needs will be sufficiently met to make considering the long term possible. In the absence of trust, it might be rational to favor the short over the long term [as the economic perspective suggests (8, 12)]. Increasing trust can help change values, goals, and motives to favor the long over the short term [as the sociological perspective suggests (10, 11)]. Finally, the presence of trust may help reduce negative affect and stress, thus improving the quality of long-term decision making [as the psychological perspective suggests (1, 2)]. In all three cases, however, trust is the underlying driver of myopic decisions.

We present evidence from four studies using archival, correlational, experimental, and field data to provide support for the hypothesis that trust drives intertemporal choices. Further, as we detail below, we suggest that two types of trust matter: (*i*) generalized trust, which extends to the social environment more generally, increases with income, and influences the belief that long-term payoffs will occur, and (*ii*) community trust, which extends to an individual's community, does not vary with income, and influences the belief that financial needs will be sufficiently met. We specifically highlight the role of community trust and suggest that interventions designed to increase community trust among low-income individuals can reduce their myopic behavior, in turn helping them alleviate their impoverished situation.

Finding 1: Generalized Trust Varies with Level of Income

Investing in a long-term payoff implicitly involves trusting that promised long-term benefits will materialize (13, 14). Studies conducted with young children show that when they do not trust their environment, they are less likely to forego immediate payoffs (e.g., a small quantity of a desired snack) for a delayed, larger payoff [e.g., a larger quantity of a desired snack (18)]. Indeed, in a situation where the receipt of a delayed option is not guaranteed, investing in the short term is likely the rational thing to do (14). Trust can be seen as a mechanism to deal with the impacts of unpredictability that helps individuals cope with social uncertainty and complexity (19). This notion is reflected in the political science literature, which recognizes "generalized trust"—"a set of moral values [that] create regular expectations of regular and honest behavior" (ref. 20, p. 53)—as an important source of individually and socially valuable outcomes, such as health and happiness (21). Partly for these reasons, generalized trust plays an important role in economic growth (22, 23).

Evidence suggests that trust is unequally distributed throughout society. Trust can be thought of as a belief (24) that emerges from a number of observations or experiences over time (25). Individuals with higher incomes are more likely to have favorable experiences in their lives, whereas those with lower incomes are more likely to experience violations of trust (13, 26). Much of what poor people experience (e.g., negative income shocks) reinforces a lack of trust in their environment (27). The intertemporal decisions of low-income individuals may therefore in part merely be factoring in the perceived uncertainty of long-term investments paying off (14). To confirm these predictions, we analyzed data from the World Values Survey ($n = 220,145$), a nationally representative survey conducted in almost 100 countries (28). Generalized trust in this survey is assessed through the question "Generally speaking, would you say that most people can be trusted or that you need to be very careful in dealing with people?" Respondents can choose between two possible options: "Most people can be trusted," (coded as 0) and "Need to be very careful" (coded as 1). Although this single-item, dichotomous measure of generalized trust is problematic (29), studies have found it to be related to other valid and relevant variables (30, 31). Income in the survey is self-reported on a scale from 1 (lowest group) to 10 (highest group), with respondents asked to consider "all wages, salaries, pensions, and other incomes" when responding. We estimate a logistic regression of income as a predictor of generalized trust and find that the coefficient of

income is significant ($\beta = -0.07$, SE = 0.002, $P < 0.001$), indicating that high-income individuals have higher levels of generalized trust. Thus, low-income individuals may be more doubtful that a long-term payoff will materialize, which can reduce the appeal of a larger, later option.

Finding 2: Financial Needs Vary with Levels of Income

In intertemporal choices, low-income individuals also have to determine whether their current financial situation allows them to forego the immediate reward. A staggering proportion of US households—nearly 50%—are unable to come up with $2,000 over the course of 1 mo if they need to (15). When levels of savings are low, as is likely the case for low-income individuals, they may be unable to forego the smaller, sooner payoff because they require the money to alleviate their immediate needs (32).

To investigate this, we recruited 285 participants from the United States who were asked to imagine a situation where they had to choose between receiving $100 today or $150 in 1 y and probed to list some of the issues they would consider when making this decision (see *Online Pilot Study* for additional details). Participants additionally responded to a three-item scale that assessed financial need [e.g., "Given my current financial constraints, I need to take $100 today rather than wait for the delayed payoff ($150 in one year)"]. Next, we measured participants' levels of income and their levels of generalized trust through a six-item scale (33). Finally, we asked participants which of the two options they would choose: $100 today or $150 in 1 y.

A total of 116 individuals (40.7%) stated that their current financial situation constrained their choice. Unsurprisingly, we find that levels of income are related to financial need ($\beta = -0.035$, SE = 0.006, $P < 0.001$), such that lower income is related to higher financial need. When we introduce both financial need and income into a linear regression predicting the choice of delayed ($150 in 1 y) over the immediate option ($100 today), only financial need is a significant predictor ($\beta = -0.12$, SE = 0.0013, $P < 0.001$), whereas income is not ($\beta = 0.0011$, SE = 0.0014, $P = 0.41$). Crucially, generalized trust is not related to financial need ($\beta = 0.03$, SE = 0.102, $P = 0.76$): Beliefs regarding whether the long-term payoff will materialize do not influence participants' evaluation of their financial situation. Similar to data from the World Values Survey described above, generalized trust is positively related to income ($\beta = 0.008$, SE = 0.004, $P = 0.027$).

Taken together, findings 1 and 2 suggest that low-income individuals are both less likely to believe long-term payoffs will occur and less able to forego the immediate reward due to higher financial need. Does this, however, mean that low-income individuals are doomed to being myopic? We turn to this question next.

Finding 3: Community Trust Can Act as a Buffer for Low-Income Individuals

Prior research emphasizes the important role of the local community in influencing the experience of everyday life (21). Communities even shape an individual's willingness to take financial risks. For instance, one study found that Chinese participants were less risk averse than Americans, attributing this difference to cultural differences between the two groups. "In socially-collectivistic cultures like China, family or other in-group members will step in to help out any group member who encounters a large and possibly catastrophic loss" (ref. 34, p. 1208). In contrast, in individualistic cultures such as the United States, individuals who make risky decisions are usually expected to face the consequences of their decisions. The social structure that reflects collectivistic societies therefore acts as a "cushion" against possible losses from risky decisions, allowing individuals in collectivistic societies to be less risk averse (34, 35). Such differences exist not only between, but also within, nations (36); one study suggests that nearly 80% of total cultural variation exists within, rather than between nations (13).

Supporting evidence for the important role of the community also originates from research conducted on the "buffering

hypothesis" that suggests that strong ties to close others have beneficial effects on individuals' well-being (37, 38). The perceived availability of support allows individuals to appraise stressful situations as less aversive, which makes it less likely such events will negatively influence them (39). Because greater financial need is often experienced as stressful (32), stronger support from the local community may also reduce the aversive impact of financial need.

Importantly, the experiences that give rise to community trust are based on an individual's interactions with his or her immediate surroundings and not with the general environment as a whole, as is the case for generalized trust. Thus, trust in one's local community to cushion against potential losses, or "buffer" against the stress of lower income, may be distributed more evenly across the income spectrum than generalized trust. To further investigate this, we again turn to the World Values Survey where individuals also respond to the question: "I'd like to ask you how much you trust people from your neighborhood. Could you tell me whether you trust people from this group?" Respondents have four possible options: (*i*) "Trust completely," (*ii*) "Trust somewhat," (*iii*) "Do not trust very much," or (*iv*) "Do not trust at all." We conducted an ordinal logistic regression of community trust against levels of income and find that levels of income do not predict levels of community trust (P = 0.15; *World Values Survey*).

In addition, in the pilot study for finding 2 above (with 285 US participants), we also measured levels of community trust using a 13-item measure (adapted from ref. 40). Example items included "I do a lot of good things in my neighborhood" and "There are advantages to living in my neighborhood." We regress community trust onto our measure of financial need and find a significant negative relationship ($\beta = -0.58$, SE = 0.136, $P < 0.01$), such that individuals with higher community trust reported lower financial need. This relationship also holds when adding income as an additional predictor ($\beta = -0.40$, SE = 0.126, $P < 0.01$). Hence, a higher level of community trust influences the choice of delayed payoffs by reducing low-income individuals' perceived constraints. The same level of actual financial need, based on an individual's current financial situation, may be experienced differently with varying levels of community trust. When individuals experience lower levels of community trust, actual financial needs are unlikely to be mitigated by the local community. However, when individuals experience higher levels of community trust, actual financial needs are alleviated by the buffering and cushioning the local community provides. In turn, when their needs are not felt as acutely, low-income individuals with higher community trust are better able to consider the long-term option.

Accordingly, we argue that it is important to consider the effects of generalized trust as distinct from community trust on the long-term decisions of the poor. Although a higher level of both generalized and community trust can theoretically support the choice of a delayed payoff, we propose there are at least three reasons why a focus on community trust is a more viable basis for an intervention to reduce myopic intertemporal choices among low-income individuals. First, because community trust does not covary with income whereas generalized trust does, low-income individuals may already have higher base rates of community trust, and this may make an intervention simpler and more effective. Second, personal beliefs are often resistant to change (41). Whereas interventions to influence personal beliefs exist (42), they require repeated, in-depth exposure and experiences that serve to reinforce the intended belief change. Generalized trust is a more entrenched belief and less amenable to change than community trust; the latter, based on interactions with one's immediate surroundings, has more touchpoints for possible interventions. Moreover, interventions that focus on community trust require fewer major changes to governmental institutions compared with treatments that aim to change generalized trust. Creating an intervention to change generalized trust requires more time, intense exposure, and systemic change than an intervention to change community trust.

Third, whereas generalized trust influences intertemporal choices by signaling to individuals how likely it is the long-term payoff will occur, community trust influences the level of financial need individuals experience and thus their ability to consider foregoing the immediate payoff. There may be instances when a lack of generalized trust is warranted, i.e., where the delayed payoff—should individuals choose it—does not occur. Thus, an intervention that increases generalized trust may backfire when low-income individuals choose the larger, later option and it does not materialize. Instead, a focus on community trust is less likely to backfire because its higher levels ameliorate the financial constraints low-income individuals face. We now turn to study 1, which seeks to establish the role of community trust in influencing temporal discounting by low-income individuals.

Study 1: Community Trust and Temporal Discounting by Low-Income Individuals

This study was an online experiment with 647 participants from the United States (see *Supporting Information* for additional details). We first presented respondents with the same 13-item scale of community trust as above (40). We then assessed their temporal discount factor (the multiplier that equates $100 in 1 y's time with the amount that an individual is willing to take instead, if received today) using Dynamic Experiments for Estimating Preferences (DEEP) (43), an adaptive testing platform where participants repeatedly choose between a smaller payoff that is received closer to the present (smaller/sooner) and a larger one that is received farther into the future (larger/later). Although decisions are hypothetical, temporal discount factors predict real-world intertemporal decisions, such as mortgage choices (44), and their consequences, such as credit scores (45). Indeed, decisions in other delay-discounting tasks are predictive of a wide range of long-term outcomes, such as health, education, and retirement savings (46, 47). Finally, respondents reported their current levels of income, as well as their gender, age, and education.

Replicating previous studies (1, 2, 7), we find that discount factors vary with levels of income ($\beta = 0.0034$, SE = 0.0015, $P = 0.021$), such that individuals with higher levels of income discounted the future less than those with lower levels of income. To illustrate this, we categorized participants with household incomes below $40,000 as low income and those with incomes above $40,000 as high income and found that low-income participants discounted the future more ($M = 0.131$, SE = 0.006) than high-income participants ($M = 0.159$, SE = 0.006), with lower discount factors indicating greater discounting. This cutoff point represents the median in our sample. Similar cutoff points are often used in prior research (48, 49). Cutoff points higher or lower than $40,000 do not significantly change our results.

Next, we regressed the discount factor on continuous income and community trust as well as the interaction between the two predictor variables. In addition to the main effect of income already mentioned, we find a main effect of community trust ($\beta = 0.0015$, SE = 0.0007, $P = 0.025$), such that individuals with higher levels of community trust discount the future less. Both main effects are qualified by a significant interaction between community trust and levels of income on temporal discounting ($\beta = -0.0052$, SE = 0.0023, $P = 0.026$). These effects also hold when we control for demographic variables such as age, gender, and education (Table S1). To better understand the interaction between community trust and income, we next conducted simple slopes analyses (50) and found that lower levels of income were related to higher discounting of the future only when levels of community trust were low ($t(643) = 2.86$, $P = 0.0044$) but not when levels of community trust were high ($t(643) = -0.032$, $P = 0.748$). Hence, only individuals with low incomes and low levels of community trust differ significantly from all other groups (Fig. S1). We now turn to study 2, which seeks to examine the impact of community trust on the temporal discounting of low-income individuals in a richer real-world context.

Study 2: Community Trust and Payday Loans

In study 2 we investigate whether taking out a payday loan—a typical form of myopic behavior displayed by low-income individuals—varies with levels of community trust (see *Supporting Information* for additional details). To do so, we combine state-level data from the Survey of Household Economics and Decision Making (SHED) with an additional survey that measured community trust, which we conducted among 5,721 US participants in 50 states. We recruited US participants through a stratified sampling method, such that ~100 participants responded per state. Participants responded to questions assessing their levels of community trust, using the same scale as in study 1. Based on these responses, we created state averages. We also obtained state-level data of additional control variables, such as income, unemployment, and age. Through SHED, we accessed state-level data on payday loan use and matched both datasets at the state level.

An ordinary least-squares regression with state-level payday loan use as the dependent variable and state-level community trust as the independent variable finds that community trust predicts payday loan use ($\beta = -0.15$, SE = 0.041, $P < 0.001$). This effect also holds when we control for other variables such as age, income, and unemployment. Crucially, this effect also holds when controlling for levels of savings ($\beta = -0.11$, SE = 0.033, $P = 0.001$), a proxy for levels of actual financial need. This provides further support that higher levels of community trust reduce perceived financial need, even when levels of actual financial need vary. Although studies 1 and 2 suggest that community trust plays a role in buffering or cushioning low-income individuals against myopic discounting, this evidence is correlational. We now turn to a study that attempts to establish causal evidence for the proposed relationship.

Study 3: Exploring the Causal Link between Community Trust and Temporal Discounting by Low-Income Individuals in the Laboratory

We recruited 120 participants online and assigned them to one of four possible conditions in a 2 × 2 design. Specifically, the design involved manipulating levels of felt income (low/high) and levels of felt community trust (low/high). Imagining more severe financial implications has been shown to evoke feelings of having lower income (2). To induce low vs. high levels of felt income, we used previously developed and validated scenarios (2). Participants in the high felt-income condition were asked to imagine scenarios with relatively minor financial implications, whereas those in the low felt-income condition were asked to imagine scenarios with more severe financial implications. We manipulated levels of community trust by increasing the salience of this construct in the minds of respondents (51). We gave participants a definition of community trust ("the extent to which you trust your community"). We then asked them to list either 2 (low) or 10 (high) examples from their own experience where community trust was justified. In contrast to studies that use a similar design to manipulate difficulty of retrieval (52), participants in this study had to produce the full number of examples requested. Subjects did not experience difficulties in providing examples. Next we assessed temporal discounting, using DEEP (43). We also collected data on several demographic variables.

Consistent with what we would expect if our manipulation of felt income was successful, we found that participants in the low felt-income condition were more myopic ($M = 0.13$, SE = 0.015) than participants in the high felt-income condition ($M = 0.178$, SE = 0.017, $P = 0.044$). We examined whether community trust serves as a buffer or cushion for individuals with lower levels of felt income by testing for an interaction effect between levels of community trust and felt income on the temporal discount factor. An ANOVA with felt income and manipulated community trust as the independent variables and the discount factor as the dependent variable shows a marginally significant interaction ($F_{(3,116)} = 2.98$, $P < 0.10$). To further investigate which condition is driving this effect, we conducted pairwise comparisons. These

revealed that three conditions differ significantly from a fourth. Participants in the low felt-income, low community-trust condition were more myopic ($M = 0.103$, SE = 0.019) than individuals in the low felt-income, high community-trust ($M = 0.178$, SE = 0.024; $P = 0.04$), high felt-income, low community-trust ($M = 0.176$, SE = 0.018; $P = 0.032$), and high felt-income, high community-trust ($M = 0.179$, SE = 0.03; $P = 0.045$) conditions. These results hold when controlling for additional control variables (e.g., age, gender, education, and actual income).

Study 3 provides laboratory-based causal evidence in support of our hypothesis that low-income individuals with higher levels of community trust discount the future less heavily than low-income individuals with lower levels of community trust. Although our previous studies show that community trust does not vary by income and that perceptions of such trust can be manipulated in a laboratory setting, we now turn to showing that community trust can be built in a real-world context and test if doing so reduces myopic intertemporal decisions.

Study 4: Exploring the Causal Link Between Community Trust and Temporal Discounting by Low-Income Individuals in the Field

In this study, we sought to replicate our findings in a field setting featuring a different cultural context and involving ultrapoor individuals (see *Supporting Information* for additional details). We collaborated with BRAC, an international development organization based in Bangladesh, and The Hunger Project (THP), a global nonprofit organization with headquarters in New York. In February 2014, BRAC and THP launched a 2-y intervention designed to increase community trust in 121 union councils (the smallest rural administrative and local government units) in four districts of Bangladesh (Kishoreganj, Habiganj, Sunamgonj, and Bagerhat). Sixty-one union councils received the intervention whereas 60 union councils were in the control condition (see Table S2 for demographic information and *Supporting Information* for additional details).

The intervention had two components. First, volunteers from the community were trained to act as intermediaries between the community and the local government. This required the volunteers to interact with other members of their community, provide input into local governance, and help residents access public services from the local government. Second, a platform was created for inclusive community-driven governance to change the way community-level decisions were made. This involved representatives from the community working with the local government to make community-level decisions, for example in the distribution of social benefits, the allocation of funds and resources for development projects, and the selection of people to use in publicly funded projects. At the end of the 2-y intervention, we surveyed individuals ($n = 1,447$) in all 121 union councils on their levels of community trust as well as assessing their temporal discounting. We measured temporal discounting using a pen-and-paper titration measure (53).

We first tested whether our intervention increased levels of community trust in treatment union councils. Our intervention was successful: We find a significant difference in levels of community trust between treatment and control union councils ($\beta = -0.14$, SE = 0.026, $P < 0.001$), such that levels of community trust (ranging from 1 to 5) are higher in treatment ($M = 3.45$, SE = 0.0015) than control union councils ($M = 3.31$, SE = 0.0013). There were no significant differences between treatment and control union councils for generalized trust. We next specified a hierarchical linear model, which nests union councils within condition and clusters SEs at the union council level. This allows us to account for differences between union councils and provides a more accurate analysis of the treatment effect. Our dependent variable is individuals' temporal discount factor. As Table S3 shows, participants in treatment union councils were significantly more likely to discount the future less heavily ($\beta = 0.081$, SE = 0.034, $P = 0.018$). In concordance with our prior studies, measured generalized trust, as shown in model 2 in

[Table S3](#), is an additional significant predictor ($\beta = 0.54$, SE = 0.13, $P < 0.01$), such that those individuals with higher levels of generalized trust are more likely to discount the future less. The addition of further control variables does not significantly influence individuals' tendency to discount the future (model 3 in [Table S3](#)). This effect also holds when controlling for levels of income, a proxy for levels of actual financial need, providing further evidence that higher levels of community trust reduce perceived financial need even when levels of actual financial need vary. To further establish the role of community trust in reducing perceived financial need, we also conducted 42 qualitative interviews and 8 focus group discussions in 14 union councils, 7 treatment and 7 control (see *Supporting Information* for further information).

In sum, this field study shows that an intervention designed to increase levels of community trust successfully does so and, in the process, affects temporal discounting, such that individuals in treatment union councils are less myopic in their intertemporal decisions than individuals in control union councils.

Discussion

Low-income individuals are more likely to make myopic decisions. This can, in turn, make it more difficult for them to alleviate their impoverished condition. At least three broad perspectives have addressed why low-income individuals are more likely to discount the future more heavily. An economic perspective views individuals living in poverty as people who, like the rest of society, engage in actions that align with their goals in a rational manner (8, 9). A sociological perspective describes the decisions of the poor as emanating from a culture of poverty that often entails misguided goals and motives (10, 11). Finally, a psychological perspective suggests that poverty itself affects individuals' information processing (7). These perspectives share the assumption that low- and high-income individuals use a similar logic in their trade-off calculation.

In this paper, we focus on a different, understudied, element of intertemporal decisions—trust. We show that low-income individuals are more likely to make myopic decisions because (*i*) they have lower levels of generalized trust, thus reducing their belief that the delayed payoff will occur, and (*ii*) they have higher levels of financial need, thus constraining their ability to forego the immediate payoff. Because community trust reduces the felt impact of actual financial need, low-income individuals with higher levels of community trust make less myopic intertemporal decisions. Indeed, community trust reduces myopic intertemporal choices even when controlling for actual financial need as in studies 2 and 4, providing further support that higher levels of community increase levels of perceived financial need. By increasing levels of community trust, the myopic behavior of low-income individuals can be reduced, potentially helping them improve their financial well-being. Generalized trust, in our studies as well as in previous work, also affects people's delay discounting but may be more difficult to change. It is worth noting that our community trust intervention in study 4 did not impact levels of generalized trust.

This paper makes three primary contributions. First, we highlight that aside from the differential impact of time delay, intertemporal choice may also be influenced by beliefs about whether long-term payoffs will occur and the ability to forego immediate payoffs. Because low-income individuals are less likely to generally trust their environment, myopic decisions may reflect not just greater impatience, but also reduced belief that long-term payoffs will occur. In addition, because low-income individuals are more likely to experience greater financial need, myopic decisions may also reflect an inability to consider long-term options. This perspective allows us to integrate previous approaches that have attempted to explain why low-income individuals are more likely to discount the future more heavily and provides a single consistent explanation capable of reconciling differences between approaches. Specifically, in the absence of trust, it might be rational to favor the short over the long term (as

the economic perspective suggests). Further, the presence of trust can help reduce negative affect and stress, in turn improving the quality of long-term decision making (as the psychological perspective suggests). Increasing trust can help change values, goals, and motives to favor the long term over the short term (as the sociological perspective suggests). Those low-income individuals who trust their community may be more willing to choose delayed payoffs because they are able to rely on their community to alleviate their financial needs, which in turn allows them to consider foregoing immediate payoffs. In all cases, trust is an underlying driver of the change in myopic behavior.

Second, we distinguish between generalized trust, which we and others show to vary with income, and community trust, which we show does not. Because community trust deals only with an individual's immediate social environment, and not with the general environment as a whole, interventions need only focus on an individual's direct social environment, rather than the general environment as a whole. Generalized trust reflects a more enduring mindset, whereas beliefs about one's community are drawn from people's transactions and interactions with their immediate surroundings, which are more amenable to targeted interventions. Third, our theoretical model generates a unique intervention strategy that we tested in the context of rural Bangladesh. Specifically, an intervention designed to increase levels of community trust was effective in shifting temporal preferences toward the long term. Such an approach has benefits over interventions based on prior perspectives on the myopic behavior of low-income individuals that have produced mixed results, for example through microfinance (54) or financial literacy programs (55). In contrast, because higher community trust reduces perceived financial need, this paper highlights a relatively low-cost, empowering, and scalable intervention.

Whereas each of our studies has its individual limitations, we deliberately adopted a multiple-study strategy that varies methods, types of data, and contexts to ensure that the strengths of each study would compensate for the weaknesses of the others and that, taken together, they would generate broad support for our theoretical model. Thus, in our laboratory and field studies, we focus on temporal discounting but do not examine whether changes in temporal discounting lead to changes in downstream behavior. However, study 2 shows that our model holds when predicting real-world payday loan use. And whereas this archival study did not use individual-level data, we attempted to provide that level of rigor in our controlled experimental laboratory studies. Finally, whereas our laboratory studies lack external validity, we aim to provide this through our 2-y field study that manipulates levels of community trust in rural Bangladesh. Due to field constraints, we were unable to collect data from the same individuals before and after the intervention in Bangladesh. Doing so would have allowed for a more powerful research design including a difference-in-difference comparison (56). We also did not incentivize our intertemporal choice tasks. Although it is preferable to use incentivized tasks, hypothetical choice tasks are widely used and predictive of real-world outcomes (45). Future research should incorporate a repeated-measures design that incentivizes intertemporal choices before and after intervention and tracks the impacts of the intervention for important real-world outcomes, such as levels of income over time.

Poverty is one of the world's most vexing problems. Although great progress has been made in alleviating poverty, there is still a long way to go, both domestically and globally. For example, in the United States, the number of households with less than \$2/d per person has nearly doubled in the last 15 y (57). Progress is often impeded because low-income individuals tend to discount the future more than is advised. To tackle this challenge, our theory and results suggests policy should move beyond a sole focus on the low-income individual and instead provide additional emphasis on the low-income community. Policy makers could implement changes that give individuals in low-income communities more opportunities to develop community trust. This can be achieved, for example, by increasing the

opportunities for interaction or giving community members more say over decision making at the local level. The poor may lack in material wealth relative to the rich, but they possess social wealth in the shape of their communities upon which they can draw. Building and boosting community trust can help decrease myopic decision making and, in turn, contribute to reducing the incidence of poverty domestically and worldwide.

All experiments we report here were approved by the Columbia University Institutional Review Board and all participants provided informed consent.

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Supporting Information

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World Values Survey

The World Values Survey (WVS) is a collection of surveys concerning human beliefs and values that is conducted in nearly 100 countries, together covering 90% of the global population. Levels of generalized trust are assessed by "Generally speaking, would you say that most people can be trusted or that you need to be very careful in dealing with people?" There are only two possible responses: (*i*) "Most people can be trusted" or (*ii*) "Need to be very careful." The WVS assesses levels of community trust with the following question: "I'd like to ask you how much you trust people from your neighborhood. Could you tell me whether you trust people from this group?" There are four possible response options: (*i*) "Trust completely," (*ii*) "Trust somewhat," (*iii*) "Do not trust very much," or (*iv*) "Do not trust at all." Income is measured via a scale from 1 (lowest income group) to 10 (highest income group) "in what group your household is." Survey participants are asked to consider "all wages, salaries, pensions and other incomes that come in" when specifying the appropriate number. Although the correlation between generalized and community trust is significant ($r = 0.328$, $P \leq 0.001$), the divergent relationship to income provides support for the view that the two sources of trust can be thought of as distinct.

Online Pilot Study

We recruited 285 participants (127 females, mean age = 35.26 y, SD = 11.36) through Amazon.com's Mechanical Turk (MTurk) website. We first measured individuals' levels of income and their levels of generalized trust, using a 6-item scale (adapted from ref. 33) (e.g., "Most people are trustworthy" and "I am trustful"; $\alpha = 0.90$). We used this 6-item measure of generalized trust with seven scale points to address potential validity concerns of the 1-item, dichotomous scale used in the WVS (33). This 6-item scale has been found to have sufficient validity and reliability and has been widely used in prior research (58). Participants were also asked to respond to a measure of community trust, using a 13-item scale (adapted from ref. 40) [e.g., "I would like my child(ren) to be raised in the neighborhood I currently live" and "I do a lot of good things in my neighborhood"; $\alpha = 0.82$]. Then we asked participants to imagine they were given a choice between receiving $100 today or $150 in 1 y and assessed their level of financial need, using a 3-item scale ["Given my current financial constraints, I need to take $100 today rather than wait for the delayed payoff ($150 in one year)"; "If I could, I would choose the delayed payoff ($150 in one year), but my current financial situation does not allow me to"; and "I want to choose the delayed payoff ($150 in one year), but I need to choose the close one ($100 today)"; $\alpha = 0.84$]. Finally, participants were asked to choose which one of the two options they would prefer, $100 today or $150 in 1 y.

Study 1: Correlational Evidence from the United States

We recruited 647 participants (319 females, mean age = 35.55 y, SD = 10.63) through Amazon.com's MTurk website. Following informed-consent procedures, participants responded on a five-point scale ranging from "not at all" to "completely" to the same 13-item measure of community trust as above ($\alpha = 0.87$).

We next assessed temporal discounting factors using DEEP (43), an adaptive testing framework where participants choose between a payoff that is smaller but is received closer to the present (smaller sooner) and one that is larger but is received farther into the future (larger later). The structure of each de-

cision depends on the participant's previous response, allowing for a precise, robust, and fast time preference estimation. Markov chain Monte Carlo and hierarchical Bayesian statistics are used to determine more accurate values of the time function—specifically beta (present bias) and delta (discounting rate). As part of a final section on demographic information, participants indicated their current levels of income, as well as their age, education, and sex.

Similar to previous research, the temporal discounting factor was computed by first calculating the annual discounting rate (ADR) ($\exp(\delta * 365)$) and then calculating the discounting factor as $1/1(1 + \text{ADR})$. Let δ_{days} be the discounting factor in day units. The discount factor in a $\beta\delta$ model hyperbolic discounting framework (59) is

$$DF_{days} = \beta\delta^{D_{days}}.$$

Therefore,

$$\delta_d = \left(\frac{PV}{FV}\right)^{1/D_{days}},$$

where D_{days} is time periods in days:

$$\delta_{years} = \left(\frac{PV}{FV}\right)^{\frac{1}{D_{years}}} = \left(\frac{PV}{FV}\right)^{\frac{1}{\frac{D_{days}}{365}}}$$

$$= \left(\frac{PV}{FV}\right)^{365/D_{days}} = \left(\delta_{days}\right)^{365}.$$

Considering one time-period delay (whatever unit), then

$$\delta = \frac{PV}{FV}.$$

For hyperbolic discounting,

$$\delta = \frac{1}{1+r}$$

for interest rate r, and

$$\delta = \exp(-r)$$

for exponential discounting.

Therefore, $r_{hyperbolic} = \frac{1-\delta}{\delta}$ and $r_{exponential} = -\log(\delta)$.

Study 2: Archival Payday Loan Data

We recruited 5,721 participants (51% female; age $M = 38.01$ y; SD = 2.16) on MTurk across all 50 US states. We committed to a sample size requirement in advance of launching our study. We aimed to have equal representation of all states in our dataset. Our target sample size was at least 50 participants in each state; we stopped recruitment when the sample size per state reached 150 participants. Unsurprisingly, the number of MTurk respondents in our sample was proportional to the number of people in a state (linear regression of state population size predicting number of MTurk respondents, with robust SEs: coefficient = 2.36×10^{-6}, $P = 0.026$).

To ensure participants recruited on MTurk were paying attention throughout the survey, we included an attention check, as

commonly done on MTurk. Ninety-one percent of 5,721 participants passed the attention check. Our main analysis focuses on participants who passed the attention check. However, when we include participants who failed the attention check, results are qualitatively similar.

Participants responded to the same 13-item community trust survey as above ($\alpha = 0.84$). To further disassociate community trust from generalized trust, we also collected participants' responses to the same measure of 6-item generalized trust as above ($\alpha = 0.89$). Although participants in this study were not exclusively low income, we are able to generate state-level averages of community trust because our previous findings indicate community trust does not differ with income. State-level variation in community trust could be driven, for example, by population density, health levels, crime rate, or unemployment rate.

We ran additional analyses that relate community trust to a range of other variables. Community trust is not significantly related to population density, age, or savings. However, we do find that community trust is marginally related to levels of unemployment ($r = -0.27$, $P = 0.056$), such that higher levels of unemployment are related to lower levels of community trust. In addition, community trust is also related to the percentage of individuals who identify themselves as being "unbanked" ($r = -0.44$, $P = 0.001$) (60), such that higher levels of unbanked citizens were related to reduced levels of community trust. In addition, we find that savings are significantly related to payday loan use ($b = -1.26$, $SE = 0.59$, $P = 0.033$), such that higher levels of savings are related to lower levels of payday loan use.

We also conducted linear regressions with both community trust and generalized trust as independent variables and payday loan use as a dependent variable, and only community trust ($\beta = 0.143$, $SE = 0.05$, $P = 0.0076$), but not generalized trust ($\beta = -0.007$, $SE = 0.006$, $P = 0.90$), was a significant predictor.

Finally, we ran additional analyses on our data, controlling for state-level differences in payday loan regulations. We accessed a database (61) that categorizes the legislation on payday loan use into "restrictive," "permissive," and "hybrid." We reran analyses for states where legislation is more permissive ($n = 3,052$) and find no significant differences in our results.

Study 3: Experimental Evidence

We recruited 120 participants (45% female, mean age = 33.2 y, SD = 10.24) from MTurk. Participants were randomly allocated to one cell in a 2 × 2 design, manipulating levels of felt income (low/high) and levels of felt community trust (low/high). To induce varying levels of felt income, we used previously developed and validated scenarios (2). Participants in both conditions were presented with four different scenarios that asked them to make decisions. The scenarios differed in the financial implications they had; whereas participants in the high felt-income condition were asked to imagine scenarios with relatively minor financial implications, those in the low felt-income condition were asked to imagine scenarios with more severe financial implications. For example, participants were asked to imagine the following: "The economy is going through difficult times; supposed your employer needs to make substantial budget cuts. Imagine a scenario in which you received a 5% (15%) cut in your salary. Given your situation, would you be able to maintain roughly your same lifestyle under those new circumstances?" Participants were then asked to elaborate, being prompted "Why or why not? If not, what changes would you need to make? Would it impact your leisure, housing, or travel plans?" [Other scenarios: Scenario 2: Imagine that an unforeseen event requires of you an immediate $200 ($2,000) expense. Scenario 3: Imagine that your car is having some trouble and requires a $150 ($1,500) service. Unfortunately, your automobile insurance will cover only 10% of this cost. Scenario 4: Suppose you have reached the point where you must replace your old refrigerator. The model you plan to buy offers two alternative financing options: (i) You can pay the full amount in cash, which will cost you $399 ($999), or (ii) you can pay in 12 monthly payments, of $40 ($100) each, which would amount to a total of $480 ($1,200).] Imagining more severe financial implications has been shown to mirror feelings of actually having lower income (2).

We manipulated levels of community trust by increasing the salience of this construct in the minds of respondents (51). We gave participants a definition of community trust ("the extent to which you trust your community"). Next, we asked participants to either list 2 (low) or 10 (high) examples where community trust was justified. This manipulation differs from Schwarz et al.'s (52) ease-of-retrieval concept, as participants did not experience difficulties in coming up with reasons for when community trust was justified. Participants in the 10-example condition wrote an average of 944.96 characters (SE = 55.39), more than three times as much than participants in the 2-example condition who wrote an average of 307.4 characters (SE = 20.43). Crucially, for participants in the 10-example condition, there is no difference in the number of characters written for the first example ($M = 88.04$, $SE = 5.71$) relative to the last example ($M = 104.28$, $SE = 9.25$; $t = -1.49$; $P = 0.139$), indicating that participants did not find it difficult to generate 10 examples. The alternative prediction, based on research investigating the "ease-of-retrieval" effect (52), would have predicted that participants would find 10 examples harder to generate, such that the latter examples were shorter. This would have led to lower levels of felt community trust, which is opposite to what we find. Next, we assessed temporal discounting factors using DEEP (43), similar to study 1. Finally, we measured demographic control variables.

Study 4: Field Evidence from Bangladesh

In study 4, we sought to replicate our findings in a different context with explicitly ultrapoor individuals. Given that our hypotheses target the future-oriented behavior of low-income persons, it is imperative our findings from previous studies also hold at the very low end of the income scale.

Before the start of the intervention, we surveyed 111 participants (37 females; mean age = 38.3 y, SD = 11.05) in 12 unions in Bangladesh. (Age information was available only for 61 participants. According to the BRAC research team, this is a rough representation of the overall age range of all participants.) Although there are no specific records available, the BRAC research team estimates that on average, most respondents are educated up to grade 8 or lower. To highlight the extremely low-income profile of our participants, we divided monthly household income by number of household members. On average, surveyed participants indicated they had about 1,600 Taka (Tk. 1,600) for each household member ($M = 1603.53$, SD = 712.43), which equals roughly $20.50. (Exchange rate Tk. 1,000 = $12.49, February 13, 2017.) That is, household members had on average less than $1/d. This is low even by Bangladeshi standards: Average monthly household income ($M = 7,208.56$, SD = 3,020.41) is lower than average monthly rural household income (Bangladeshi Taka) as measured by the World Bank Household and Expenditure Survey in 2010 (Tk. 11,480). We assessed levels of temporal discounting and community trust for this small sample of 111 participants and found community trust to be a significant predictor of temporal discounting ($\beta = 0.158$, $SE = 0.037$, $P < 0.001$), such that higher levels of community trust were associated with lower temporal discounting.

Following the intervention, interviewers approached participants individually and read aloud the questions. Following participants' verbal responses, interviewers filled out the survey. Levels of community trust were measured by adapting the 13-item scale of study 2 to the local Bangladeshi context. After back translation and pretesting at the local BRAC offices, we developed a 12-item scale equivalent for use in rural Bangladesh

($\alpha = 0.69$). Participants were asked to respond on a scale ranging from 1 "not at all" to 5 "completely," with sample items such as "Daily life in my village makes me hopeful about the future of my child(ren)" and "There is a strong sense of 'community' and 'trust' among the inhabitants of my village."

Given contextual constraints, temporal discount factors were assessed using a titration measure. Similar to previous research (53), participants were asked to decide between a smaller–sooner and a larger–later option. Interviewers explained the measure as follows: "Listed below are several financial payout options ranging from an instant payment of Tk. 500 to several different incremental payout options available in 3 months' time. Please indicate your payout preference for each row." There were seven payout options in 3 mo, ranging from Tk. 515 to Tk. 2,500 (the local currency in Bangladesh; amounts were pretested by the local BRAC office). For each option, participants were asked to choose between Tk. 500 and the payout option in 3 mo. We were unable to collect data at the end of the intervention for 4 of the 121 village union councils, 2 in the control and 2 in the treatment condition.

First, we computed estimates of temporal discount factors by calculating the indifference point, that is, the trade-off where individuals switched from smaller–sooner to larger–later. There were no preference reversals, for example participants preferring Tk. 600 in 3 mo over an instant Tk. 500, but then preferring an instant Tk. 500 over Tk. 700 in 3 mo. Sixteen participants always chose the instant Tk. 500, even when the payout in 3 mo was Tk. 3,000. We code these participants as having an indifference point of Tk. 3,001, a conservative estimate given that their true indifference point is unknown and possibly much higher. (There is also the possibility that these participants did not fully understand the instructions given. Therefore, we ran all subsequent analyses both with and without these 16 participants, with no significant changes in our results.) On average, the indifference point was $M = 1,851.08$ (SD = 1,041.93).

We also investigated whether individuals who were relatively better off were less likely to be beneficially affected by higher levels of community trust. To do this, we ran a two-way interaction between treatment and average income on temporal discounting rates. We find no significant interaction ($P = 0.94$) and only a significant main effect of treatment ($P = 0.021$) on intertemporal discount rate. However, we want to highlight the extremely low-income levels of participants in this study. At the mean, participants had less than \$1/d per household member (~\$23.20/mo). At 1 SD above the mean, participants had ~\$1.35/d (~\$40.64/mo), and even at 2 SD above the mean, participants just barely surpassed the World Bank's international poverty line of \$1.90/d (at ~\$1.94/d or \$58.11/mo). Thus, it is highly unlikely that the effect of community trust should vary for relatively richer participants in our study because most, if not all, participants in our sample had trouble making ends meet and were thus likely beneficially affected by higher levels of community trust.

To alleviate concerns of endogeneity we also ran a two-stage least-squares model (62), with treatment as the instrumental variable, community trust as the explanatory variable, and discount factor as the dependent variable. The model results are consistent with the hierarchical linear model specified above, such that community trust remains a significant predictor of discount factor ($\beta = 0.27$, SE = 0.13, $P = 0.032$). Gender, the only demographic variable that differed across conditions, had no significant effect on temporal discounting, similar to findings of prior research (63).

We also conducted 42 qualitative interviews and 8 focus group discussions in 14 union councils, 7 treatment and 7 control. These were conducted at the end of the intervention period by one of the authors. Interviews were held with elected local government representatives (24 individuals) and persons involved in the community trust intervention (18 individuals). The focus group discussions were held with local community members.

In the control unions, the lack of trust in one's local community is exemplified in quotes from interviewees, such as the following: "Some of us attended a ward shava [local government meeting] once, and we did not know what we were supposed to do. We raised some concerns in front of the Member [local government representative], but later nothing was done about it. It seems our opinions do not matter, and so people from our community do not attend these events or bother to find out what is happening in the union." "What is the point of going to meetings? We do not have any say in this process. [...] There is no reason for us to attend." "The community does not get involved in my problems." "There is little to no participation from the local community. The people who attend [local government meetings] are a limited number of influential people from the area." "We hold meetings regularly as we are supposed to, and try to get the community involved, but the truth is people are simply not interested. It is usually us representatives, local influential people and local government officials who attend."

In contrast, individuals in the treatment councils reported the following: "When I fail to do something, they [other community members] help us give the solution of the problem. Thus, we work together." "The people who got training try to arrange meetings with regular citizens regularly which are named 'Utahan Baithak' [courtyard meetings]. [...] The meetings are held in different areas every week. The problems of the people and their solutions are discussed here in this meeting." "If you need us while applying for this [government program], we will be there to help you." "After participating in the training, she calls a weekly meeting at Friday in the yard of her home. [...] In these gatherings, the community gets together to collectively discuss and solve their problems. We have also formed a citizen's committee to find out the problems of the population and also the solutions of these problems." More details on the qualitative data collected are available in a separate document, ref. 64.
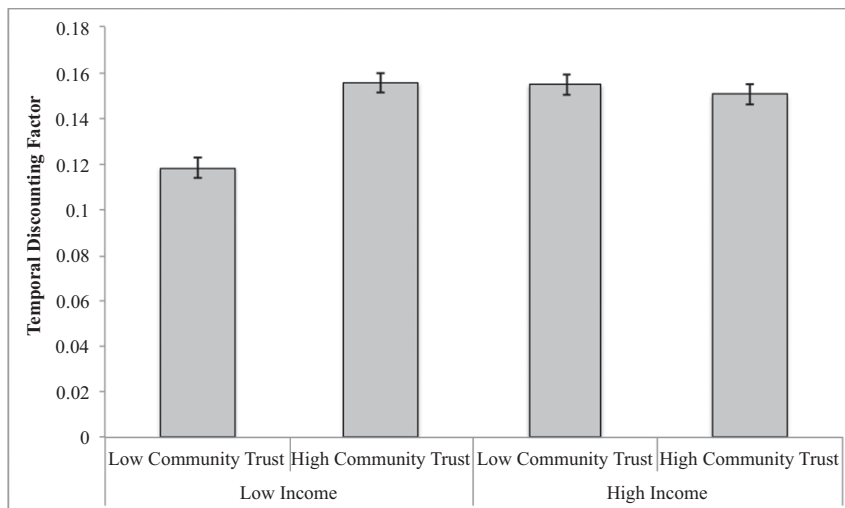
Fig. S1. Temporal discounting factor as a function of income and community trust.

Table S1. Temporal discounting predicted by income and community trust

	Model 1	Model 2	Model 3	Model 4
(Intercept)	0.1269***	0.0913***	−0.0053	−0.0127
	(0.0089)	(0.0243)	(0.0484)	(0.0523)
Income	0.0034*		0.0221*	0.0204*
	(0.0015)		(0.0088)	(0.0089)
Community trust		0.0149*	0.0376**	0.0371**
		(0.0067)	(0.0135)	(0.0135)
Income × community trust			−0.0052*	−0.0050*
			(0.0023)	(0.0024)
Sex				−0.0038
				(0.0089)
Age				−0.0003
				(0.0004)
Education				0.0045
				(0.0026)
R^2	0.0082	0.0077	0.0203	0.0257
Adjusted R^2	0.0067	0.0062	0.0157	0.0166
No. observed	647	647	647	647
rmse	0.1121	0.1121	0.1116	0.1116

$*P < 0.05$, $**P < 0.01$, $***P < 0.001$.

Table S2. Field study descriptive statistics

	Control	Intervention
No. of union councils	60	61
Community trust	3.31 (0.60)	3.45 (0.58)
Generalized trust	3.67 (0.71)	3.70 (0.71)
Mean age, y	33.83 (10.5)	33.10 (11.09)
Sex: 0 = male, 1 = female	0.31 (0.50)	0.47 (0.47)
Average monthly income, in Bangladeshi Taka	1,935.31 (1,367.34)	1,956.94 (1,525.75)
Education	10.80 (2.95)	10.97 (2.72)

SD is in parentheses. Average monthly income is reported as household income divided by household members. One thousand Taka = $12.49 (February 13, 2017). Chi-square test reveals only gender differed between conditions; otherwise there were no significant differences.

Table S3. Hierarchical linear regression with unions nested within condition and dependent variable temporal discounting factor

	Model 1	Model 2	Model 3
(Intercept)	0.39***	0.10	0.06
	(0.06)	(0.09)	(0.11)
Treatment: 0 = control, 1 = treatment	0.08*	0.09*	0.08*
	(0.03)	(0.03)	(0.03)
Generalized trust		0.54***	0.54***
		(0.13)	(0.13)
Age			0.00
			(0.00)
Sex: 0 = male, 1 = female			0.01
			(0.02)
Average income			0.00
			(0.00)
Education			0.00
			(0.00)
AIC	−49.04	−62.79	−12.53
BIC	−29.72	−38.64	30.90
Log likelihood	28.52	36.39	15.26
No. observed	928	928	928
No. groups	117	117	117

*$P < 0.05$, ***$P < 0.001$. AIC, Akaike's information criterion; BIC, Bayesian information criterion.