I Z A Institute
of Labor Economics
Initiated by Deutsche Post Foundation

DISCUSSION PAPER SERIES

IZA DP No. 14607

# Psychological Effects of Poverty on Time Preferences

Vojtěch Bartoš
Michal Bauer
Julie Chytilová
Ian Levely

JULY 2021

I Z A Institute
of Labor Economics

Initiated by Deutsche Post Foundation

DISCUSSION PAPER SERIES

IZA DP No. 14607

# Psychological Effects of Poverty on Time Preferences

**Vojtěch Bartoš**
*University of Munich*

**Michal Bauer**
*CERGE-EI, Charles University in Prague and IZA*

**Julie Chytilová**
*CERGE-EI and Charles University in Prague*

**Ian Levely**
*King's College London*

JULY 2021



ISSN: 2365-9793

**IZA – Institute of Labor Economics**

Schaumburg-Lippe-Straße 5–9
53113 Bonn, Germany

Phone: +49-228-3894-0
Email: publications@iza.org

www.iza.org

# ABSTRACT

## Psychological Effects of Poverty on Time Preferences*

We test whether an environment of poverty affects time preferences through purely psychological channels. We measured discount rates among farmers in Uganda who made decisions about when to enjoy entertainment instead of working. To circumvent the role of economic constraints, we experimentally induced thoughts about poverty-related problems, using priming techniques. We find that thinking about poverty increases the preference to consume entertainment early and to delay work. Using monitoring tools similar to eye tracking, a novel feature for this subject pool, we show that this effect is unlikely to be driven by less careful decision-making processes.

**JEL Classification:** C93, D91, O12

**Keywords:** poverty, scarcity, time preferences, self-control, inattention

**Corresponding author:**
Michal Bauer
Institute of Economic Studies
Faculty of Social Sciences Charles University
Opletalova 26
110 00 Prague 1
Czech Republic
E-mail: bauerm@fsv.cuni.cz

* We thank Ned Augenblick, Alexander Cappelen, Paul Collier, Stefano DellaVigna, Thomas Dohmen, Armin Falk, Johannes Haushofer, Yves LeYaouanq, Anandi Mani, Frank Schilbach, Charlie Sprenger, and journal reviewers and participants at various conferences and seminars for helpful comments. The data collection was funded by the Czech Science Foundation grant 13-20217S. Bauer and Chytilová gratefully acknowledge further support from the Czech Science Foundation when writing the initial version of the paper (17-13869S) and when revising the paper (20-11091S). Vojtěch Bartoš gratefully acknowledges the support of the German Science Foundation through CRC TRR 190. The research was approved by the Commission for Ethics in Research at the Faculty of Social Sciences, Charles University. An earlier version of this paper was circulated with the title "Effects of Poverty on Impatience: Preferences or Inattention?" The paper is forthcoming in the Economic Journal.

Can poverty lead people to behave impatiently through channels other than standard budget-constraints or long-term processes of preference formation? In this paper, we focus on direct, immediate effects of poverty on time preferences. We study the behaviour of extremely poor farmers in rural Uganda who made choices in a controlled longitudinal experiment, in which we elicited time discounting of entertainment and exogenously activated thinking about poverty-related problems.

Development economists have long observed that low-income individuals often behave impatiently: many spend surprisingly large shares of their budgets on the consumption of temptation goods, including entertainment and alcohol, do not take advantage of high-return investment opportunities, and repeatedly take out high-interest loans (Banerjee and Duflo 2007; De Mel, McKenzie, and Woodruff 2008; Duflo, Kremer, and Robinson 2011). Using economic experiments, progress has been made in studying the influence of negative income shocks on time discounting, and most of the evidence suggests that having a lower income makes people behave more impatiently.[1] Documenting such effects of financial pressure on behaviour is important, because they may contribute to a self-reinforcing nature of poverty. It remains an open question whether the effects of low income on inter-temporal decision-making are due only to shifts in

[1] Several studies have shown that poor people tend to discount future income more than rich people (e.g., Lawrance 1991; Pender 1996). A number of experiments elicit time preferences by giving subjects a choice between sooner and later cash payments: in Vietnam, Tanaka, Camerer, and Nguyen (2010) use rainfall data as an instrumental variable for income, and find evidence suggesting that income has a causal effect on an experimentally measured discount rate. Using a similar approach in Ethiopia, Di Falco, Damon, and Kohlin (2011) show that severe draughts led to increases in the discount rate. In Southern Uganda, Bauer and Chytilová (2010) exploit variation in access to schools and disruption in the education system to document a causal effect of schooling on time discounting. Focusing on low income households in the US, Carvalho, Meier, and Wang (2015) show that before a pay day, participants are found to be more present-biased in intertemporal choices about monetary rewards. This effect does not extend to intertemporal choices about non-monetary real effort tasks, suggesting that liquidity constraints before the payday are the likely source of apparent present bias in choices for monetary rewards in this setting. Thus, since most previous studies measures inter-temporal choices for cash payments, there is little well-identified evidence that could not simply be explained by changes liquidity constraints, rather than changes in time preference. To address this issue, we use an experimental design that eliminates the role of liquidity and time constraints.

economic constraints, such as liquidity constraints, life expectancy and arbitrage opportunities, or whether they reflect changes in time preferences due to psychological constraints.

Recent work on "scarcity" or the "psychology of poverty" has documented that living in an environment of ubiquitous scarcity consumes cognitive resources and adversely affects emotions (Mani et al. 2013; Mullainathan and Shafir 2013; Haushofer and Fehr 2014; Haushofer and Shapiro 2016). However, little evidence exists of the impacts of these factors on economic behaviour, such as productivity, preferences and decision-making (Kremer, Rao, and Schilbach 2019). This paper contributes to this literature by focusing on psychological effects of poverty on time preferences. Motivated by research in behavioural economics, which highlights that delaying gratification and exercising self-control (Bernheim and Rangel 2004; Fudenberg and Levine 2006; Muraven and Baumeister 2000) can be seen as costly mental processes, we test the idea that the cognitive or emotional burdens associated with living in chronic poverty may tax self-control, and thus directly affect time preferences.

To shed light on this question, this paper offers several empirical innovations. First, we study time discounting of the consumption of a temptation good – watching entertaining videos instead of working. An advantage of implementing the entertainment-discounting task among this population is that it eliminates the role of liquidity and time constraints, and thus mitigates some of the key confounds involved in measuring time *preferences*. Second, to circumvent identification issues and income effects, we directly manipulate concerns about financial difficulties, using priming techniques. Finally, in addition to measuring intertemporal choices, we integrate new tools to monitor attention and information acquisition when participants make decisions. These measures of the *decision-making process* help us to separate the two psychological mechanisms

through which poverty may influence inter-temporal decision-making: higher time preference or reduced attention.

Our subjects are 289 adult subsistence farmers in Northern Uganda, who were recruited to perform a tedious manual task for a fixed work period on two dates, one week apart. The subjects were given a budget of "entertainment minutes" which they could use to watch entertaining videos on tablet computers instead of working on an unpleasant task. To elicit discount rates for the consumption of leisure, subjects were asked to allocate minutes of entertainment over the earlier and later work dates, for five different substitution rates. The subjects made the same entertainment allocation decisions twice: one week in advance and again just before the first work period in which early entertainment could be consumed.

We experimentally induced thoughts about poverty by presenting poverty-related situations to the subjects, as in Mani et al. (2013). Participants were asked how they would go about solving scenarios involving shocks, for example crop damage or a health shock. The scenarios were similar across conditions, except for the severity: half of the subjects deliberated about negative shocks with minor consequences, while the other half considered scenarios with severe consequences before making their inter-temporal choices.

Manipulating thoughts about poverty-related concerns resembles priming techniques, a well-established and frequently used method in psychology, and more recently also in economics and finance (Cohn and Maréchal 2016). It refers to mental activation of primed concepts and enables measurement of their pure psychological impact (via cognition and emotions) on behaviour in subsequent tasks. Such an approach has been employed to study the effects of a business cycle or recollections of violence on risk preferences (e.g., Callen et al. 2014; Cohn et al. 2015). Here, we use this technique to identify the psychological impact of cognitive load and stress

associated with pressing budgetary preoccupations on time discounting. This approach allows us to avoid the confounding influence of liquidity, wealth, access to financial markets, and health, as all of these variables remain unchanged across conditions.[2]

Our main finding is that thinking about poverty systematically increases preferences for consuming entertainment earlier and delaying work. This effect on discounting is economically meaningful: the poverty-related prime leads individuals to consume 1.7 more minutes of entertainment at an earlier date on a base of 21 minutes.[3] The effect is robust to controlling for a long list of observable characteristics, holds for the whole range of prices of early vs. delayed entertainment, and is slightly stronger when allocation of leisure/labour has immediate consequences than it is when subjects make allocation decisions one week in advance.

Further, we show that the effect of the poverty prime on discounting is unlikely to be driven by reduced attention to the task. Using our detailed data on the decision-making process, we find no systematic or significant effects of the poverty prime on decision-making time, patterns of information acquisition, or signs of being distracted while making a decision. We arrive at similar conclusions when analyzing responsiveness to information about the parameters of the choice: the poverty-primed subjects are not less prone to respond to changes in substitution rate, for example.

[2] An alternative approach to overcoming the challenging issue of how to manipulate poverty-related concerns, without changing actual income and thus liquidity constraints, is in Haushofer, Schunk, and Fehr (2013). The authors randomly assign negative income shocks in a laboratory experiment among undergraduate students at the University of Zurich. An elegant feature of their study is that manipulation of an initial endowment was set up such that the absolute level of income was the same for the groups which experienced an income shock and those which did not. The authors find that the subjects who received a negative income shock exhibited more present-biased behavior than those who did not, suggesting that income shocks can have direct effects on time preferences.

[3] The magnitude of the effect is comparable to the effect of earlier entertainment being more tempting, either because earlier entertainment could be enjoyed immediately instead of in one week time (1.2 minutes difference), or because earlier entertainment was made more salient by first presenting to the subjects the options which maximized earlier entertainment rather than the options which maximized entertainment later on (1.8 minutes difference).

Since we employ convex budget sets to elicit time preferences, a relatively complex protocol that was originally devised for sophisticated student subjects (Augenblick, Niederle, and Sprenger 2015; Andreoni and Sprenger 2012), it is important to gauge whether the farmers in our study correctly understood the task, given that, on average, they had five years of schooling. Although we find several intuitive patterns in their discounting, we also find that a non-negligible percentage of our subjects violate monotonicity: around 40% of subjects allocate in one of their decisions fewer minutes of entertainment to an earlier date at a lower substitution rate, as compared to the number of minutes allocated at a higher substitution rate. Such behaviour cannot be reconciled with transitive preferences and may indicate imperfect understanding. Importantly, the main effect of the poverty prime on entertainment discounting is robust to restricting the sample to literate individuals, individuals with full understanding, based on cross-check questions, and to the sub-sample of subjects who did not violate monotonicity. Based on these and other robustness tests, we believe that the observed effect of thinking about poverty on discounting is unlikely to have been driven by inattention or confusion.

Based on existing models of time preferences, we describe several mechanisms through which the poverty prime may affect time discounting. We conclude that our empirical findings most closely match the predictions of the costly self-control model of Fudenberg and Levine (2006) and Fudenberg and Levine (2012), in which individuals are in constant conflict between a short-run self that seeks immediate gratification and a forward-looking long-run self, and in which the parameter capturing costs of self-control is affected by environmental factors, such as anxiety and cognitive load associated with poverty, or the proximity of temptation. An alternative mechanism, denoted in psychology as the myopic-misery hypothesis (Lerner, Li, and Weber 2013; Lerner et al. 2004), is that a negative affect enters individual utility function, and early

consumption of entertainment may compensate for this utility loss. While this mechanism can explain the effect of a poverty prime on discounting, it cannot be the sole explanation since it struggles to explain the other patterns we find.

In addition to manipulating thoughts about poverty, we also exogenously manipulated the number of calories consumed by subjects, prior to making decisions, to test whether calories affect decision-making. Following Gailliot et al. (2007), Wang and Dvorak (2010), Kuhn, Kuhn, and Villeval (2017), we offered participants a drink sweetened either with sugar, or with a sugar substitute containing zero calories (a placebo condition). We do not find evidence that this treatment affected decision-making, in contrast to early work in psychology (Gailliot et al. 2007; Wang and Dvorak 2010), but in line with more recent economic experiments (Kuhn, Kuhn, and Villeval 2017). This does not imply, however, that better nutrition does not affect the decision-making processes of the poor in general. Our results instead indicate that the one-time provision of a relatively small amount of calories, as in our experiment, may not be enough to affect decision-making. For example, evidence from Schofield (2014) documents improvements in the cognitive capacity of rickshaw drivers in India who received daily snacks for five weeks. We provide more details about manipulating calories in our experiment in Appendix E.

Finally, in light of the large literature documenting present-oriented behaviour of the poor, it is noteworthy that, on average, subjects in our experiment do not act particularly impatiently. Although the level of discounting may in part be affected by the discreteness of the choice set, subjects allocate 22.2 out of a possible 45 minutes of entertainment to the earlier date. This is intriguing, given that our experiment employs several design features to mitigate the usual confounds involved in measuring time preferences in choice experiments, specifically liquidity constraints. Our main (causal) finding suggests that the environment of poverty makes the poor

more impatient due to psychological constraints. Yet the relatively low levels of observed discounting also indicate that standard economic constraints play an important role in explaining why previous studies, based on choices between time dated money that cannot isolate the role of liquidity constraints, have often identified very large discount rates among the poor.

Our paper is related to several streams of literature. First, the paper contributes to emerging empirical literature testing the psychological effects of poverty on decision-making. Negative income shocks or concerns about income shocks have been shown to reduce cognitive function (Mani et al. 2013; Lichand and Mani 2019). Kaur et al. (2019) show that scarcity of one's own income (but not priming) reduces productivity. Our paper documents impacts of financial anxiety on economic behaviour in a new domain – whether to delay work and enjoy leisure early - and thus may help to explain why sometimes the poor seem to place surprisingly low priority on engaging in income-generating activities, and high weight on consuming temptation goods (Schilbach 2019; Banerjee and Duflo 2007). Interestingly, a recent paper by Fehr, Fink, and Kelsey (2019) shows that greater scarcity is associated with a lower endowment effect, suggesting that scarcity may reduce decision biases in some domains. Besides shortage of income, other experiments have estimated the psychological effects on economic behaviour of other conditions associated with poverty, such as noise, alcohol, sleep deprivation and lack of food (Dean 2020; Schilbach 2019; Bessone et al. 2019; Schofield 2014). Kremer, Rao, and Schilbach (2019) and Schilbach, Schofield, and Mullainathan (2016) provide comprehensive reviews of this literature.

Second, this paper illustrates the usefulness of using priming techniques to study economic behaviour. Besides the aforementioned work focusing on poverty (Mani et al. 2013; Lichand and Mani 2019; Kaur et al. 2019), other examples include studies on the effects of ethnic, criminal and banker identity on preferences (Benjamin, Choi, and Strickland 2010; Cohn, Fehr, and Maréchal

2014; Cohn, Maréchal, and Noll 2010). Cohn and Maréchal (2016) provide a recent review of the economic literature on the topic, including a discussion of the methodological trade-offs involved in using priming techniques, and conclude that its main limitations, in particular the difficulty of pinning down which mental concept has been activated, is shared with other empirical approaches. Also note that this technique identifies impacts of greater *intensity* of poverty-related thoughts, rather than the overall effects. Thus, to the extent that people in the control condition may also have poverty-related concerns very much at top of mind, this technique may underestimate the actual effects of poverty (Kaur et al. 2019).

Third, the paper speaks to the literature on measuring time preferences. Most previous studies estimate time preferences using intertemporal choices over money -- both in developed (Sutter et al. 2013; Meier and Sprenger 2015; Andreoni and Sprenger 2012) and in developing country settings (Tanaka, Camerer, and Nguyen 2010; Bauer, Chytilova, and Morduch 2012; Giné et al. 2018). We build on recent experiments (Augenblick and Rabin 2018; Augenblick, Niederle, and Sprenger 2015), implemented among US undergraduates, which measure discounting based on choices over time-dated effort. This helps us to avoid several potential confounds associated with using monetary rewards when measuring time preferences and limited self-control, especially the possibility to arbitrage outside of the experiment and the role of liquidity constraints. Our paper focuses on choices of when to enjoy entertainment (i.e., a tempting good), and one of its contributions is a demonstration that elicitation of discounting using choices over time-dated consumption/effort is feasible to implement even among the very poor in a developing country setting. This relates our paper to Andreoni et al. (2016) and Abebe, Caria, and Ortiz-Ospina (2019) who elicit effort discounting among health care workers in Pakistan and applicants for clerical jobs in Ethiopia, respectively.

Fourth, we contribute to literature analysing the decision making process by adapting monitoring tools that have been developed for laboratory experiments, in order to be feasible to implement in a field environment with an important population for which computerized experiments are not suitable. Our effort to gather data on decision-making process is motivated by recent papers, which have cautioned against automatically interpreting heterogeneity in risky or impatient *behaviour* in experiments as reflecting differences in the underlying *preferences*, since choices may also capture differences in effort and attention, and consequently the quality of the decision-making process more broadly. This empirical challenge has been debated by researchers who study the effects of cognitive ability on risk behaviour (Andersson et al. 2018; Dohmen et al. 2018), but it applies to any study that aims to estimate the causal effect of environmental factors or individual characteristics on preferences. Our approach to addressing this issue is inspired by techniques commonly used in computerized experiments, in which researchers complement choice data with data on the decision-making process. For example, several studies suggest that longer response time is a good proxy for greater effort and attention to the task.[4] Inspired by mouse-tracking techniques, we use a novel video-recording set-up to obtain detailed measures of decision time, information acquisition and other aspects of the decision-making process in a field setting.

The rest of the paper is organized as follows. Section I describes the sample and experimental design. Section II presents the main results and a set of robustness tests. Section III links our findings with theory and discusses which models of discounting are best suited to explain the patterns observed. Section IV concludes.

[4] Wilcox (1993) finds that subjects exhibit longer response time in a lottery choice task when monetary incentives are higher and the task is complex. Similarly, Chabris et al. (2009) show that the closer the expected utility of the competing options is, and thus the choice is more difficult, the longer the response time is. Recalde, Riedl, and Vesterlund (2018) find that shorter decision-making time is correlated with greater likelihood of making errors and Enke and Graeber (2019) show that people who make faster decisions later report greater uncertainty about whether they made the right decisions in experiments.

## I. Experimental design

We present the experimental design in five sub-sections. First, we summarize the sample selection. Second, we describe the forms of work and entertainment to be allocated over time. Third, we describe the tools used to monitor attention allocation during the decision-making process. Then, we describe how we manipulated poverty-related concerns. Last, we provide further details about experimental procedures and the timeline.

### *A. Sample*

The participants are from twelve villages in the Gulu district in Northern Uganda. The data was collected in September-October 2014. In each village, households were randomly selected from a village roster. One member of each household completed a short survey, identifying the age, gender and occupation of all household members. We then randomly selected one individual from each household who was between 20 and 55 years of age and whose primary occupation was farming, stratifying by gender. Thus, the sample is representative of the population of farmers in the villages studied. This setting allows us to study the behaviour of an extremely poor population, for which, a priori, behavioural responses to poverty should be the most relevant.

Table 2 reports the summary statistics. Overall, we have data for 289 subjects, of whom 51 percent are female. Subjects are 35 years old on average. The farmers in our sample are poor, with median reported cash income of just UGX 56,000 ($21.28) over the previous month. The majority (63.3 percent) live in homes with mud walls. Subjects reported that they usually eat just under two meals per day, on average, and only 13.7 percent reported eating meat more than once a month.

Health shocks are common in our sample: 45.3 percent of respondents reported that they were unable to work or perform other duties over the previous month at least once due to illness. Subjects have 5.16 years of schooling on average, and just over half said they were literate enough to write a letter. The area that we study was exposed to sporadic conflict with the Lord's Resistance Army (LRA) from roughly 1994 to 2005. We asked subjects a set of questions on their conflict experiences, including violence witnessed, received and whether family members had been killed during the conflict (see Appendix G).

*B. Elicitation of Time Discounting*

When eliciting time discounting about entertainment consumption, we implement a longitudinal experimental design conducted over three weeks. The experiment focuses on the intertemporal allocation of entertainment and work between Week 2 and Week 3. Subjects were informed that in Weeks 2 and 3 there would be an "activity hour," during which they would have to be present and to work. The length of the activity hour was fixed at sixty minutes in both weeks. The work consisted of a tedious form of labour: sorting yellow and red dried beans by colour. Subjects were informed that a certain fraction of the activity hour in each week would be spent watching videos on tablet computers, instead of working. They could choose from a number of short videos, including traditional dancing, modern music videos, soccer highlight reels and short comedic sketches, in order to satisfy a variety of tastes. None of the available videos involved long

narratives, so that it was not advantageous to concentrate the entertainment time into one activity hour.[5]

The amount of beans that subjects were responsible for sorting was proportional to the amount of time devoted to work in a given activity hour. Therefore, by increasing the proportion of entertainment allotted to a given week, subjects simultaneously decreased the quantity of beans that they were responsible for sorting. This was demonstrated visually: for each 5-minute work interval, they were responsible for sorting an additional cup of beans. If subjects finished their assigned work before the time ran out, they were asked to wait quietly until the work time was over.

In order to provide subjects with experience of how enjoyable the entertainment was and how effortful the work was, they were required to watch videos for five minutes and to work for five minutes, prior to making allocation decisions in both Weeks 1 and 2, and prior to the activity hour in Week 3. Subjects were informed in Week 1 that they would also take part in the same minimum entertainment and minimum work in Weeks 2 and 3.[6]

The subjects were endowed with a fixed budget of entertainment minutes. Using a discrete convex decision environment, subjects allocated minutes of entertainment over the two activity hours. They made decisions on how much of their entertainment endowment to consume at the earlier date (Week 2) or later (Week 3). Sacrificing one minute of entertainment early corresponded to consuming $p$ more minutes of entertainment a week later, where $p$ is an intertemporal substitution rate. Subjects made allocations for five substitution rates: 0.5, 0.75, 1,

[5] Television ownership is rare and watching videos can be considered a luxury for this population: around 64 percent of subjects report watching TV or videos "never" or "rarely," while only 7 percent report watching daily. All but two subjects reported that they enjoyed watching the videos.

[6] This also eliminates the role of discontinuity in preferences for work/entertainment.

1.25, and 1.5. The subjects knew all the substitution rates before making any choices. For each substitution rate, subjects selected between six levels of consumption of entertainment early, with a fixed difference of eight minutes (45, 37, 29, 21, 13, and 5). The amount of entertainment which could be allocated to the earlier date was capped at 45 minutes and implied no entertainment at the later date. Table A1 in the Appendix presents all the choice sets. We made extensive use of graphic aids to help subjects visualize comparisons between the various substitution rates (see Appendix Figure F1).

In order to identify whether our poverty-related manipulations made the subjects more dynamically inconsistent, subjects allocated entertainment minutes between Weeks 2 and 3 twice, once in Week 1 and again in Week 2 (see Table 1). In Week 1, the set of five choices concerns consumption in two future dates, while allocations in Week 2 involve consumption at present and in the future. Before making decisions in Week 1, the decisions to be made in Week 2 were explained. In total, participants made ten allocation decisions (five in Week 1 and five in Week 2). Subjects were aware that one randomly selected decision would be implemented, ensuring the decisions were incentive compatible.

Formally, the present value budget constraint can be represented as:

$$e_t + \frac{e_{t+1}}{p} = m$$

where $e_t$ is the number of entertainment minutes consumed at the earlier date, i.e. either now or one week from now, $e_{t+1}$ is the amount of entertainment minutes consumed at the later date, i.e. either in one week ($t = 0$) or in two weeks ($t = 1$), $p$ represents the substitution rate, and $m$ is the total budget allocation of entertainment minutes across the two weeks, i.e. 45 minutes in each decision.

The time discounting task was designed so that the standard economic constraints, money and time, should not affect entertainment allocations. Liquidity constraints should not affect subjects' intertemporal choices, since the allocation decisions concerned a good that could not be traded outside of the laboratory (time-dated entertainment). Also, the monetary compensation for participation was unrelated to experimental choices: subjects received compensation of 15,000 UGX (≈USD 5.70), if they successfully completed all elements of the experiment, and a show up fee (UGX 2000) for participation in each experimental session. Out-of-lab time constraints also should not have affected allocations. Since the length of the activity hour was fixed, the allocations affected share of work vs. entertainment, but not the total time spent at an experimental session.

We elicit time preferences using choices over time-dated consumption, rather than choices over time-dated money, since this approach helps to overcome several potential confounds (Augenblick, Niederle, and Sprenger 2015). First, subjects in our experiment could consume the entertainment only during the experimental sessions and thus there was no scope for out-of-lab smoothing opportunities, which could confound estimation of individual time preferences.[7] Second, the design helps to address a concern that subjects' choices may reflect higher transaction costs of redeeming rewards later, or a low level of trust in the experimenters, rather than their time preferences (Giné et al. 2018; Andreoni and Sprenger 2012). This concern is particularly relevant for a field setting in a developing country, in which extra-lab payment infrastructure (such as automatic bank transfers) is limited and cannot be readily used to reduce transaction cost differences. In this experiment the incentives to come in later weeks were high, since the main

[7] Arbitrage arguments cast skepticism over time discounting experiments with money, since, in theory, choices over monetary payments should only reveal the subject's out-of-lab borrowing and lending opportunities (Dean and Sautmann 2014; Cubitt and Read 2007; Pender 1996), especially in settings in which financial markets are thick and transaction costs are low.

reward for participation (completion bonus) was disbursed in Week 3. Indeed, the attrition rate was very low (1.4 percent), as we describe in greater detail below.

*C. Monitoring the Decision-Making Process*

We developed a decision-making environment which is simple to understand and allows us to monitor the decision-making process. For each of the five substitution rates, subjects made choices by flipping through six pages in a small booklet. Each page graphically and numerically displayed one option: the number of minutes of entertainment allocated to earlier and later dates. After being given all instructions and answering cross-check questions on understanding, subjects could, on their own, flip through the booklets and inspect different options, with no time restriction. Five booklets, one for each substitution rate, were mounted on top of one another on a single board (see Figure 1 for a picture of the allocation environment). This allowed subjects to visually compare their choices across all five rates.[8] When subjects arrived at a final allocation decision, they were asked to leave the booklets open on the page with their desired allocation and to inform the experimenter, who recorded their choices.

We randomly varied which option was presented to subjects first. In the IMPATIENT default condition, when subjects approached the board, all five booklets were open to the page with the maximum number of minutes of entertainment early. In the PATIENT default condition, booklets were open to the page with maximum entertainment at a later date. These conditions were randomly allocated using a between-subjects design, and each subject faced the same default for

[8] Our efforts to monitor the decision-making process imply that, unlike most studies on time discounting which explore choices made by subjects continuously along a convex budget set, we use a discrete decision environment with six possible levels of consumption for each substitution rate.

all ten choices (i.e. five in Week 1 and five in Week 2). We refer to this manipulation as changing the default allocation, since if subjects abstained from making an active choice and did not flip the pages of a given booklet, the open option is treated as a decision. Note that because there are virtually no transaction costs involved in making an active decision, this manipulation is very subtle compared to other types of default allocation that have been studied in other contexts. We believe it affects decisions primarily by making the open option more salient.

Gathering data about a decision-making process by using mouse-tracking or eye-tracking tools is common in computerized laboratory experiments. Our aim was to develop a portable experimental set-up that is feasible to implement in the field with a subject pool that is not computer literate. When flipping through the options in the booklets, subjects wore empty eye glass frames with a video camera attached.[9] Since the cameras recorded the subjects' actions on the board and only one option for a given rate can be opened at one point in time, this set up provides us with direct measures of the decision-making process. The data allow us to test whether prime affects inter-temporal decision-making by influencing the amount of attention (measured by the total decision-making time, the number of options inspected, and the likelihood of not making an active choice by sticking to the default option).

*D. Manipulating Poverty-Related Concerns*

In order to manipulate poverty-related concerns, we adapted the method developed by Mani et al. (2013), who used the technique to prime poor individuals in the US with hypothetical income

[9] Subjects were informed that their decisions would be recorded, but that the camera would not record their faces. In order to minimize the distraction caused by wearing the cameras, subjects were fitted with the apparatus several minutes beforehand, so that they were used to wearing it by the time they made their decisions.

shocks. Immediately before making allocation decisions, subjects were presented with two hypothetical scenarios, which described negative income shocks arising from crop damage, damage to home, or a health shock. These scenarios were designed to activate actual financial concerns and were developed based on focus group discussions on common sources of income shocks in the area we study.

We experimentally varied the severity of the hypothetical poverty-related problems. In the HARD condition, scenarios involve problems with severe consequences, while in the EASY condition, subjects were presented similar scenarios, but with less severe consequences. Across conditions, pairs of scenarios described the same type of income shock and had similar wording. For example, the wording of a scenario on crop damage in the HARD condition is: "Imagine that hail stones destroy your entire crop and the whole harvest is lost. How do you deal with this situation? Does this require you to liquidate your savings? Do you need to borrow? Do you need to eat less?", while the corresponding scenario in the EASY condition is: "Imagine that hail stones fall on your crops after the harvest is nearly finished, destroying a small part of the crop that is enough to feed your family for one day. …." Individuals were assigned to the same treatment condition in each week of the study.[10] The exact wording of the complete set of implemented scenarios appears in Appendix F. The order in which scenarios were presented was randomized.

The subjects were also asked to rate, on a four-point scale, how difficult it would be to face the given situation and how anxious they would be if facing the given situation. As expected, the average difficulty and self-reported anxiety indeed substantially increases in the HARD

[10] This manipulation and the manipulation of calories, described in Appendix E, were implemented using a 2x2 factorial design.

conditions, as compared to EASY. The likelihood of rating the problem as "very difficult" increases from 25 percent in EASY to 61 percent in HARD and the share of people who would feel very anxious increases from 22 percent in EASY to 47 percent in HARD (Appendix Tables A2 and A3). The effects are remarkably stable across different types of scenarios. Further, since subjects were exposed to HARD or EASY conditions in both weeks, we test whether they responded to primes differently in Week 1 and Week 2. A legitimate concern is that the effects might diminish if subjects are exposed to a similar poverty prime a second time. We find virtually the same magnitude of the effect of HARD vs. EASY conditions on perceived difficulty in both weeks (36 percentage points in Week 1 and 32 percentage points in Week 2). The effects on average anxiety is positive in both weeks, but the magnitude is somewhat smaller in Week 2 (21 percentage points), as compared to Week 1 (32 percentage points).

*E. Further Details about Procedures*

Baseline characteristics do not systematically differ across experimental conditions, suggesting the randomization was successful (see Appendix Table A4). We took several steps to minimize attrition during the course of the experiment. First, subjects had to take part in all three experimental sessions in order to receive the completion bonus of UGX 15,000. On top of this, they received UGX 2,000 as a show-up fee each week. This is a substantial amount of money for the population we study – median cash income for the sample is 1000 UGX per day. Second, the experiments were implemented in local schools (or community meeting places), in the villages where subjects live. Third, subjects always participated on the same day of the week at the same time throughout the three-week long experiment. Thus, subjects whose session in Week 1 took place on Tuesday, for example, allocated entertainment to be consumed on two future Tuesdays.

Sessions were conducted either in the morning (8 AM) or early afternoon (1 PM), in groups of around ten subjects from the same village, and there was one morning and one afternoon session per week in each village. Local leaders were hired to visit and remind participants before each experimental session. Consequently, attrition was low -- only four subjects who participated in Week 1 failed to show up in Week 2.

Due to technical issues, we failed to gather the decision-making process video data for 39 individuals (13 percent of the full sample). The main reason is that the video cameras participants wore when making their choices were not working properly or were not correctly aimed at the decision-making board. Table A4 shows that the technical issues were evenly distributed across conditions and the main results on choice patterns are robust to excluding subjects for whom the decision-making data are missing (Panel A, Column 2, Table A5).

Table 1 summarizes the timeline of the longitudinal experiment. In Week 1, experimenters explained the timeline of the experiment and how subjects would be compensated for their participation. Subjects were also informed that they were free to leave anytime during the experiment if they did not wish to participate. Then, subjects experienced five minutes of work and five minutes of watching videos. They were informed that the sessions in Week 2 and Week 3 would begin with a similar warm-up.

Next, subjects received instructions on the length and timing of the activity hours, about different substitution rates and how to allocate entertainment minutes between an earlier and a later activity hour. After the group instructions, subjects were taken one by one to an experimenter, and were given further examples and clarifications, before they were asked a set of nine comprehension questions. (See Appendix H for the instructions).

After cross-check questions, subjects were served tea containing either sugar or artificial sweetener. While subjects consumed the tea, the poverty-related scenarios in either the HARD or EASY conditions were presented. Then, the experimenter left and asked subjects to make intertemporal decisions, using the board with booklets. Subjects were asked to wear eyeglass frames with affixed cameras. It was explained that this would help to reliably record their choices. After making their experimental choices, subjects completed a short questionnaire about food consumption earlier in the day and basic demographic information (See Appendix I for questionnaires).

The procedure in Week 2 was very similar to Week 1, up to the point that subjects completed the inter-temporal choices and answered survey questions. After this, experimenters drew a number from a bag, for each subject, to determine which of the 10 decisions would be implemented. Subjects then completed the activity hour, divided between work and entertainment according to the selected decision. In Week 3, there were no decisions. Subjects completed the activity hour, then after answering the set of questions in the HARD or EASY poverty prime, performed a Raven's progressive matrices task to measure cognitive function. They were asked additional questions about their personal characteristics, financial behaviour and conflict history, before they were given the show up fee and completion bonus.

## II. Results

Section II.A presents the basic patterns of choices in the time discounting task and describes proxies of understanding of the task. Section II.B estimates the effect of the poverty prime on inter-temporal choices. Section II.C probes whether the main effects can be explained by differences in attention or confusion about the task.

*A. Basic patterns: Measures of discounting and the level of understanding of the task*

In total, each subject made ten inter-temporal decisions: one for each of the five substitution rates in Week 1 and again in Week 2. The attrition rate is very low -- only four subjects who participated in Week 1 did not show up in Week 2.[11] Thus, in total we analyse 2,870 decisions for 289 subjects. We find that, on average, subjects allocate 22.2 out of a possible 45 minutes of entertainment to the earlier date. Thus, subjects behaved relatively patiently and the estimated discount rate is comparable to the results of Augenblick, Niederle, and Sprenger (2015) who used a related task among undergraduate students in US.[12]

There is also a great deal of variation in subjects' choices (Figure A1). The standard deviation for each substitution rate is between 10.52 and 11.72. The subjects do not seem to choose any simple focal point from the choice set, like the mid-point or either of the extremes. On average, the frequency of the four interior choices (13, 21, 29 and 37 minutes of entertainment in the earlier session) is roughly equal, with each option accounting for between 18 and 21 percent of choices. At the same time, the least patient option (all 45 minutes of entertainment allocated to the earlier date) accounts for less than 5 percent of all choices, and the most patient option (5 minutes of

[11] The results are robust to excluding these subjects from the analysis.

[12] Appendix Table A6 reports structural estimates of parameters from a beta-delta quasi-hyperbolic discounting model, while Appendix C discusses how the parameters are estimated. The estimated parameters in Augenblick, Niederle, and Sprenger (2015) are $\delta$=1.00 and $\beta$=0.91. In our setting, the estimated parameters are $\delta$=1.11 and $\beta$=0.91. At face value, $\delta$>1 is surprising. Note, however, that interpretation of the estimated $\delta$ is difficult, since the estimate is likely affected by the discrete choice space that we implemented. For each substitution rate, subjects had to choose between six options how to allocate entertainment time. By design, sacrificing half of the entertainment early (which implies an equal split for a price equal to one) was not possible. The closest option to an equal split (22.5) was 21 and the neighbouring option was 29 minutes of entertainment early. Thus, such choice space could lead to a greater estimated $\delta$, because subjects with $\delta$=1 could not choose a preferred allocation (equal split), but only a slightly more patient option (implying delta>1). Note that this is less of an issue for estimating the $\beta$ parameter, since the choice space is constant across weeks. Section III considers a dual-self model as the model of choice, but the structural estimates presented here allow comparisons to earlier literature.

entertainment in the earlier session) accounts for 15 percent of all choices. At the individual level, only around 10 and 5 percent of subjects made choices exclusively at either of the two extremes for all substitution rates in Weeks 1 and 2, respectively.

Next, we observe several intuitive patterns (Table 3). First, as the cost of earlier entertainment increases, entertainment allocated to the earlier week decreases monotonically for choices in both Week 1 and Week 2 (Figure 2). Second, in line with previous work (e.g., Dohmen et al. 2010), we find that cognitive ability (as measured by performance on Raven matrices) predicts patience (Table A7). Third, we also find evidence of dynamic inconsistency: in Week 1, subjects allocated 1.2 minutes less entertainment for the earlier session than when facing the same decision in Week 2 ($p=0.08$).

We use several proxies to gauge the subject's level of understanding. First, we use answers to a set of nine comprehension questions. This measure indicates that the overall level of understanding was relatively high. All comprehension questions were answered correctly by 77 percent of subjects in Week 1 and by 84 percent of subjects in Week 2.

As a second proxy of understanding, we use violations of monotonicity, i.e. we measure the proportion of subjects who responded to an increase in the relative price of entertainment in Week 1 by choosing to allocate more entertainment minutes to this date. Specifically, we consider a pair of choices with adjacent substitution rates as violating monotonicity if fewer minutes of entertainment are allocated to the earlier date at a lower substitution rate, compared to the number of minutes allocated at a higher substitution rate. Given the discrete nature of the choices in our experiment, we can only identify violations of monotonicity of a relatively large magnitude (at least eight minutes). Note that a violation of monotonicity does not necessarily imply that a subject made a mistake – it is a mistake in the sense that it is not reconcilable with transitivity.

We find that a non-negligible percentage of subjects violated monotonicity. In a given week, 56 percent of subjects made no inconsistent choices, 31 percent made one inconsistent choice, and around 13 percent made two, three or four inconsistent choices. Around 40 percent of subjects made no violations of monotonicity in either week. Taking into account all pairs of choices from all subjects in both weeks (2,312 pairs in total) we find that 15 percent are inconsistent.[13] For comparison, we run 5,000 simulations with choices generated stochastically for each substitution rate from a uniform distribution. This yields 42 percent of inconsistent decision pairs, which is substantially higher than in our data. Further, we use an alternative measure of the extent of violations of monotonicity, by defining the minimum number of "page flips" in all booklets, across the five rows, required to make the allocation consistent with monotonicity. In our data, 11.1 percent of decisions would require three or more "page flips", compared to 66 percent of the randomly generated decisions (Figure A2).

Thus, given that these patterns suggest that understanding was imperfect for non-negligible fraction of subjects, in the analysis of treatment effects, we pay particular attention to addressing the question whether the main effects can be explained by imperfect understanding or confusion (Section II.C).

[13] For comparison, the share of inconsistencies in previous studies that use convex budgets to study time discounting was 19 percent among Malawian farmers (Giné et al. 2018), 18 percent among German high school students (Lührmann, Serra-Garcia, and Winter 2018), and 17 percent for a representative sample of Americans (Carvalho, Meier, and Wang 2016). However, these numbers are not directly comparable to our result (15 percent) since we can only identify violations of monotonicity of a relatively large magnitude, due to the discrete nature of the choices in our experiment. Subjects in our experiments are more likely to violate monotonicity than undergraduate students from developed countries: only 8 percent of subjects in Andreoni and Sprenger (2012) and 16 percent of subjects in Augenblick, Niederle, and Sprenger (2015) exhibit some inconsistency, compared to 60 percent in our study.

*B. Main results: Do poverty-related concerns affect time discounting?*

We find that subjects in the HARD poverty condition behave less patiently in the experiment than subjects in the EASY condition, and this result holds for all five substitution rates (Figure 2). On average, subjects in the HARD poverty condition allocated 23.09 minutes of entertainment to the earlier date, compared to 21.34 in the EASY condition, an economically meaningful difference.

Table 3 shows this pattern in a regression framework.[14] We regress the minutes of entertainment allocated to the earlier week on the poverty prime and calories treatment, and control for the indicator of the patient default, the indicator for initial Week 1 allocations, substitution rate, age and gender, with robust standard errors clustered at the individual level. The HARD poverty prime increases entertainment allocated to an earlier week by 1.7-minutes (p=0.04).

In columns 2-6, we break down the decisions by substitution rate and find that the effect of the poverty prime is relatively stable. The HARD condition increases entertainment allocated to the earlier week by 1.42 - 2.13 minutes, and the p-value of the least statistically significant difference between the HARD and EASY conditions is 0.14. The stability across substitution rates provides evidence against the interpretation that the effects of the poverty prime on inter-temporal decisions are driven by changes in the curvature of the utility function. This also provides a first indication that the shift in inter-temporal choices is not due to a difference in the level of attention to information about the substitution rate. We revisit this question in more detail in Section II.C.

The effect of the HARD poverty prime treatment on time allocated to entertainment at the earlier date is robust to several alternative specifications (Tables A5 and A7), including individual-

[14] In the main estimates, we focus on analysis of the raw data, using similar regression specification as in Carvalho, Meier, and Wang (2016), who study the effects of payday on discounting.

level random effects, village-level fixed effects, experimenter fixed effects, individual observable characteristics, including education, income, and household size, and non-linear controls for the substitution rate.[15]

An interesting question is whether the poverty prime causes a relatively smaller shift in discounting for many subjects, or whether the effects are driven by the large responses of a few individuals who, after exposure to the prime, lose all self-control and start to behave very impatiently. Since we implemented the prime using a "between-subject" design, we cannot estimate the effect at the individual level. Nevertheless, a comparison of the distributions of discounting choices in the HARD vs. EASY conditions is informative. Figure A3 reveals a relatively smooth shift in the distribution – all three of the most impatient options are more prevalent (and all three less patient options are less prevalent) in the HARD condition, suggesting the treatment effects are driven by the moderate responses of a larger set of subjects.

Next, the effect does not seem to operate through increased salience of a subject's own mortality, which would lead to an increased discount factor through risk perceptions, as the point estimate of the HARD poverty prime is actually larger, though insignificantly, when restricting the sample to individuals who did not face scenarios related to their own health issues (Table A8).

Finally, we study the effect of the poverty prime across situations in which early consumption of entertainment is more tempting. We consider the role of two manipulations in particular: whether entertainment can be consumed immediately and whether consuming

[15] As discussed above, the population we study had been exposed to conflict. Earlier research has documented that experiencing conflict may have lasting effects on preferences (Voors et al. 2012; Callen et al. 2014; Bauer et al. 2016). Similarly to Voors et al. (2012), we observe that individuals with above median conflict exposure tend to be less patient and allocate more minutes to early entertainment relative to those below the median (22.70 minutes versus 21.84 minutes, p=0.07). Although the point estimate for the HARD poverty prime is also higher for the above median group (Panel B, Columns 8 and 9, Table A5), the effects are qualitatively similar for both groups.

entertainment early is the salient option. This allows us to tentatively gauge which decision situations are likely to be the most relevant to the psychological effects of poverty on entertainment discounting, thus potentially providing some insight into what real-life situations the findings are likely generalizable.

First, we test whether the effect of the HARD poverty prime is stronger when entertainment can be enjoyed immediately, and thus the impatient option is more tempting (Columns 1-2, Table 4). We estimate the effects of the HARD prime separately for decisions made in Week 1, when subjects decided how to allocate entertainment over two future dates, and for decisions made in Week 2, when subjects faced a trade-off between immediate and future entertainment consumption. We find that the effect of the HARD poverty prime is larger for immediate rewards. The effect is still positive but smaller and no longer statistically significant when we consider allocation over two future dates. The interaction effect between HARD and delayed early consumption of entertainment does not reach statistical significance, potentially due to lack of statistical power.[16]

Second, we explore whether the effect of thinking about poverty is larger when consuming entertainment early is made more salient by being the default option (Columns 3-4 of Table 4). We find that the HARD poverty prime increases the allocation of entertainment to an earlier date by 2.31 minutes in the IMPATIENT default condition, and the effect is statistically significant. In the PATIENT default condition, the effect of the HARD poverty prime has the same sign, but it is small and not statistically significant. The interaction effect between HARD poverty prime and

[16] We come to similar conclusions when comparing values of $\beta$ in structural estimates of present bias across treatments. We find evidence of present bias on average in both priming treatments: $\beta=0.88$ and $\beta=0.93$, in the HARD and EASY treatments, respectively, though only the former value differs statistically from 1 at the 90 percent level (Table A6). The treatment difference in present bias is not statistically significant ($p=0.29$).

PATIENT default does not reach statistical significance. (Figure A4 plots the coefficients for the HARD poverty prime for both default treatments, separately).

Together, these results show that the poverty prime affects decision making in situations similar to scenarios that subsistence farmers face in their everyday lives. We find that the effect of the poverty prime is statistically significant in Week 2, when there is an immediate consequence of the choices. This is arguably the condition with the most economic significance for poor individuals such as the farmers in our sample, since it is likely that they usually choose how to allocate their time on a daily basis, rather than making binding commitments for work and entertainment in the future (analogous to the Week 1 decision). It is somewhat less clear which of the default conditions is more closely related to decision making out of the lab. In any case, it is reassuring that we find a muted effect of the poverty prime in only a single condition, when earlier consumption is the least salient across both dimensions: i.e. when working sooner is the default option and when decisions involve allocations over future dates only (Columns 5-6 of Table 4, Figure A4). This offers support for the generalizability of our findings.

*C. Further results*

In this sub-section, we address the question of whether the observed effects of the poverty prime on discounting could be explained by reduced attention to the task, or less understanding and consequently more noisy decisions, rather than by direct effects on time preferences. We proceed in two steps. First, we study the effects of the poverty prime on proxies of attention to task (response time, information acquisition), and on the prevalence of patterns in choice data that could indicate lower quality decision-making (violations of monotonicity, sticking to the default allocation, low sensitivity to the substitution rate). As a next step, we test the robustness of the

main effects among sub-samples of subjects for whom there is less reason to worry about a lack of understanding.

In terms of measures of the decision-making process, in Table 5, Panel A, we show that the poverty prime does not significantly affect overall decision-making time (Columns 1 and 2). Next, subjects in the HARD poverty condition were not more distracted than those in the EASY condition, as measured by the amount of time spent looking away from the decision environment (Column 3), and the poverty prime has virtually no influence on the number of options viewed (Column 4 and 5). Further, in Table A9, we consider additional variables derived from the videos of subjects' decision making, including a single standardized index and a first principal component of all measures, and arrive at the same conclusion: none of the estimated coefficients suggests that the poverty prime reduces attention to the discounting task.[17]

If subjects in the HARD condition were less attentive or less able to understand the task, we would expect them to be less sensitive to changes in the substitution rate, more likely to stick with the default option and more likely to violate monotonicity. However, first, the effect of the HARD poverty prime is relatively stable across different substitution rates, indicating that the prime has not reduced the ability to acquire and process information about the substitution rate (Column 1 of Table 5, Panel B). Second, subjects exposed to the HARD poverty prime are not more likely to stick with default option (Column 2) or to make choices with closer distance to the default allocation (Column 3), as compared to the EASY poverty prime. Third, we consider two measures of violations of monotonicity. The first is the number of inconsistencies, which yields values between 0 and 4 for each week. The second measure takes a different approach, by defining

[17] Also, in line with these findings, we find no effect of the poverty prime on cognitive skills, as measured by the number of correctly solved Raven's matrices (Table A10).

the minimum number of flips through the five booklets required to make the allocation consistent with monotonicity. Subjects in the HARD treatment made slightly more violations of monotonicity on average (out of the maximum of four): 0.63 inconsistent choice pairs compared to 0.53 in the EASY condition (p=0.11). The coefficients for the HARD poverty prime are positive but not statistically significant for both measures (Columns 4-5, Panel B of Table 5).

To assess whether the lack of statistically significant effects on proxies of the quality of decision-making could be due to insufficient power, we calculate minimum detectable effects (MDEs) for the HARD poverty prime for each measure (Table A11). Appendix D describes how MDEs are calculated. The median MDE obtained is 15% (the range is between 9% and 61%), measured as a minimum detectable change relative to the mean of the respective variables for the EASY poverty prime. While the estimated MDEs are high for some of the measures, we find it remarkable that we did not detect any statistically significant effect for any of the 15 measures of attention, including those with relatively low MDEs.[18]

Finally, we test the robustness of the main effect among sub-samples of subjects for whom there is less reason to worry about a lack of understanding. We find that the estimated coefficients are similar in magnitude when we (i) exclude subjects who did not answer all comprehension questions correctly (Column 3, Panel A of Table A5), (ii) exclude subjects who made one or more choices that violated monotonicity in a particular week (Columns 4-5), (iii) control for the number of inconsistent choices (Column 6), and (iv) exclude subjects who are illiterate (Column 7). Further, if the effect were driven by confusion or misunderstanding of the task, it should be larger

[18] We test for joint insignificance of the main variables of interest across Tables V and A9 (HARD poverty prime interacted with the substitution rate in the first column of Panel B in Table 5 and HARD poverty prime elsewhere), using the multi-equation omnibus test of joint insignificance (Young 2019). The results indicate a very high likelihood of joint insignificance (p=0.99). The same test rejects joint insignificance of the HARD poverty prime for all models in Table 3 (p<0.01) and in Table 4 (p<0.01).

in Week 1 when the subjects made choices for the first time than in Week 2, when they were already familiar with the task. Yet, when comparing the effect of HARD poverty prime across the two weeks, we find that it is somewhat stronger (though the difference is not statistically significant) in Week 2 than in Week 1. Finally, using a simulation, we show that the main result is unlikely to be driven by increased prevalence of random choices among the subjects in the HARD poverty prime (Figure A5).

In sum, a rich set of tests does not favour the interpretation that thinking about poverty affects discounting through less attention and/or reduced understanding of the task.

## III. Links to theory

This section provides a discussion that aims to illuminate possible mechanisms through which poverty related concerns can affect impatience in our experiment. Since economic constraints, such as time and liquidity constraints, are closed down by design, we do not consider these factors as potential explanations. Also, since we do not find effects of the HARD poverty prime on measures of inattention, we do not formalize this mechanism.

We first consider the well-established dual-self model of Fudenberg and Levine (2012), which assumes that individuals are in constant conflict between a short-run self, seeking immediate gratification, and a forward-looking long-run self. We show that under a plausible assumption that costs of self-control increase with cognitive load, anxiety and salience of the tempting option, the model can fully explain the set of findings. Next, we discuss the idea that, while similar results may be obtained by assuming that individuals have immediate disutility from negative affect or that individuals have state-dependent time preferences, the assumptions would have to be fairly

strong to explain the full set of results we find. In Appendix B we provide a formal framework that aims to illuminate the mechanisms. It is also noteworthy that the psychological mechanisms we describe here neither rely on different psychological constraints of the rich and poor, nor on mental processes that would be specific to poverty. Instead, the aim is to illuminate how general psychological processes are more prone to affect behaviour of the poor, given the difficulties of the environment they live in.

The dual-self model of costly self-control by (Fudenberg and Levine 2012) assumes a constant conflict between a short-run self seeking immediate gratification, and a forward-looking long-run self. The long-run self can only impose its preferences on the short-run self, an ultimate decision-maker, by paying a mental cost of self-control. Earlier research, not necessarily focusing on the role of poverty, suggests that the cost of self-control is affected by external conditions taxing mental capacity (Shiv and Fedorikhin 1999; Gul and Pesendorfer 2001; Toussaert 2018). Our experiment is designed to increase the costs of self-control by several experimental manipulations. First, we assume that the HARD poverty prime increases costs of self-control since the process of actively thinking about poverty and how to resolve the presented scenarios consumes subjects' mental processing resources. Second, the cost of self-control is likely to be higher when individuals are making their choices in period 2 when they can obtain instant gratification from consuming entertainment immediately rather than having to wait. Third, the salience of temptations is also higher when respondents are presented with immediate consumption of entertainment through IMPATIENT default.

Indeed, we observe more impatient choices for each of these experimental manipulations. We document three key findings. (1) Participants are more impatient under the HARD poverty prime than under the EASY poverty prime. (2) The effect of the HARD poverty prime is stronger

when combined with the IMPATIENT default. (3) Although statistically insignificant, the effect of the HARD poverty prime is higher when decisions are made just before the first activity hour, in Week 2. All of these findings are predicted by the costly self-control model.

We consider two alternative models. First, participants may derive disutility from a negative affect when experiencing poverty related concerns (Lerner, Li, and Weber 2013; Lerner et al. 2015). As long as the negative affect enters a utility function, individuals may compensate themselves for it by consuming more entertainment. This would be consistent with the main finding (1), that the HARD poverty prime increases impatience. Our finding (3), a weaker effect of HARD poverty prime in Week 1, relative to Week 2 choices, would also be consistent with a model of negative affect if individuals were able to predict their future emotions and discounted them. Nevertheless, individuals seem to be rather poor in predicting own future emotions (Frederick, Loewenstein, and O'Donoghue 2002; Wilson and Gilbert 2003). Finally, the negative affect model predicts no effect of IMPATIENT default on decision making. Thus, while the negative affect model can explain some of our findings, it cannot be the sole explanation.

Second, we consider a model of state dependent preferences. Following (Becker and Mulligan 1997) we assume that the discounting parameter changes with external conditions, in our case psychological states of the mind of our participants. Yet in order to be able to explain all three key findings, we would also need to impose such state-dependency beyond the effect of the poverty prime, on the domains of time and default. While this is theoretically plausible, we believe it is rather unlikely that such specifically state-dependent parameters would drive all of our results.

## IV. Conclusions

This paper presents experimental evidence on the psychological effects of poverty on time preferences. We study farmers in Uganda, exogenously manipulate the extent of their thinking about financial pre-occupations, and then measure their inter-temporal choices in an entertainment discounting task. The results show that concerns about poverty-related problems increase individual preferences for earlier consumption of entertainment. In addition to measuring choices, we employed monitoring techniques and gathered detailed data on the decision-making process, which suggest that the behavioural change induced by the poverty scenario is unlikely to be driven by differences in attention to the task. Taken together, our results support the interpretation that thinking about poverty directly influences time preferences.

Our results speak to a long-standing debate about why the poor behave differently from the rich. "Two-systems" models of individual decision making (Bernheim and Rangel 2004; Fudenberg and Levine 2006) treat decision-making as a result of a strategic interplay between an impulsive agent and a forward-looking agent who can reduce the influence of the impulsive agent only by drawing on a limited budget of cognitive resources. The results indicate that such a two-system model may be a useful way to think about the psychological impacts of poverty. The poor may not necessarily have different hardwired time preferences than the rich, but their impulsive self may more easily affect behaviour due to an increased cognitive load or stress associated with poverty. Also, since such an effect may create a feedback loop between poverty and impatience, our findings provide empirical support for recent efforts to model behavioural poverty traps (see the recent classification of Ghatak 2015), in particular those based on the assumption that poverty directly reduces self-control (Bernheim, Ray, and Yeltekin 2015; Banerjee and Mullainathan 2010).

These findings are potentially important for policy. First, if thinking about poverty-related problems directly increases time preferences, then there may be an additional mechanism, besides the standard economic channels, through which even temporary anti-poverty programs may have lasting positive impacts on economic activity and accumulation of assets. In this context, it is noteworthy that a recent series of randomized evaluations of simple unconditional cash transfers finds promising impacts, documenting positive effects on measures of economic activity and human capital investments, but zero or negative effects on alcohol and tobacco consumption (Blattman and Fiala 2014; Haushofer and Shapiro 2016). Second, the timing of subsidies or offers for products that involve future-oriented decisions may play a large role. In line with this reasoning, the evidence shows that making investment decisions outside of periods of intense scarcity induces more patient choices, such as increased purchases of fertilizers (Duflo, Kremer, and Robinson 2011). Third, perceptions about the sources of inequality have been shown to play an important role in willingness to redistribute from rich to poor (Cappelen et al. 2007). Negative views on helping the poor are often tied to a presumption that poverty originates in reckless behaviour. Enjoying entertainment while putting off work until later – the choice in our experiment - is frequently featured as an example of such condemnable behaviour. Here we provide unambiguous evidence that the relationship between economic circumstances and (lack of) patience is more complex, by demonstrating that it is, at least in part, driven by poverty damaging the ability to exercise self-control.

## References


Abebe, Girum, Stefano Caria, and Esteban Ortiz-Ospina. 2019. "The Selection of Talent: Experimental and Structural Evidence from Ethiopia." Mimeo.

Andersen, Steffen, Glenn W Harrison, Morten I Lau, and E Elisabet Rutström. 2008. "Eliciting Time and Risk Preferences." *Econometrica* 76 (3): 583–618.

Andersson, Ola, Hakan J. Holm, Jean Robert Tyran, and Erik Wengstr. 2018. "Risk Aversion Relates to Cognitive Ability: Preferences or Noise." *Journal of European Economic Association* 14 (June): 1129–54.

Andreoni, James, Michael Callen, Yasir Khan, Jaffar Karrar, and Charles Sprenger. 2016. "Using Preference Estimates to Customize Incentives: An Application to Polio Vaccination Drives in Pakistan." NBER working paper 22019.

Andreoni, James, and Charles Sprenger. 2012. "Estimating Time Preferences from Convex Budgets." *American Economic Review* 102 (7): 3333–56.

Augenblick, Ned, Muriel Niederle, and Charles Sprenger. 2015. "Working over Time: Dynamic Inconsistency in Real Effort Tasks." *Quarterly Journal of Economics* 130 (3): 1067–1115.

Augenblick, Ned, and Matthew Rabin. 2018. "An Experiment on Time Preference and Misprediction in Unpleasant Tasks." *Review of Economic Studies* forthcomin.

Banerjee, Abhijit V., and Esther Duflo. 2007. "The Economic Lives of the Poor." *The Journal of Economic Perspectives: A Journal of the American Economic Association* 21 (1): 141.

Banerjee, Abhijit V., and Sendhil Mullainathan. 2010. "The Shape of Temptations: Implications for the Economic Lives of the Poor." NBER Working Paper n. 15973.

Bauer, M., and J. Chytilová. 2010. "The Impact of Education on Subjective Discount Rate in Ugandan Villages." *Economic Development and Cultural Change* 58: 643–669.

Bauer, Michal, Christopher Blattman, Julie Chytilová, Joseph Henrich, Edward Miguel, and Tamar Mitts. 2016. "Can War Foster Cooperation?" *Journal of Economic Perspectives* 30 (3): 249–74.

Bauer, Michal, Julie Chytilova, and Jonathan Morduch. 2012. "Behavioral Foundations of Microcredit: Experimental and Survey Evidence from Rural India." *The American Economic Review* 102 (2): 1118–1139.

Becker, Gary S, and Casey B Mulligan. 1997. "The Endogenous Determination of Time Preference." *The Quarterly Journal of Economics* 112 (3): 729–58.

Benjamin, Daniel J., James J. Choi, and Joshua Strickland. 2010. "Social Identity and Preferences." *American Economic Review* 100 (4): 1913–28.

Bernheim, B. Douglas, Debraj Ray, and Şevin Yeltekin. 2015. "Poverty and Self-Control." *Econometrica* 83 (5): 1877–1911.

Bernheim, Douglas B., and Antonio Rangel. 2004. "Addiction and Cue-Triggered Decision Processes." *American Economic Review* 94 (5): 1558–90.

Bessone, Pedro, Gautam Rao, Frank Schilbach, Heather Schofield, and Mattie Toma. 2019. "Sleepless in Chennai : The Consequences of Increasing Sleep among the Urban Poor." Mimeo.

Blattman, Christopher, and Nathan Fiala. 2014. “Generating Skilled Self-Employement in Developing Countries: Experimental Evidence from Uganda.” *Quarterly Journal of Economics* 129 (2): 697–752.

Callen, Michael, Mohammad Isaqzadeh, James D Long, and Charles Sprenger. 2014. “Violence and Risk Preference: Experimental Evidence from Afghanistan.” *American Economic Review* 104 (1): 123–48.

Cappelen, Alexander W, Astri Drange Hole, Erik Sorensen, and Bertil Tungodden. 2007. “The Pluralism of Fairness Ideals : An Experimental Approach.” *American Economic Review* 97 (3): 818–27.

Carvalho, Leonardo S., Stephan Meier, and Stephanie W Wang. 2016. “Poverty and Economic Decision - Making : Evidence from Changes in Financial Resources at Payday.” *American Economic Review* 106 (2): 260–84.

Chabris, Christopher F, David Laibson, Carrie L Morris, Jonathon P Schuldt, and Dmitry Taubinsky. 2009. “The Allocation of Time in Decision-Making.” *Journal of the European Economic Association* 7 (2–3): 628–37.

Cohn, Alain, Jan Engelmann, Ernst Fehr, and Michel André Maréchal. 2015. “Evidence for Countercyclical Risk Aversion: An Experiment with Financial Professionals.” *American Economic Review* 105 (2): 860–85.

Cohn, Alain, Ernst Fehr, and Michel André Maréchal. 2014. “Business Culture and Dishonesty in the Banking Industry.” *Nature*, no. 516: 86–89.

Cohn, Alain, and Michel André Maréchal. 2016. “Priming in Economics.” *Current Opinion in Psychology* 12: 17–21.

Cohn, Alain, Michel André Maréchal, and Thomas Noll. 2010. “Bad Boys: How Criminal Identity Salience Affects Rule Violation.” *Review of Economic Studies* 82 (4): 1289–1308.

Cubitt, Robin P., and Daniel Read. 2007. “Can Intertemporal Choice Experiments Elicit Time Preferences for Consumption?” *Experimental Economics* 10 (4): 369–89.

Dean, Joshua T. 2020. “Noise , Cognitive Function , and Worker Productivity.” Mimeo.

Dean, Mark, and Anja Sautmann. 2020. “Credit Constraints and the Measurement of Time Preferences.” *Review of Economics and Statistics* forthcomin.

Dohmen, Thomas, Armin Falk, David Huffman, and Uwe Sunde. 2010. “Are Risk Aversion and Impatience Related to Cognitive Ability?” *American Economic Review* 100 (3): 1238–1260.

———. 2018. “On the Relationship between Cognitive Ability and Risk Preference.” *Journal of Economic Literature* 32 (2): 115–34.

Duflo, E., M. Kremer, and J. Robinson. 2011. “Nudging Farmers to Use Fertilizer: Theory and Experimental Evidence from Kenya.” *American Economic Review* 101 (6): 2350–90.

Enke, Benjamin, and Thomas Graeber. 2019. “Cognitive Uncertainty.” Mimeo.

Falco, S. Di, S. Damon, and G. Kohlin. 2011. “Mental Shocks, Rates of Time Preference and Conservation: A Behavioural Dimension of Poverty Traps?” Working Paper.

Fehr, Dietmar, Gunther Fink, and Jack Kelsey. 2019. “Poverty, Seasonal Scarcity and Exchange Asymmetries.”

Frederick, Shane, George Loewenstein, and Ted O'Donoghue. 2002. "Time Discounting and Time Preference: A Critical Review." *Journal of Economic Literature* 40 (2): 351–401.

Fudenberg, Drew, and David K Levine. 2006. "A Dual-Self Model of Impulse Control." *American Economic Review* 96 (5): 1449–76.

———. 2012. "Timing and Self-Control." *Econometrica* 80 (1): 1–42.

Gailliot, Matthew T, Roy F Baumeister, C Nathan DeWall, Jon K Maner, E Ashby Plant, Dianne M Tice, Lauren E Brewer, and Brandon J Schmeichel. 2007. "Self-Control Relies on Glucose as a Limited Energy Source: Willpower Is More than a Metaphor." *Journal of Personality and Social Psychology* 92 (2): 325–36.

Ghatak, Maitreesh. 2015. "Theories of Poverty Traps and Anti-Poverty Policies." *World Bank Economic Review* 29 (August): S77–105.

Giné, Xavier, Jessica Goldberg, Silverman Dan, and Yang Dean. 2018. "Revising Commitments: Field Evidence on the Adjustment of Prior Choices." *Economic Journal* 128 (608): 159–88.

Gul, Faruk, and Wolfgang Pesendorfer. 2001. "Temptation and Self-Control." *Econometrica* 69 (6): 1403–35.

Haushofer, Johannes, and Ernst Fehr. 2014. "On the Psychology of Poverty." *Science (New York, N.Y.)* 344 (6186): 862–67.

Haushofer, Johannes, Daniel Schunk, and Ernst Fehr. 2013. "Negative Income Shocks Increase Discount Rates." Mimeo.

Haushofer, Johannes, and Jeremy Shapiro. 2016. "The Short-Term Impact of Unconditional Cash Transfers to the Poor: Experimental Evidence from Kenya." *Quarterly Journal of Economics* 131 (4): 1973–2042.

Kaur, Supreet, Sendhil Mullainathan, Frank Schilbach, and Suanna Oh. 2019. "Does Financial Strain Lower Worker Productivity?" Mimeo.

Kremer, Michael, Gautam Rao, and Frank Schilbach. 2019. "Behavioral Development Economics." In *Handbook of Behavioral Economics*, edited by Douglas Bernheim, Steffano DellaVigna, and David Laibson, 2:345–458. Elsevier B.V.

Kuhn, Michael A, Peter Kuhn, and Marie Claire Villeval. 2017. "Decision-Environment Effects on Intertemporal Financial Choices: How Relevant Are Resource-Depletion Models?" *Journal of Economic Behavior & Organization* 137: 72–89.

Lawrance, Emily C. 1991. "Poverty and the Rate of Time Preference : Evidence from Panel Data." *Journal of Political Economy* 99 (1): 54–77.

Lerner, Jennifer S, Ye Li, Piercarlo Valdesolo, and Karim S Kassam. 2015. "Emotion and Decision Making." *Annual Review of Psychology* 66: 799–823.

Lerner, Jennifer S, Ye Li, and Elke U Weber. 2013. "The Financial Costs of Sadness." *Psychological Science* 24 (1): 72–79.

Lerner, Jennifer S, Deborah a Small, George Loewenstein, Jennifer S Lerner, Deborah a Small, and George Loewenstein. 2004. "Heartstrings and Pursestrings: Carryover Effects of Emotions on Economic Decisions." *Psychological Science* 15 (5): 337–41.

Lichand, Guilherme, and Anandi Mani. 2019. "Cognitive Droughts." Mimeo.

Lührmann, Melanie, Marta Serra-Garcia, and Joachim Winter. 2018. “The Impact of Financial Education on Adolescents’ Intertemporal Choices.” *American Economic Journal: Economic Policy* 10 (3): 309–32.

Mani, Anandi, Sendhil Mullainathan, Eldar Shafir, and Jiaying Zhao. 2013. “Poverty Impedes Cognitive Function.” *Science (New York, N.Y.)* 341 (6149): 976–80.

Meier, Stephan, and Charles Sprenger. 2015. “Temporal Stability of Time Preferences.” *Review of Economics and Statistics* 96 (4): 638–47.

Mel, Suresh De, David McKenzie, and Christopher Woodruff. 2008. “Returns to Capital in Microenterprises: Evidence from a Field Experiment.” *The Quarterly Journal of Economics* 123 (4): 1329–1372.

Mullainathan, Sendhil, and Eldar Shafir. 2013. *Scarcity: Why Having Too Little Means so Much*. Time Books.

Muraven, Mark, and Roy F Baumeister. 2000. “Self-Regulation and Depletion of Limited Resources : Does Self-Control Resemble a Muscle ?” *Psychological Bulletin* 126 (2): 247–59.

Pender, John L. 1996. “Discount Rates and Credit Markets " Theory and Evidence from Rural India.” *Journal of Development Economics* 50: 257–96.

Recalde, Maria P., Arno Riedl, and Lise Vesterlund. 2018. “Error-Prone Inference from Response Time: The Case of Intuitive Generosity in Public-Good Games.” *Journal of Public Economics* 160: 132–47.

Schilbach, Frank. 2019. “Alcohol and - Self-Control : A Field Experiment in India.” *American Economic Review* 109 (4): 1290–1322.

Schilbach, Frank, Heather Schofield, and Sendhil Mullainathan. 2016. “The Psychological Lives of the Poor.” *American Economic Review* 106 (5): 435–40.

Schofield, Heather. 2014. “The Economic Costs of Low Caloric Intake: Evidence from India.” *Working Paper*.

Shiv, B., and A. Fedorikhin. 1999. “Heart and Mind in Conflict: The Interplay of Affect and Cognition in Consumer Decision Making.” *Journal of Consumer Research* 26 (3): 278–292.

Sutter, Matthias, Martin G. Kocher, Daniela Glätzle-Rützler, and Stefan T. Trautmann. 2013. “Impatience and Uncertainty: Experimental Decisions Predict Adolescents’ Field Behavior.” *The American Economic Review* 103 (1): 510–31.

Tanaka, T., C. F Camerer, and Q. Nguyen. 2010. “Risk and Time Preferences: Experimental and Household Survey Data from Vietnam.” *American Economic Review* 100 (1): 557–71.

Toussaert, Séverine. 2018. “Eliciting Temptation and Self-Control Through Menu Choices: A Lab Experiment.” *Econometrica* 86 (3): 859–89.

Voors, M., E. E Nillesen, P. Verwimp, E. H Bulte, R. Lensink, D. Van Soest, and W. Netherlands. 2012. “Violent Conflict and Behavior: A Field Experiment in Burundi.” *American Economic Review* 102 (2): 941–64.

Wang, X T, and Robert D Dvorak. 2010. “Sweet Future: Fluctuating Blood Glucose Levels Affect Future Discounting.” *Psychological Science* 21 (2): 183–88.

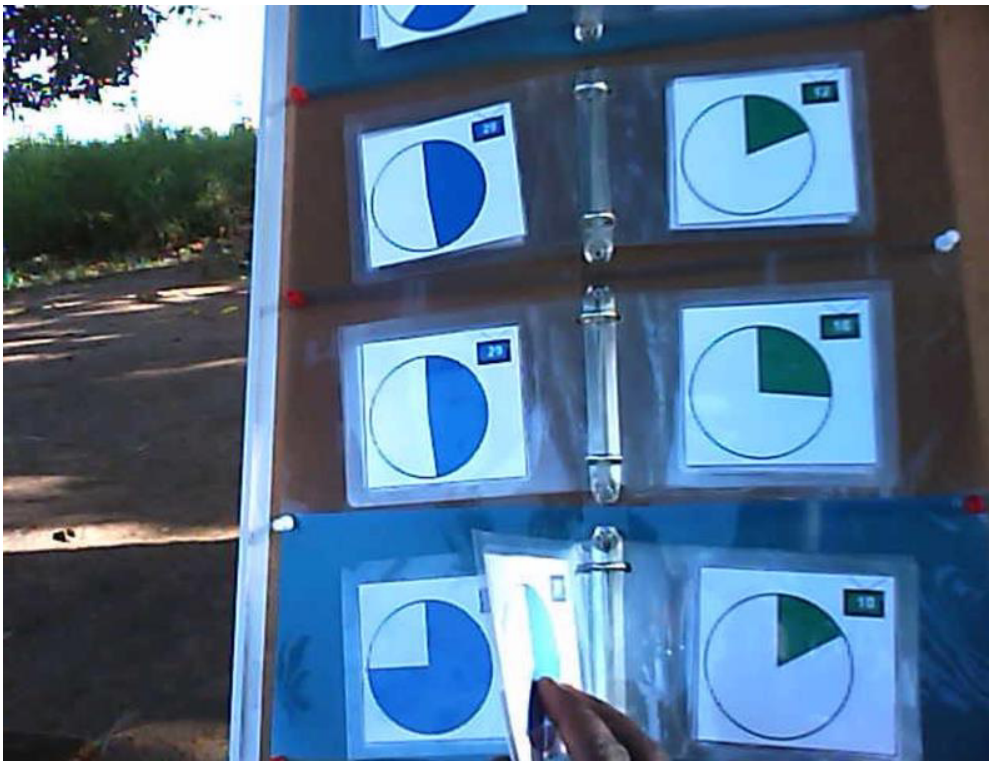
Wilcox, Nathaniel T. 1993. “Lottery Choice: Incentives, Complexity and Decision Time.” *Economic Journal* 103: 1397–1417.

Wilson, Timothy D, and Daniel T Gilbert. 2003. “Affective Forecasting.” *Advances in Experimental Social Psychology* 35 (35): 345–411.

Young, Alwyn. 2019. “Channeling Fisher: Randomization Tests and the Statistical Insignificance of Seemingly Significant Experimental Results.” *Quarterly Journal of Economics* 134 (2): 557–98.

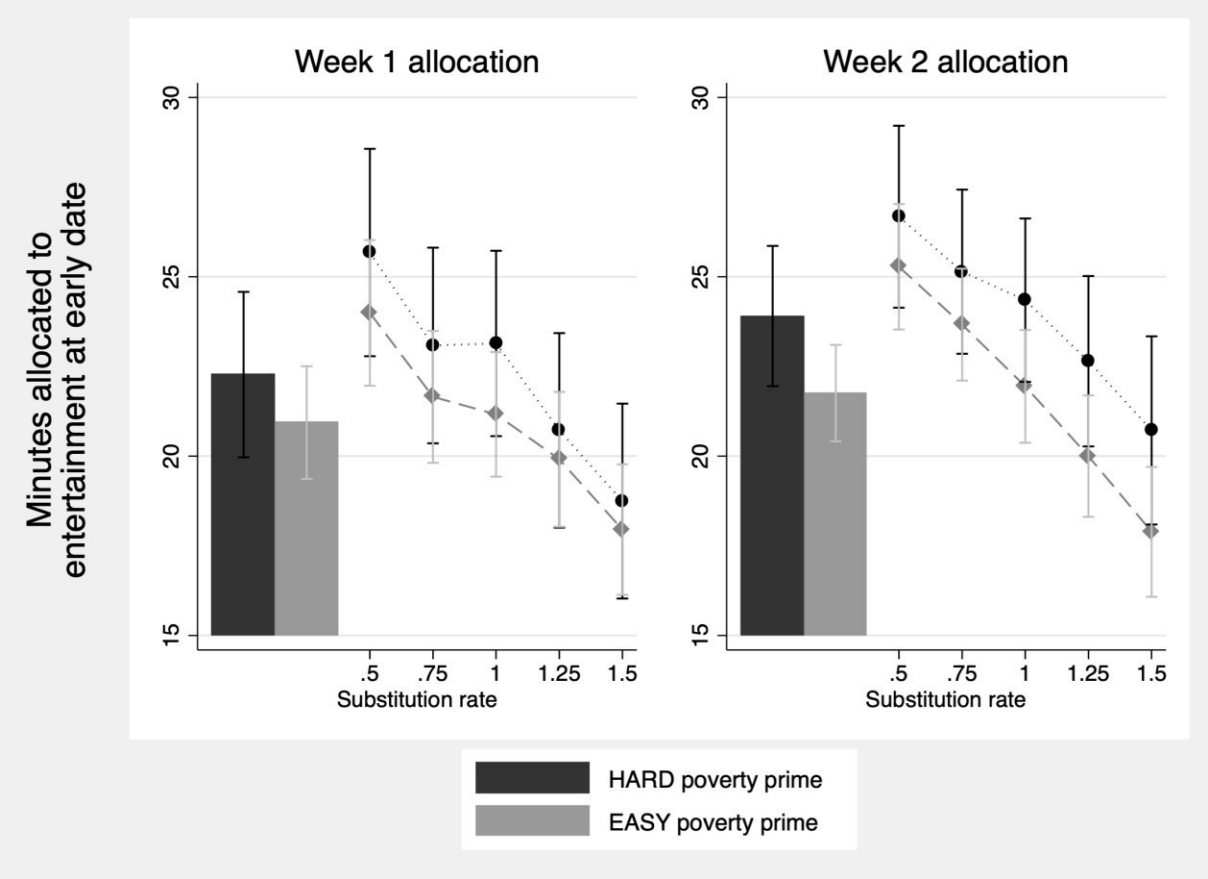
## Figures and Tables

*Figure 1: Entertainment allocation environment*



Notes: Decision-making booklets shown to participants. The left-hand side refers to Week 2 allocation of work and entertainment. The numbers inside the small TV icon (top right corner of each of the cards) and the blue part of the pie-charts refer to minutes of entertainment. The remaining white part of the pie-chart represents the number of minutes of work to the full hour in that week. Analogously, the right-hand side of each booklet refers to Week 3 allocations. Green is used to represent the Week 3 entertainment time. Each row represents a different intertemporal substitution rate. On each row there are six pages corresponding to six levels of early consumption of entertainment (see Appendix Table A1).

*Figure 2: Minutes allocated to entertainment at an early date: by poverty prime, substitution rate, and week*




*Notes:* The thick bars represent choices aggregated over all substitution rates, while the dots indicate choices at the respective substitution rates. Error bars represent 95% level confidence intervals from a regression with standard errors clustered at the individual level.

*Table 1: Timeline of the Experiment*

| | Beginning of Session → | | | | | | | | → End of session | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Payment[f] | |
| | *Group instructions* | *Minimum work and entertainment*[a] | *Poverty prime and calories*[b] | *Work and entertainment allocations*[c] | *Draw decision* | *Work and entertainment hour* | *Raven's progressive matrices*[d] | *Survey*[e] | *Weekly fee* | *Completion bonus* |
| Week 1 | x | x | x | x | | | | | x | |
| Week 2 | x | x | x | x | x | x | | | x | |
| Week 3 | | x | | | | x | x | x | x | x |

Note: [a] The minimum work/entertainment consisted of 5 minutes of watching videos and 5 minutes of sorting beans. [b] The poverty priming procedure and calorie treatment were timed in order that the work and entertainment allocations were completed under elevated stress and blood glucose levels. [c] Subjects made 5 decisions in each week corresponding to various intertemporal substitution rates. [d] The poverty and calorie priming procedure was repeated for a third time in week 3 directly before the raven's progressive matrices. [e] In week 1, a short survey on basic demographic information was administered. In all three weeks subjects were asked about diet over the previous week. In week 3, we collected additional information about demographics, conflict and credit history (See Appendix E and G for full survey texts). [f] The weekly participant fee was UGX 2,000, and the completion bonus was UGX 15,000.

*Table 2: Summary statistics*

| | Mean (1) | Std. Dev. (2) | Min (3) | Max (4) | N (5) |
|---|---|---|---|---|---|
| *Panel A: Observable characteristics* | | | | | |
| Age | 35.45 | 9.96 | 20.00 | 57.00 | 289 |
| Female (dummy) | 0.51 | 0.50 | 0.00 | 1.00 | 289 |
| Married (dummy) | 0.35 | 0.48 | 0.00 | 1.00 | 289 |
| Household size | 7.18 | 3.82 | 0.00 | 30.00 | 289 |
| Education (years) | 5.16 | 3.48 | 0.00 | 13.00 | 289 |
| Able to write a letter (dummy) | 0.53 | 0.50 | 0.00 | 1.00 | 278 |
| Monthly earnings (in thousands. UGX) | 241.8 | 657.3 | 0.0 | 8178.8 | 289 |
| Household owns a bicycle (dummy) | 0.63 | 0.48 | 0.00 | 1.00 | 278 |
| Household owns a radio (dummy) | 0.51 | 0.50 | 0.00 | 1.00 | 278 |
| Household owns cattle (dummy) | 0.40 | 0.49 | 0.00 | 1.00 | 278 |
| Household owns a mobile phone (dummy) | 0.55 | 0.50 | 0.00 | 1.00 | 278 |
| Brick walls (dummy) | 0.36 | 0.48 | 0.00 | 1.00 | 278 |
| Number of meals taken during a day | 1.90 | 0.52 | 1.00 | 4.00 | 278 |
| Number of days unable to work due to sickness during the last 4 weeks | 2.69 | 5.08 | 0.00 | 31.00 | 278 |
| Cognitive skills (0-5) | 2.86 | 1.32 | 0.00 | 5.00 | 289 |
| Index of conflict exposure (0-12) | 5.87 | 3.09 | 0.00 | 12.00 | 240 |
| *Panel B: Experimental choices* | | | | | |
| Entertainment consumed early (minutes) | 22.2 | 11.4 | 5.0 | 45.0 | 2870 |
| Entertainment consumed early (minutes, Week 1) | 21.6 | 12.0 | 5.0 | 45.0 | 1445 |
| Entertainment consumed early (minutes, Week 2) | 22.8 | 10.7 | 5.0 | 45.0 | 1425 |
| Number of inconsistencies (0-4) | 0.58 | 0.74 | 0.00 | 4.00 | 574 |
| Distance from consistency (average) | 0.90 | 1.35 | 0.00 | 8.00 | 574 |
| Distance from default allocation (average) | 2.90 | 1.65 | 0.00 | 6.00 | 2870 |
| Sticking to the default allocation (dummy) | 0.09 | 0.28 | 0.00 | 1.00 | 2870 |
| *Panel C: Process of decision-making* | | | | | |
| Total decision-making time (seconds) | 220.1 | 126.8 | 43.1 | 880.2 | 506 |
| Distraction time (seconds) | 3.6 | 7.4 | 0.0 | 61.7 | 506 |
| Number of options viewed (average, out of 6) | 3.6 | 1.6 | 0.0 | 6.0 | 2530 |
| Total number of page views | 37.6 | 24.5 | 5.0 | 216.0 | 506 |

Notes: Panel A reports summary statistics for the observable characteristics. The cognitive skills variable measures the number of Raven's matrices correctly solved by the individual (out of 5). The index of conflict exposure is the sum of positive responses to 12 questions on different types of exposure to violence (see Appendix G for details). Panel B reports summary statistics for experimental choices. The number of inconsistencies (0 to 4) is defined as the number of violations of the law of demand at adjacent substitution rates within a given week, i.e. if fewer minutes are allocated to the earlier date at a lower substitution rate, compared to the number of minutes allocated at a higher substitution rate. Distance from consistency is defined as the minimum number of flips through the decision-making booklet required to make the allocation consistent with the law of demand. Distance from default allocation is defined as the number of page flips from the default allocation in the booklet at a given substitution rate. Sticking to the default is an indicator for whether the individual selected the allocation provided by the experimenter by default. Panel C reports summary statistics for the decision-making process: the total decision-making time in a given week, the distraction time – the amount of time the individual was looking away from the decision-making booklet, the number of options that the individual viewed at least once at a given substitution rate (out of the 6 options), and the total number of page views (at all substitution rates), regardless of whether the page was visited once or repeatedly.

*Table 3: Time discounting*

| Dependent variable | Entertainment sooner (minutes) | | | | | |
|---|---|---|---|---|---|---|
| | | Substitution rate | | | | |
| Choices | All | 0.5 | 0.75 | 1 | 1.25 | 1.5 |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| HARD poverty prime | 1.71** | 1.56 | 1.42 | 2.13** | 1.69* | 1.76 |
| | (0.85) | (1.03) | (0.97) | (0.96) | (1.02) | (1.08) |
| CALORIES condition | 0.34 | 0.42 | 0.18 | 0.34 | 0.58 | 0.16 |
| | (0.84) | (1.02) | (0.97) | (0.96) | (1.00) | (1.08) |
| PATIENT default | -1.79** | -1.57 | -2.89*** | -2.67*** | -1.64 | -0.19 |
| | (0.85) | (1.03) | (0.96) | (0.97) | (1.01) | (1.08) |
| Only delayed rewards | -1.19* | -1.11 | -1.98** | -0.94 | -0.96 | -0.94 |
| | (0.68) | (0.91) | (0.83) | (0.77) | (0.81) | (0.81) |
| Substitution rate | -6.29*** | | | | | |
| | (0.61) | | | | | |
| Constant | 29.45*** | 29.76*** | 26.73*** | 23.18*** | 20.06*** | 16.08*** |
| | (1.80) | (2.12) | (1.98) | (1.95) | (2.04) | (2.30) |
| Observations | 2,870 | 574 | 574 | 574 | 574 | 574 |
| R-squared | 0.054 | 0.028 | 0.036 | 0.029 | 0.018 | 0.013 |
| Mean of dep. var. for EASY poverty prime | 21.34 | 24.32 | 22.65 | 21.55 | 19.96 | 17.92 |

Notes: OLS, standard errors clustered at the individual level in parentheses. The dependent variable in all columns is the number of minutes allocated to entertainment at an early date (Week 2). All regressions include controls for age and gender.
*** Significant at the 1% level.
** Significant at the 5% level.
* Significant at the 10% level.

*Table 4: Effects of prime on time discounting: The role of contextual features*

| Dependent variable | Entertainment sooner (minutes) | | | | | |
|---|---|---|---|---|---|---|
| Choices | All | Only delayed rewards | All | PATIENT default | All | Only delayed rewards and PATIENT default |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| HARD poverty prime | 2.10** | 1.37 | 2.31** | 0.87 | 2.68** | -0.35 |
| | (0.98) | (1.17) | (1.13) | (1.27) | (1.22) | (1.68) |
| CALORIES condition | 0.34 | 0.69 | 0.31 | 1.04 | 0.32 | 1.26 |
| | (0.84) | (1.17) | (0.85) | (1.28) | (0.85) | (1.71) |
| PATIENT default | -1.79** | -0.74 | -1.19 | | -1.20 | |
| | (0.85) | (1.17) | (1.17) | | (1.17) | |
| HARD prime x PATIENT default | | | -1.22 | | -1.20 | |
| | | | (1.73) | | (1.73) | |
| Only delayed rewards | -0.81 | | -1.18* | -0.12 | -0.81 | |
| | (0.91) | | (0.68) | (0.99) | (0.91) | |
| HARD prime x Only delayed rewards | -0.76 | | | | -0.74 | |
| | (1.35) | | | | (1.35) | |
| Substitution rate | -6.29*** | -6.00*** | -6.29*** | -5.27*** | -6.29*** | -5.19*** |
| | (0.61) | (0.75) | (0.61) | (0.87) | (0.61) | (1.10) |
| Constant | 29.26*** | 28.54*** | 29.13*** | 21.63*** | 28.94*** | 23.17*** |
| | (1.83) | (2.43) | (1.87) | (2.58) | (1.89) | (3.59) |
| Observations | 2,870 | 1,445 | 2,870 | 1,415 | 2,870 | 725 |
| R-squared | 0.054 | 0.038 | 0.055 | 0.037 | 0.055 | 0.032 |
| Mean of dep. var. for EASY poverty prime | 21.34 | 20.93 | 21.34 | 20.75 | 21.34 | 21.32 |

Notes: OLS estimates in all columns. Standard errors clustered at the individual level in parentheses. The dependent variable in all columns is the number of minutes allocated to entertainment at an early date. All regressions include controls for age and gender.
*** Significant at the 1% level.
** Significant at the 5% level.
* Significant at the 10% level.

*Table 5: Quality of decision-making*

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| **Panel A: Direct measures of attention** | | | | | |
| Dependent variable | Decision-making time | | Distraction time | Information acquisition | |
| | Seconds | | Seconds | Number of options viewed at a given price | Total number of page views at a given price |
| Sample | All | Excluding outliers | All | All | All |
| HARD poverty prime | -8.17 | -2.47 | 0.07 | -0.06 | -0.24 |
| | (12.67) | (7.80) | (0.66) | (0.13) | (0.44) |
| CALORIES condition | -10.70 | 0.10 | 0.25 | -0.02 | -0.10 |
| | (12.58) | (7.84) | (0.65) | (0.13) | (0.45) |
| PATIENT default | 21.53* | 20.46*** | 1.10 | -0.14 | 0.68 |
| | (12.88) | (7.81) | (0.68) | (0.13) | (0.43) |
| Only delayed rewards | 32.22*** | 24.18*** | 1.55** | 0.17* | 0.62* |
| | (9.35) | (5.89) | (0.66) | (0.09) | (0.37) |
| Substitution rate | | | | -0.58*** | -1.27*** |
| | | | | (0.11) | (0.32) |
| Constant | 187.69*** | 122.89*** | 2.55** | 4.31*** | 8.83*** |
| | (31.42) | (14.99) | (1.28) | (0.28) | (1.11) |
| Observations | 506 | 456 | 506 | 2,530 | 2,530 |
| R-squared | 0.028 | 0.078 | 0.023 | 0.023 | 0.018 |
| Mean of dep. var. for EASY poverty prime | 224.06 | 189.21 | 3.62 | 3.67 | 7.22 |

**Panel B: Patterns of choices**

| Dependent variable | Automatic decision-making | | | Inconsistency in choices | |
|---|---|---|---|---|---|
| | Entertainment sooner (minutes) | Sticking to the default allocation at a given price (dummy) | Distance from default allocation at a given price | Number of inconsistencies (0-4) | Distance from consistency |
| HARD poverty prime | 1.40 | 0.01 | -0.10 | 0.10 | 0.13 |
| | (1.44) | (0.02) | (0.11) | (0.07) | (0.13) |
| CALORIES condition | 0.34 | -0.01 | 0.04 | -0.05 | -0.07 |
| | (0.84) | (0.02) | (0.11) | (0.07) | (0.13) |
| Substitution rate | -6.44*** | 0.04** | 0.14 | | |
| | (0.86) | (0.01) | (0.09) | | |
| HARD poverty prime*Substitution rate | 0.32 | | | | |
| | (1.23) | | | | |
| PATIENT default | -1.79** | 0.15*** | -1.73*** | 0.12* | 0.27** |
| | (0.85) | (0.02) | (0.10) | (0.07) | (0.13) |
| Only delayed rewards | -1.19* | 0.01 | 0.14 | -0.01 | 0.03 |
| | (0.68) | (0.02) | (0.08) | (0.05) | (0.09) |
| Constant | 29.61*** | -0.03 | 3.06*** | 0.19 | 0.24 |
| | (1.88) | (0.04) | (0.22) | (0.15) | (0.28) |

| | | | | | |
|---|---|---|---|---|---|
| Observations | 2,870 | 2,870 | 2,870 | 574 | 574 |
| R-squared | 0.054 | 0.071 | 0.278 | 0.041 | 0.033 |
| Mean of dep. var. for EASY poverty prime | 21.34 | 0.08 | 2.92 | 0.54 | 0.84 |

Notes: OLS, standard errors clustered at the individual level in parentheses. All regressions include controls for age and gender.
Dependent variables in Panel A: (1) the total decision-making time (in seconds), (2) the total decision-making time excluding the 10 percent of observations with the longest decision-making time, (3) the time the individual was looking away from the decision-making booklet (in seconds), (4) the number of options that the individual viewed at least once at a given substitution rate (out of the 6 options), and (5) the total number of page views at a given substitution rate, regardless of whether the page was visited once or repeatedly.
Dependent variables in Panel B are: (1) the number of minutes allocated to entertainment in Week 2, (2) an indicator for whether the individual selected the allocation provided by the experimenter by default at a given substitution rate, (3) the number of page flips from the default allocation in the booklet at a given substitution rate
, (4) number of inconsistencies (0 to 4) defined as number of violations of the law of demand at adjacent substitution rates within a given week, i.e. if fewer minutes are allocated to an earlier date at a lower substitution rate, compared to the number of minutes allocated at a higher substitution rate, and (5) the minimum number of flips through the decision-making booklet required to make the allocation consistent with the law of demand.
*** Significant at the 1% level.
** Significant at the 5% level.
* Significant at the 10% level.

**[For online publication only]**

# Online Appendix
for

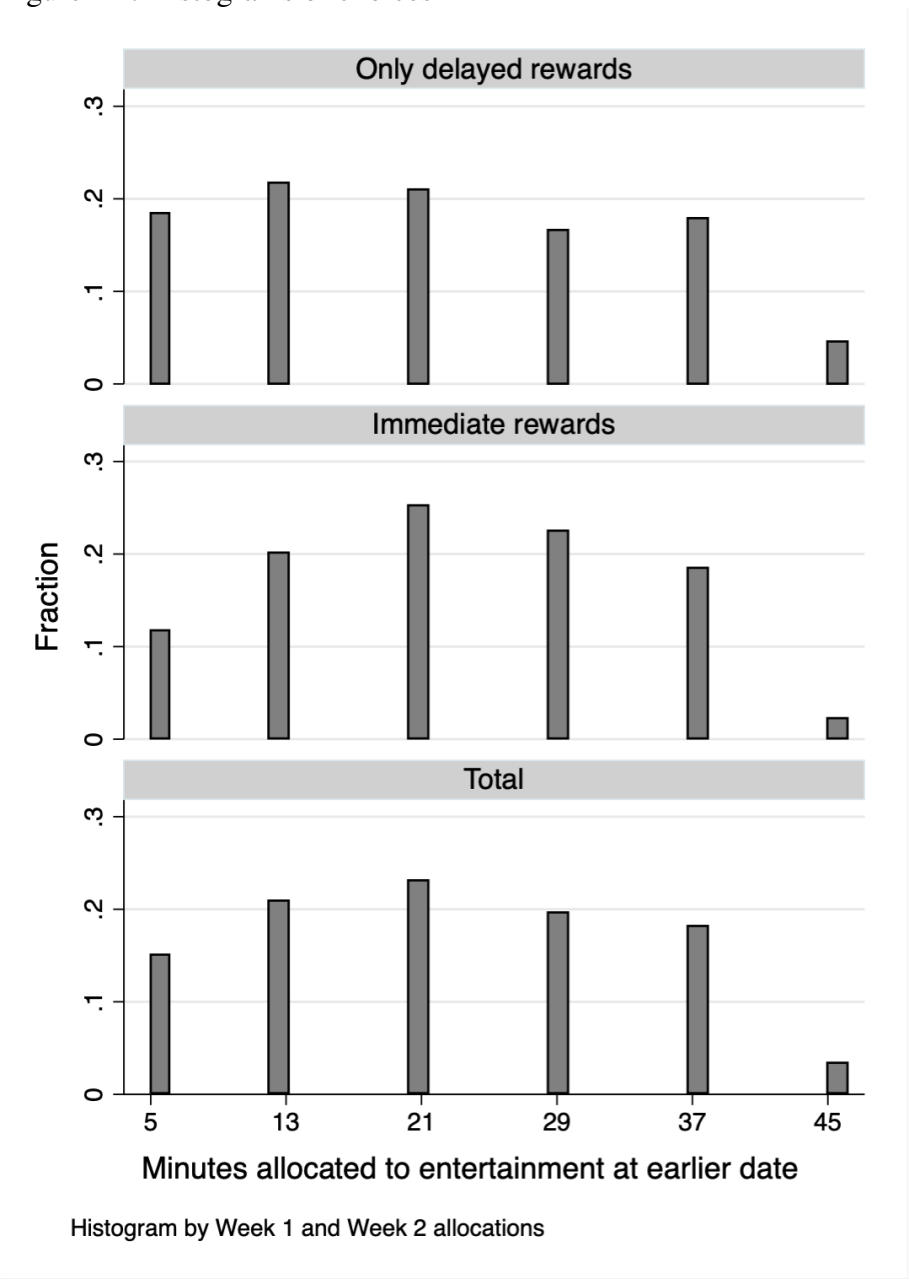
# Psychological Effects of Poverty on Time Preferences

Vojtěch Bartoš, Michal Bauer, Julie Chytilová and Ian Levely

**Contents**

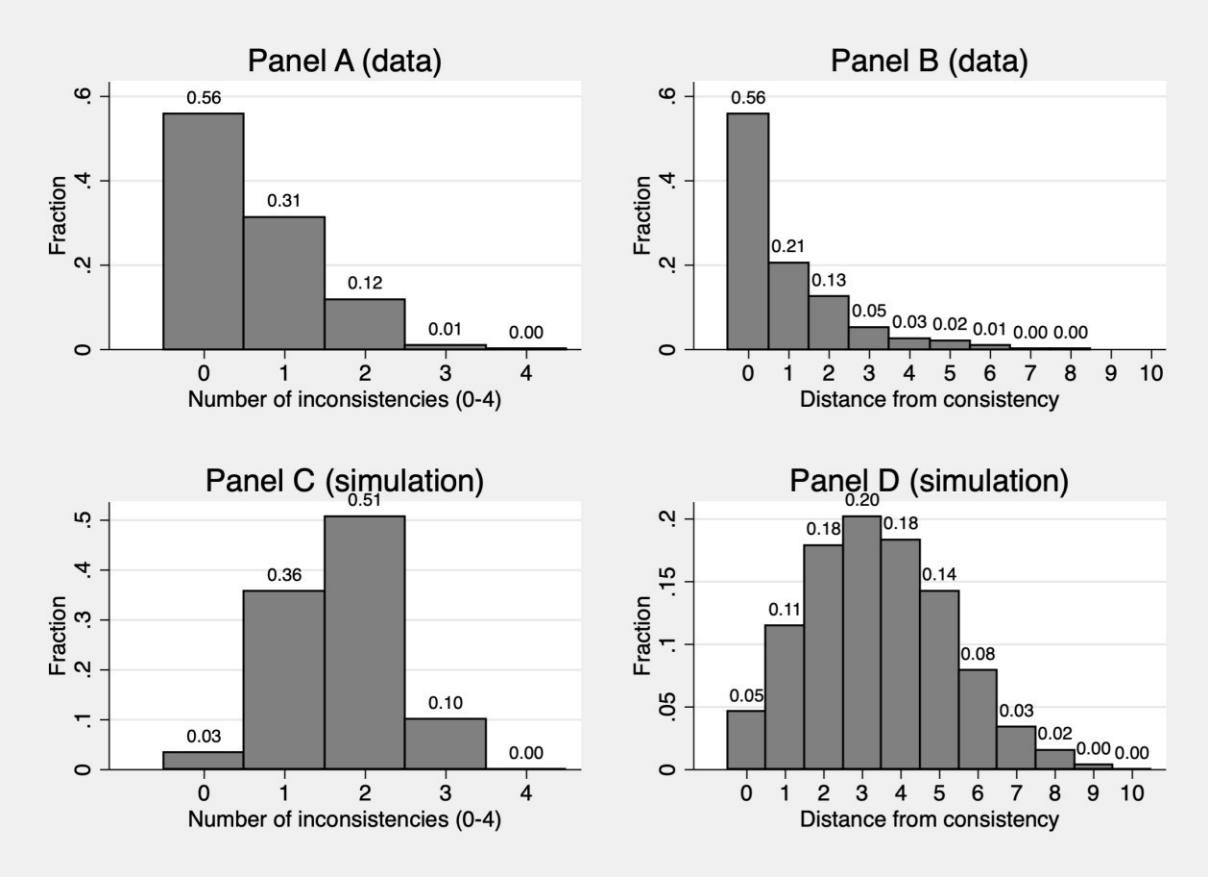
## Appendix A: Additional figures tables

Figure A1: Histograms of choices



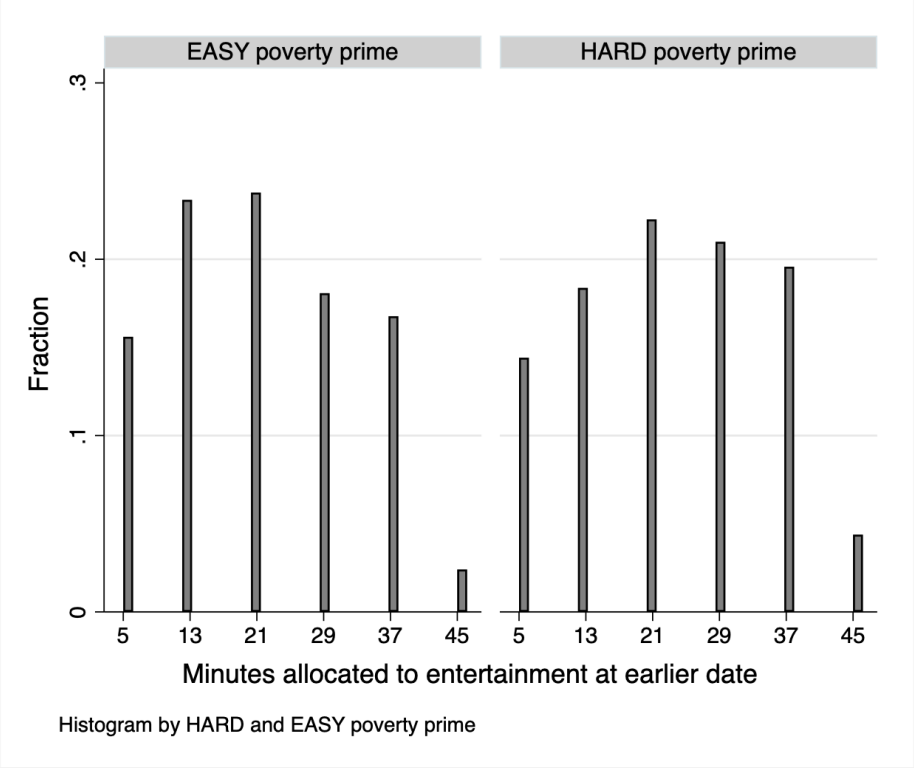

*Notes:* The three panels present histograms of the fractions of choices of minutes of entertainment at earlier date by the six options available. The top panel does so for Week 1 choices, the middle one for Week 2 choices, and the bottom panel for choices combined over both weeks.

Figure A2: Histograms of inconsistent choices



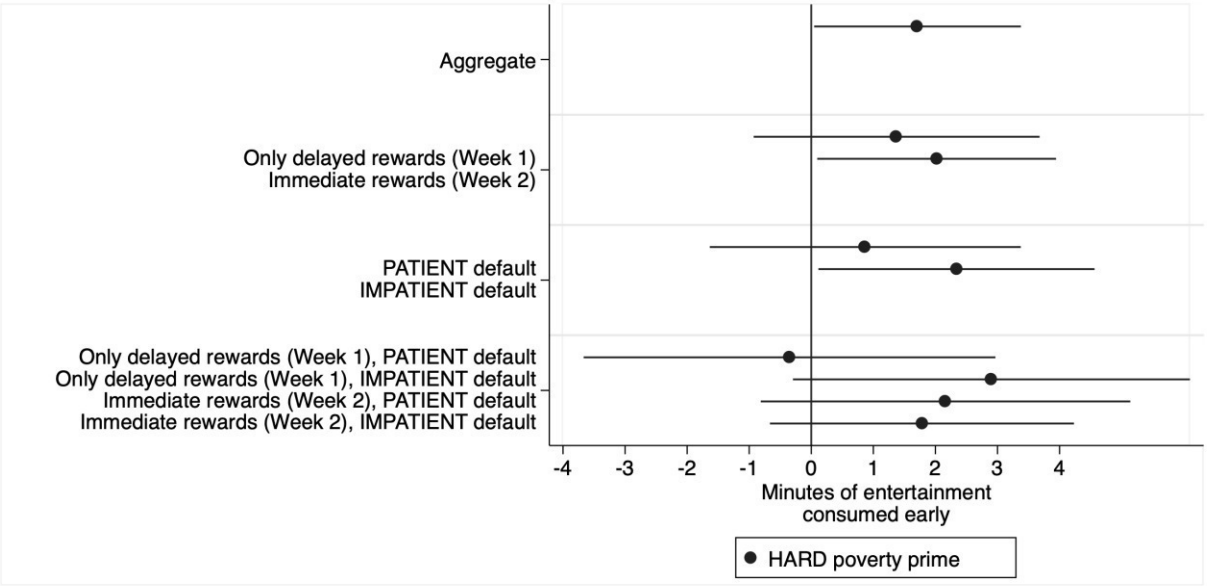

*Notes:* Panel A presents a histogram of the frequency of inconsistent choices out of 4 in per subject in a given week. A choice is counted as inconsistent if fewer minutes of entertainment are allocated to the earlier date at a lower substitution rate, compared to the number of minutes allocated at a higher substitution rate. Panel B presents a histogram of frequency of how many page flips in the entire booklet across all rows per subject in a given week would be needed so that the resulting choice no longer violates monotonicity. Panels C and D present the same histograms as Panels A and B, respectively, for 5000 "individuals" with stochastically generated choices.

Figure A3: Histogram of choices by prime



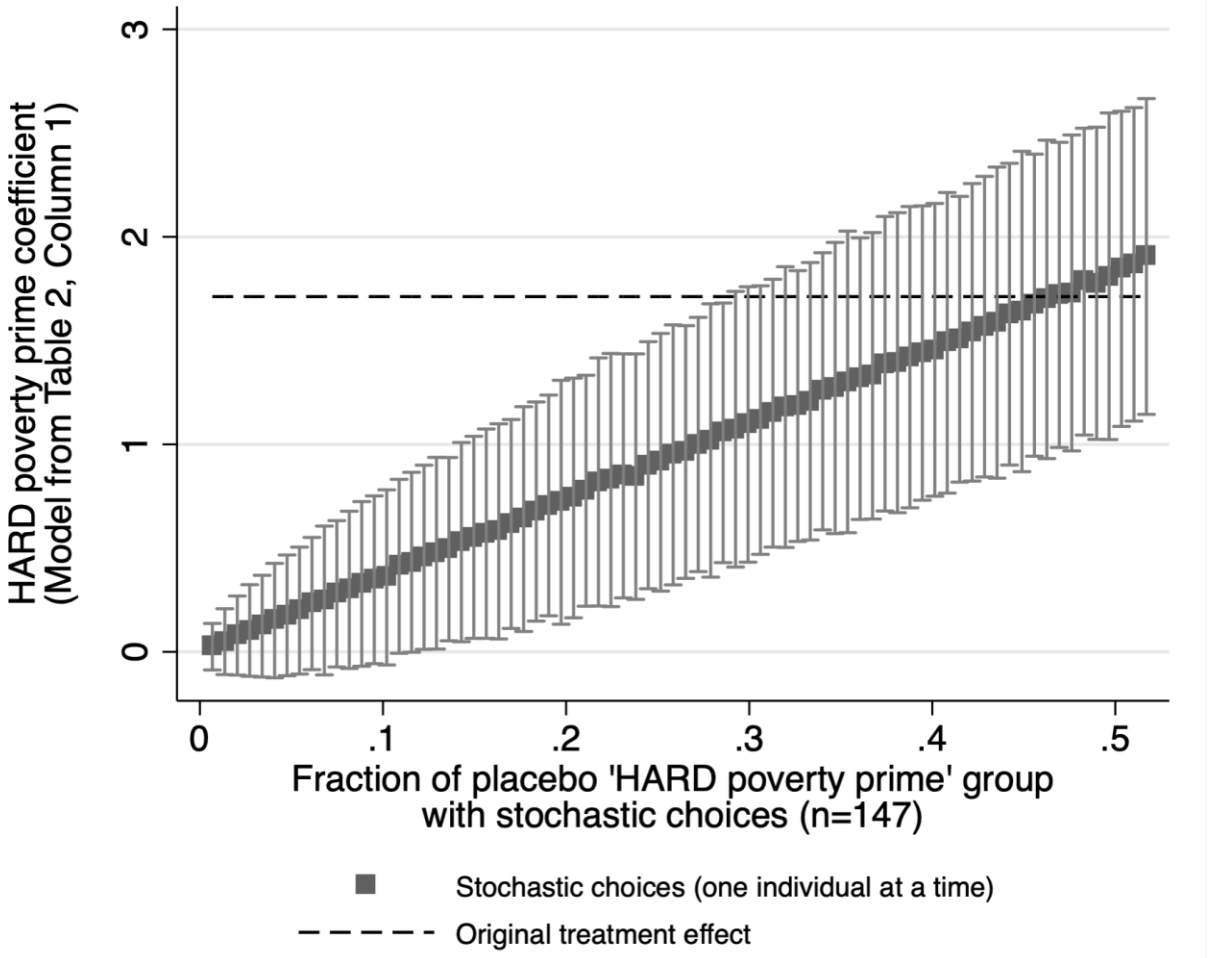

*Notes:* The two panels present histograms of fractions of choices of minutes of entertainment at earlier date by the six options available. The left panel displays the histogram for choices under the EASY poverty prime, the right panel for choices under the HARD poverty prime.

Figure A4: Time discounting coefficient plots




*Notes:* Regression results from model estimated in column 1 of Table 3. The dependent variable is the number of minutes allocated to entertainment at the early date. The upper most panel presents the aggregate results for the full sample (the coefficient is for Week 2 allocations). The second panel presents the results split by decisions in Week 1 and Week 2, respectively. The third panel presents the results split by subsamples of subjects in PATIENT and IMPATIENT default, respectively. The fourth panel presents the results split by subsamples of subjects in the four categories above combines. Error bars represent 95 percent confidence intervals.

**Figure A5: Stochastic choice benchmarking simulation**




*Notes:* The figure presents results of a simulation in which we test whether the main result (Table 3, Column 1) can be replicated by a difference in stochastic choices across HARD and EASY poverty prime. First, we duplicate the EASY poverty prime group. We then classify the duplicated EASY poverty prime subjects as placebo "HARD poverty prime" subjects. Each data point presents the average coefficient of the HARD poverty prime in which we replace choices for a number of individuals with random draws from a uniform distribution. For each number of individuals, we repeat the procedure 1000 times and the point estimate reports the average coefficient we obtain. Error bars represent 95 percent confidence intervals.
On average, we replicate our main effect when the choices of 47 percent of individuals (69 out of 147) are replaced with random draws. The reason for the increasing pattern is mechanical. The average choice of minutes of entertainment for EASY poverty prime in our data is 21.34 minutes, the average random choice is 25 minutes. Patterns of choices across HARD and EASY poverty prime in our data do not support the possibility that the HARD poverty prime subjects would exhibit such dramatic levels of stochasticity in their choices.

Table A1: Choice sets across the five substitution rates

| Entertainment minutes allocated to early date (Week 2) | Substitution rate | | | | |
|---|---|---|---|---|---|
| | 0.5 | 0.75 | 1 | 1.25 | 1.5 |
| | Entertainment minutes allocated to a later date (Week 3) | | | | |
| 45 | 0 | 0 | 0 | 0 | 0 |
| 37 | 4 | 6 | 8 | 10 | 12 |
| 29 | 8 | 12 | 16 | 20 | 24 |
| 21 | 12 | 18 | 24 | 30 | 36 |
| 13 | 16 | 24 | 32 | 40 | 48 |
| 5 | 20 | 30 | 40 | 50 | 60 |

Table A2: Poverty prime: Effects on anxiety and perceptions of difficulty (means)

| | EASY poverty prime (1) | HARD poverty prime (2) | Difference: (2)-(1) (3) |
|---|---|---|---|
| *Panel A: Share of subjects who would feel very anxious* | | | |
| All four scenarios - average | 0.22 | 0.47 | 0.25 (0.00) |
| Week 1 scenarios - average | 0.21 | 0.53 | 0.32 (0.00) |
| Week 2 scenarios - average | 0.23 | 0.44 | 0.21 (0.00) |
| Crop scenario in Week 1 | 0.12 | 0.47 | 0.34 (0.00) |
| Other scenario in Week 1 | 0.30 | 0.59 | 0.29 (0.00) |
| Crop scenario in Week 2 | 0.15 | 0.44 | 0.29 (0.00) |
| Other scenario in Week 2 | 0.31 | 0.44 | 0.14 (0.02) |
| *Panel B: Share of subjects who think the situation would be very difficult to deal with* | | | |
| All four scenarios - average | 0.25 | 0.61 | 0.36 (0.00) |
| Week 1 scenarios - average | 0.25 | 0.61 | 0.36 (0.00) |
| Week 2 scenarios - average | 0.27 | 0.59 | 0.32 (0.00) |
| Crop scenario in Week 1 | 0.30 | 0.66 | 0.35 (0.00) |
| Other scenario in Week 1 | 0.20 | 0.57 | 0.37 (0.00) |
| Crop scenario in Week 2 | 0.31 | 0.63 | 0.33 (0.00) |
| Other scenario in Week 2 | 0.22 | 0.54 | 0.32 (0.00) |

Notes: Means reported in Columns 1 and 2. Column 3 reports differences in percentage points, and in parentheses we report p-value for a t-test testing the null hypothesis that the difference is zero.

Table A3: Poverty prime: Effects on anxiety and perceptions of difficulty (regression analysis)

| Dependent variable | Very anxious | | Very difficult | |
|---|---|---|---|---|
| | Crop and other scenario (average) | | Crop and other scenario (average) | |
| | (1) | (2) | (3) | (4) |
| HARD poverty prime | 0.25*** | 0.20*** | 0.34*** | 0.32*** |
| | (0.04) | (0.04) | (0.04) | (0.04) |
| CALORIES condition | 0.00 | 0.00 | 0.00 | 0.00 |
| | (0.04) | (0.04) | (0.04) | (0.04) |
| PATIENT default | -0.06* | -0.06* | 0.01 | 0.01 |
| | (0.04) | (0.04) | (0.04) | (0.04) |
| Only delayed rewards | 0.03 | -0.02 | 0.00 | -0.02 |
| | (0.03) | (0.03) | (0.03) | (0.04) |
| HARD poverty prime*Only delayed rewards | | 0.11** | | 0.04 |
| | | (0.05) | | (0.05) |
| Constant | 0.09 | 0.12 | 0.08 | 0.09 |
| | (0.08) | (0.08) | (0.08) | (0.08) |
| Observations | 523 | 523 | 523 | 523 |
| R-squared | 0.124 | 0.128 | 0.199 | 0.199 |
| Mean of dep. var. for EASY poverty prime | 0.22 | 0.22 | 0.26 | 0.26 |

Notes: OLS estimates in all columns. Standard errors clustered at the individual level in parentheses. Dependent variables stand for whether the subject responded "very anxious" to "How anxious would this situation make you feel?" about the presented scenario or an average over the two scenarios (columns 1-2), or responded "very difficult" to "How difficult would it be to face this situation?" about a particular scenario or an average over the two scenarios (columns 3-4). All regressions include controls for age and gender.
*** Significant at the 1 percent level.
** Significant at the 5 percent level.
* Significant at the 10 percent level.

Table A4: Randomization check

| | Poverty-related concerns | | | Calories | | | Default option | | |
|---|---|---|---|---|---|---|---|---|---|
| | HARD | EASY | Difference (ttest p-value) | PLACEBO | CALORIES | Difference (ttest p-value) | PATIENT | IMPATIENT | Difference (ttest p-value) |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| Age | 36.20 | 34.73 | 1.48 | 35.56 | 35.35 | 0.21 | 35.98 | 34.92 | 1.06 |
| | (10.49) | (9.39) | (0.21) | (10.15) | (9.78) | (0.86) | (10.29) | (9.61) | (0.37) |
| Female (dummy) | 0.49 | 0.52 | -0.02 | 0.53 | 0.48 | 0.05 | 0.48 | 0.47 | 0.08 |
| | (0.50) | (0.50) | (0.68) | (0.50) | (0.50) | (0.38) | (0.50) | (0.50) | (0.18) |
| Married (dummy) | 0.39 | 0.31 | 0.09 | 0.33 | 0.37 | -0.05 | 0.37 | 0.31 | 0.07 |
| | (0.49) | (0.46) | (0.12) | (0.47) | (0.49) | (0.41) | (0.49) | (0.47) | (0.19) |
| Household size | 7.72 | 7.98 | -0.25 | 7.69 | 8.03 | -0.34 | 8.13 | 7.56 | 0.57 |
| | (3.48) | (3.46) | (0.54) | (3.37) | (3.57) | (0.41) | (3.59) | (3.31) | (0.17) |
| Education (years) | 5.44 | 4.89 | 0.55 | 5.09 | 5.24 | -0.15 | 5.24 | 5.24 | -0.16 |
| | (3.45) | (3.50) | (0.18) | (3.43) | (3.54) | (0.71) | (3.46) | (3.51) | (0.70) |
| Able to write a letter (dummy) | 0.57 | 0.48 | 0.09 | 0.49 | 0.57 | -0.08 | 0.51 | 0.54 | -0.02 |
| | (0.50) | (0.50) | (0.12) | (0.50) | (0.50) | (0.18) | (0.50) | (0.50) | (0.71) |
| Monthly earnings (in thousands UGX) | 309.73 | 176.12 | 133.62 | 259.73 | 223.18 | 36.55 | 231.70 | 251.92 | -20.22 |
| | (879.31) | (311.15) | (0.08)* | (757.03) | (537.09) | (0.64) | (542.26) | (757.58) | (0.79) |
| Monthly earnings (in thousands UGX)* | 223.45 | 176.12 | 47.34 | 205.49 | 192.71 | 12.78 | 201.92 | 196.48 | 5.43 |
| | (451.44) | (311.15) | (0.30) | (376.29) | (397.14) | (0.78) | (408.18) | (363.82) | (0.91) |
| Household owns a bicycle (dummy) | 0.82 | 0.84 | -0.02 | 0.91 | 0.74 | 0.17 | 0.83 | 0.82 | 0.01 |
| | (0.80) | (0.76) | (0.86) | (0.82) | (0.74) | (0.07)* | (0.80) | (0.77) | (0.94) |
| Household owns a radio (dummy) | 0.64 | 0.58 | 0.07 | 0.60 | 0.62 | -0.02 | 0.63 | 0.60 | 0.03 |
| | (0.66) | (0.76) | (0.44) | (0.72) | (0.70) | (0.86) | (0.78) | (0.64) | (0.72) |
| Household owns cattle (dummy) | 2.01 | 2.06 | -0.05 | 2.16 | 1.91 | 0.25 | 2.18 | 1.89 | 0.29 |
| | (3.37) | (6.57) | (0.94) | (3.56) | (6.56) | (0.69) | (6.71) | (2.98) | (0.64) |
| Household owns a mobile phone (dummy) | 0.85 | 0.81 | 0.04 | 0.85 | 0.80 | 0.06 | 0.92 | 0.73 | 0.19 |
| | (1.00) | (1.14) | (0.75) | (1.00) | (1.15) | (0.67) | (1.24) | (0.86) | (0.13) |
| Brick walls (dummy) | 0.37 | 0.36 | 0.01 | 0.34 | 0.39 | -0.05 | 0.37 | 0.36 | 0.01 |
| | (0.48) | (0.48) | (0.83) | (0.48) | (0.49) | (0.41) | (0.48) | (0.48) | (0.92) |
| Number of meals taken during a day | 1.82 | 1.97 | -0.15 | 1.89 | 1.90 | -0.01 | 1.91 | 1.88 | 0.03 |
| | (0.53) | (0.51) | (0.01)** | (0.52) | (0.53) | (0.82) | (0.52) | (0.53) | (0.68) |
| Number of days unable to work due to sickness during the last 4 weeks | 2.83 | 2.56 | 0.26 | 2.76 | 2.63 | 0.13 | 2.83 | 2.55 | 0.28 |
| | (5.30) | (4.86) | (0.67) | (5.23) | (4.92) | (0.83) | (5.41) | (4.72) | (0.65) |
| Index of conflict exposure (0-12) | 5.78 | 5.95 | -0.17 | 5.98 | 5.75 | 0.24 | 0.87 | 5.97 | -0.20 |
| | (2.95) | (3.24) | (0.68) | (3.15) | (3.04) | (0.56) | (0.34) | (2.95) | (0.62) |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Video data available (dummy) | 0.85<br>(0.36) | 0.88<br>(0.33) | -0.03<br>(0.53) | 0.88<br>(0.33) | 0.85<br>(0.36) | 0.03<br>(0.53) | 35.98<br>(10.29) | 0.86<br>(0.35) | 0.01<br>(0.85) |
| F-statistic of joint significance (p-value) | | | 1.34<br>(0.17) | | | 0.92<br>(0.55) | | | 0.62<br>(0.88) |

Notes: Means reported in columns 1, 2, 4, 5, 7, and 8. Standard deviations in the parentheses. Columns 3, 6, and 9 report differences in percentage points, and in parentheses we report the p-value for a t-test testing the null hypothesis that the difference is zero. The index of conflict exposure sums up positive responses to 12 questions on different types of exposure to violence.
Monthly earnings difference between HARD and EASY poverty prime samples is driven by two individuals reporting extremely high incomes exceeding 4500 Ugandan Shillings. Excluding these individuals in Monthly earnings (in thousands UGX)* yields an insignificant difference between HARD and EASY poverty prime samples. Our results are robust to excluding the two individuals.
The bottom row presents the F-statistic and a corresponding p-value for an omnibus test of joint orthogonality. In columns 3, 6, and 9, the OLS models regress indicators for 1) HARD poverty prime, 2) CALORIES condition, and 3) PATIENT default on the full set of characteristics, respectively.

Table A5: Robustness checks

| *Panel A* | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Dependent variable | Entertainment sooner (minutes) | | | | | | | | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| Sample | All | Decision-making process data available | Comprehension questions answered correctly | Maximum one inconsistency | Always consistent | All | Literate | All | Eating at least two meals per day |
| HARD poverty prime | 1.71** | 1.78** | 2.11** | 1.82 | 1.83 | 1.59* | 3.05*** | 1.71** | 1.87* |
| | (0.85) | (0.89) | (0.90) | (1.12) | (1.44) | (0.84) | (1.03) | (0.85) | (0.98) |
| CALORIES condition | 0.34 | 0.49 | -0.47 | 0.34 | 0.03 | 0.38 | -0.27 | 0.34 | 0.10 |
| | (0.84) | (0.89) | (0.90) | (1.07) | (1.39) | (0.84) | (1.02) | (0.84) | (0.96) |
| PATIENT default | -1.79** | -1.34 | -1.40 | -2.51** | -3.20** | -1.95** | -1.92* | -1.79** | -1.31 |
| | (0.85) | (0.89) | (0.92) | (1.12) | (1.44) | (0.86) | (1.04) | (0.85) | (0.97) |
| Only delayed rewards | -1.19* | -1.42* | -1.44** | -1.19 | -1.79 | -1.18* | -1.41* | -1.19* | -0.55 |
| | (0.68) | (0.73) | (0.71) | (0.86) | (1.09) | (0.68) | (0.72) | (0.68) | (0.75) |
| Substitution rate | -6.29*** | -6.46*** | -6.66*** | -9.27*** | -10.89*** | -6.29*** | -7.37*** | | -6.60*** |
| | (0.61) | (0.66) | (0.72) | (0.70) | (0.94) | (0.61) | (0.83) | | (0.67) |
| Substitution rate 0.75 | | | | | | | | -2.02*** | |
| | | | | | | | | (0.33) | |
| Substitution rate 1.0 | | | | | | | | -2.76*** | |
| | | | | | | | | (0.44) | |
| Substitution rate 1.25 | | | | | | | | -4.59*** | |
| | | | | | | | | (0.54) | |
| Substitution rate 1.5 | | | | | | | | -6.58*** | |
| | | | | | | | | (0.62) | |
| Number of inconsistencies | | | | | | 0.63* | | | |
| | | | | | | (0.32) | | | |
| Constant | 29.45*** | 29.73*** | 29.67*** | 33.87*** | 36.65*** | 29.23*** | 29.33*** | | 29.51*** |
| | (1.80) | (1.87) | (1.89) | (2.24) | (3.04) | (1.83) | (2.16) | | (2.15) |
| Observations | 2,870 | 2,530 | 2,310 | 1,900 | 1,130 | 2,870 | 1,880 | | 2,345 |
| R-squared | 0.054 | 0.056 | 0.063 | 0.106 | 0.152 | 0.058 | 0.091 | | 0.052 |
| Mean of dep. var. for EASY poverty prime | 21.34 | 21.20 | 20.83 | 20.73 | 21.06 | 21.34 | 20.49 | 21.34 | 21.16 |

*Panel B*

| Dependent variable | Entertainment sooner (minutes) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | All | All | All | Did not eat prior the experiment | Drank the whole cup of tea | Rating tea as "good" or "neutral" | All | Lower conflict exposure | Higher conflict exposure |
| HARD poverty prime | 1.60* | 1.50* | 1.71** | 1.32 | 2.01** | 1.16 | 1.68** | 1.52 | 2.49* |
| | (0.83) | (0.84) | (0.83) | (1.03) | (0.96) | (1.05) | (0.84) | (1.20) | (1.48) |
| CALORIES condition | 0.29 | 0.81 | 0.29 | 0.40 | 0.28 | -0.02 | 0.43 | 0.14 | 0.61 |
| | (0.83) | (0.89) | (0.84) | (1.05) | (0.94) | (1.03) | (0.88) | (1.16) | (1.47) |
| PATIENT default | -1.88** | -2.32** | -1.60* | -1.24 | -2.02** | -2.26** | -1.43* | -3.21*** | -1.55 |
| | (0.83) | (1.10) | (0.83) | (1.04) | (0.95) | (1.04) | (0.86) | (1.18) | (1.51) |
| Only delayed rewards | -1.17* | -1.17* | -1.15* | -1.16 | -1.93** | -0.83 | -1.17* | 0.20 | -1.44 |
| | (0.68) | (0.68) | (0.68) | (0.82) | (0.76) | (0.81) | (0.68) | (0.97) | (1.17) |
| Substitution rate | -6.29*** | -6.29*** | -6.29*** | -5.40*** | -5.94*** | -6.36*** | -6.20*** | -7.10*** | -6.23*** |
| | (0.61) | (0.61) | (0.61) | (0.76) | (0.63) | (0.74) | (0.62) | (0.77) | (1.22) |
| Constant | 31.50*** | 31.48*** | 31.06*** | 27.05*** | 29.01*** | 28.98*** | 27.63*** | 29.77*** | 32.84*** |
| | (2.45) | (2.51) | (1.95) | (2.24) | (2.04) | (2.11) | (2.32) | (2.54) | (3.59) |
| Controlling for village fixed effects | yes | yes | no | no | no | no | no | no | no |
| Individual level random effects | no | yes | no | no | no | no | no | no | no |
| Controlling for experimenter fixed effects | no | no | yes | no | no | no | no | no | no |
| Controlling for tea rating | no | no | no | no | no | no | yes | no | no |
| Observations | 2,870 | 2,870 | 2,870 | 1,900 | 2,335 | 1,965 | 2,835 | 1,425 | 960 |
| R-squared (overall with RE) | 0.075 | 0.075 | 0.063 | 0.038 | 0.058 | 0.055 | 0.067 | 0.075 | 0.065 |
| Number of IDs | | 289 | | | | | | | |
| Mean of dep. var. for EASY poverty prime | 21.34 | 21.34 | 21.34 | 21.23 | 20.83 | 21.12 | 21.34 | 21.12 | 21.63 |

Notes: OLS estimates in all columns, except for Panel B, Column 2 where individual level random effect estimates are reported. Panel B, Columns 1 and 2 also include village level fixed effects, while Panel B, Column 3 includes experimenter fixed effects, Column 7 controls for individual perceptions of the taste of tea provided. Standard errors clustered at the individual level in parentheses. The dependent variable in all columns is the number of minutes allocated to entertainment at an early date (Week 2). All regressions include controls for age and gender.

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Table A6: Structural estimates of time discounting parameters

| | All | HARD poverty prime | EASY poverty prime |
|---|---|---|---|
| | (1) | (2) | (3) |
| Beta | 0.91 | 0.88 | 0.93 |
| Delta (weekly) | 1.11 | 1.05 | 1.16 |
| Gamma | 0.20 | 0.18 | 0.22 |
| N | 2770 | 1365 | 1405 |
| H0: Beta = 1 | 3.94 | 3.02 | 1.11 |
| chi squared (p-value) | (0.05)** | (0.08)* | (0.29) |
| H0: Beta (HARD) = beta (EASY) | | 0.29 | |
| chi squared (p-value) | | (0.59) | |
| H0: Delta (HARD) = delta (EASY) | | 1.36 | |
| chi squared (p-value) | | (0.24) | |
| H0: Gamma (HARD) = gamma (EASY) | | 0.38 | |
| chi squared (p-value) | | (0.54) | |

Notes: Parameters of present bias (beta), time discounting (weekly delta), and utility function curvature (gamma) estimated using censored-normal regression. For more details, refer to Appendix C. Parameters are recovered using non-linear combinations and the standard errors clustered at the individual level used for statistical tests are estimated using the delta method. Since the method employed requires some variation in responses to the intertemporal substitution rate in order to recover reasonable parameter estimates, we drop observations for all subjects who stick to the default in all five choices in a given week (10 subjects in Week 1 and 10 subjects in Week 2; four subjects stick to the default in both weeks). Chi-squared tests are reported in last four rows.
*** Significant at the 1 percent level.
** Significant at the 5 percent level.
* Significant at the 10 percent level.

Table A7: Including additional controls

| Dependent variable | Entertainment sooner (minutes) | | | | |
|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) |
| Sample | All | All | All | All | All |
| HARD poverty prime | 1.74** | 1.92** | 1.88** | 1.78** | 1.82** |
| | (0.85) | (0.82) | (0.82) | (0.82) | (0.83) |
| CALORIES condition | 0.33 | 0.19 | 0.12 | 0.06 | 0.08 |
| | (0.85) | (0.85) | (0.86) | (0.86) | (0.86) |
| PATIENT default | -1.95** | -1.81** | -1.80** | -1.75** | -1.73** |
| | (0.85) | (0.84) | (0.84) | (0.83) | (0.83) |
| Only delayed rewards | -1.18* | -1.19* | -1.19* | -1.20* | -1.20* |
| | (0.68) | (0.68) | (0.68) | (0.68) | (0.68) |
| Substitution rate | -6.29*** | -6.29*** | -6.29*** | -6.29*** | -6.29*** |
| | (0.61) | (0.61) | (0.61) | (0.61) | (0.61) |
| Age | -0.03 | -0.05 | -0.05 | -0.06 | -0.06 |
| | (0.05) | (0.05) | (0.05) | (0.06) | (0.06) |
| Female (dummy) | -0.03 | -1.10 | -1.07 | -0.99 | -0.90 |
| | (0.84) | (0.92) | (0.95) | (0.95) | (0.99) |
| Married (dummy) | 0.34 | 0.47 | 0.46 | 0.43 | 0.42 |
| | (1.12) | (1.10) | (1.09) | (1.10) | (1.09) |
| Household size | 0.18 | 0.22* | 0.25* | 0.28** | 0.29** |
| | (0.12) | (0.12) | (0.14) | (0.14) | (0.14) |
| Education (years) | | -0.10 | -0.08 | -0.07 | -0.06 |
| | | (0.17) | (0.16) | (0.16) | (0.17) |
| Able to write a letter (dummy) | | -1.43 | -1.68 | -1.57 | -1.67 |
| | | (1.14) | (1.16) | (1.18) | (1.20) |
| Cognitive skills (0-5) | | -0.57* | -0.62* | -0.66* | -0.65* |
| | | (0.32) | (0.33) | (0.34) | (0.34) |
| Monthly earnings (in thousands UGX) | | | 0.00 | 0.00 | 0.00 |
| | | | (0.00) | (0.00) | (0.00) |
| Household owns a bicycle (dummy) | | | 0.06 | 0.13 | 0.13 |
| | | | (0.66) | (0.67) | (0.67) |
| Household owns a radio (dummy) | | | 1.07* | 1.17* | 1.19* |
| | | | (0.65) | (0.64) | (0.64) |
| Household owns cattle (dummy) | | | -0.10 | -0.11 | -0.10 |
| | | | (0.09) | (0.09) | (0.09) |
| Household owns a mobile phone (dummy) | | | -0.32 | -0.34 | -0.38 |
| | | | (0.60) | (0.60) | (0.62) |
| Brick walls (dummy) | | | 0.37 | 0.51 | 0.52 |
| | | | (0.90) | (0.90) | (0.90) |
| Number of meals taken during a day | | | | -0.73 | -0.71 |
| | | | | (0.70) | (0.70) |
| Number of days unable to work (last 4 weeks) | | | | -0.02 | -0.02 |
| | | | | (0.08) | (0.08) |
| Index of conflict exposure (0-12) | | | | | 0.09 |
| | | | | | (0.17) |
| Constant | 28.54*** | 32.23*** | 31.89*** | 33.14*** | 32.73*** |
| | (2.18) | (2.47) | (2.48) | (2.80) | (2.84) |
| Observations | 2,870 | 2,870 | 2,870 | 2,870 | 2,870 |
| R-squared | 0.057 | 0.071 | 0.076 | 0.077 | 0.078 |

Notes: OLS estimates in all columns. Standard errors clustered at the individual level in parentheses. The dependent variable in all columns is the number of minutes allocated to entertainment at an early date (Week 2). We replace the missing observations for 10 individuals for whom we lack survey data and another 35 individuals who did not feel

comfortable answering conflict related questions by a zero. In all regressions we control for a binary variable that equals one if any data is missing. The results are robust to excluding observations for individuals missing any data.
*** Significant at the 1 percent level.
** Significant at the 5 percent level.
* Significant at the 10 percent level.

Table A8: Time discounting by poverty prime scenario type

| Dependent variable | Entertainment sooner (minutes) | |
|---|---|---|
| Choices | Other scenario NOT about own health issues | Other scenario about own health issues |
| | (1) | (2) |
| HARD poverty prime | 2.01** | 1.23 |
| | (0.99) | (1.17) |
| CALORIES condition | 0.16 | 0.50 |
| | (0.98) | (1.20) |
| PATIENT default | -1.56 | -1.89 |
| | (0.98) | (1.22) |
| Only delayed rewards | -0.49 | -2.24* |
| | (1.01) | (1.22) |
| Substitution rate | -6.76*** | -5.66*** |
| | (0.72) | (0.86) |
| Constant | 29.02*** | 29.90*** |
| | (2.07) | (2.64) |
| Observations | 1,630 | 1,240 |
| R-squared | 0.058 | 0.056 |
| Mean of dep. var. for EASY poverty prime | 21.27 | 21.44 |

Notes: OLS, standard errors clustered at the individual level in parentheses. The dependent variable in all columns is the number of minutes allocated to entertainment at an early date (Week 2). All regressions include controls for age and gender.
*** Significant at the 1 percent level.
** Significant at the 5 percent level.
* Significant at the 10 percent level.

Table A9: Additional measures of attention

| Dependent variable | Number of the three most impatient options viewed (0-3) | Number of the three most patient options viewed (0-3) | Most patient option viewed at a given price (dummy) | Two most patient options viewed at a given price (dummy) | Three most patient options viewed at a given price (dummy) | Index of all standardized attention measures | First principal component of attention measures |
|---|---|---|---|---|---|---|---|
| Sample | All | All | All | All | All | | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| HARD poverty prime | 0.04 | -0.10 | -0.05* | -0.02 | -0.00 | -0.01 | -0.11 |
| | (0.07) | (0.09) | (0.03) | (0.03) | (0.03) | (0.08) | (0.16) |
| CALORIES condition | 0.04 | -0.06 | -0.02 | -0.03 | -0.03 | -0.07 | -0.13 |
| | (0.07) | (0.09) | (0.03) | (0.03) | (0.03) | (0.08) | (0.16) |
| PATIENT default | -1.25*** | 1.11*** | 0.65*** | 0.48*** | 0.34*** | 0.49*** | 1.58*** |
| | (0.07) | (0.09) | (0.03) | (0.03) | (0.03) | (0.08) | (0.16) |
| Only delayed rewards | 0.06 | 0.12** | 0.03 | 0.05** | 0.06** | 0.21*** | 0.31*** |
| | (0.06) | (0.06) | (0.02) | (0.02) | (0.03) | (0.06) | (0.11) |
| Substitution rate | -0.49*** | -0.09 | 0.02 | -0.09*** | -0.08*** | -0.17*** | -0.39*** |
| | (0.06) | (0.07) | (0.02) | (0.03) | (0.03) | (0.05) | (0.12) |
| Constant | 3.09*** | 1.22*** | 0.16** | 0.30*** | 0.31*** | -0.32 | -0.57 |
| | (0.15) | (0.20) | (0.06) | (0.08) | (0.08) | (0.20) | (0.37) |
| Observations | 2,530 | 2,530 | 2,530 | 2,530 | 2,530 | 2,530 | 2,530 |
| R-squared | 0.298 | 0.222 | 0.453 | 0.237 | 0.129 | 0.082 | 0.158 |
| Mean of dep. var. for EASY poverty prime | 1.86 | 1.81 | 0.62 | 0.49 | 0.40 | | |

Notes: OLS estimates in all columns. Standard errors clustered at the individual level in parentheses. The dependent variables are: (1-2) how many of the three most patient and impatient options, respectively, were visited at least once at a given substitution rate, (3-5) are indicator variables for whether the most patient, two of the most patient, or three of the most patient options were visited at least once, respectively, (6) is a standardized index of equally weighted average of z-scores of all attention measures in Panel A of Table 5 and Table A9 following Kling, Liebman, and Katz (2007),[19] and (7) is the first principal component constructed using all attention measures in Panel A of Table 5 and Table A9. All regressions include controls for age and gender.

*** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

[19] Kling, J.R., Liebman, J.B. and Katz, L.F., 2007. "Experimental analysis of neighborhood effects." *Econometrica*, *75*(1), pp.83-119.

Table A10: Cognitive skills and poverty-related concerns

| Dependent variable | Cognitive skills |
|---|---|
| | (1) |
| HARD poverty prime | -0.01 |
| | (0.16) |
| CALORIES condition | -0.28* |
| | (0.15) |
| PATIENT default | 0.16 |
| | (0.16) |
| Constant | 3.34*** |
| | (0.30) |
| Observations | 289 |
| R-squared | 0.029 |
| Mean of dep. var. for EASY poverty prime | 2.87 |

Notes: OLS estimates. Standard errors clustered at the individual level in parentheses. The dependent variable is cognitive skills measured as the number of Raven's matrices solved correctly by the individual (out of 5). The regression includes controls for age and gender.
*** Significant at the 1 percent level.
** Significant at the 5 percent level.
* Significant at the 10 percent level.

Table A11: Minimum detectable effects of HARD poverty prime (for Tables 5 and A9)

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|---|
| *Panel A: Direct measures of attention* | | | | | | | |
| Dependent variable | Decision-making time | | Distraction time | Information acquisition | | | |
| | Seconds | Seconds | Seconds | Number of options viewed at a given price (out of 6) | Total number of page views at a given price | | |
| Sample | All | Excluding outliers | All | All | All | | |
| HARD poverty prime | -8.17 | -2.47 | 0.07 | -0.06 | -0.24 | | |
| | (12.67) | (7.80) | (0.66) | (0.13) | (0.44) | | |
| Minimum detectable effect | 31.49 | 19.39 | 1.64 | 0.31 | 1.08 | | |
| EASY poverty prime mean | 224.06 | 189.21 | 3.62 | 3.67 | 7.22 | | |
| Percent of EASY poverty prime mean | 0.14 | 0.10 | 0.45 | 0.09 | 0.15 | | |
| *Panel B: Additional measures of attention* | | | | | | | |
| Dependent variable | Number of the three most impatient options viewed (0-3) | Number of the three most patient options viewed (0-3) | Most patient option viewed at a given price (dummy) | Two most patient options viewed at a given price (dummy) | Three most patient options viewed at a given price (dummy) | Index of all standardized attention measures | First principal component of attention measures |
| Sample | All | All | All | All | All | | |
| HARD poverty prime | -0.24 | -0.10 | -0.10 | -0.02 | -0.00 | -0.01 | -0.11 |
| | (0.07) | (0.09) | (0.03) | (0.03) | (0.03) | ( 0.08) | ( 0.16) |
| Minimum detectable effect | 0.18 | 0.22 | 0.07 | 0.08 | 0.08 | 0.21 | 0.39 |
| EASY poverty prime mean | 1.86 | 1.81 | 0.62 | 0.49 | 0.40 | 0.01 | 0.07 |
| Percent of EASY poverty prime mean | 0.10 | 0.12 | 0.12 | 0.17 | 0.21 | | |

*Panel C: Indirect measures of attention (based on patterns of choices)*

| Dependent variable | Automatic decision-making | | | Inconsistency in choices | |
|---|---|---|---|---|---|
| | Entertainment sooner (minutes) | Sticking to the default allocation at a given price (dummy) | Distance from default allocation at a given price | Number of inconsis-tencies (0-4) | Distance from consistency |
| Sample | All | All | All | All | All |
| HARD poverty prime | 1.40 | 0.01 | -0.10 | 0.10 | 0.13 |
| | (1.44) | (0.02) | (0.11) | (0.07) | (0.13) |
| Minimum detectable effect | 3.58 | 0.05 | 0.26 | 0.18 | 0.33 |
| EASY poverty prime mean | 21.34 | 0.08 | 2.92 | 0.54 | 0.84 |
| Percent of EASY poverty prime mean | 0.17 | 0.61 | 0.09 | 0.33 | 0.39 |

Notes: OLS estimates for HARD poverty prime from full estimations in Table 5 reported in first rows of all panels in all columns. Standard errors clustered at the individual level in parentheses in second rows of all panels. All regressions include controls for age and gender.
The dependent variables in Panel A are: (1) the total decision-making time (in seconds), (2) the total decision-making time excluding the 10 percent of observations with the longest decision-making time, (3) the time the individual was looking away from the decision-making booklet (in seconds), (4) the number of options that the individual viewed at least once at a given substitution rate (out of the 6 options), and (5) the total number of page views at a given substitution rate, regardless of whether the page was visited once or repeatedly.
The dependent variables in Panel B are: (1-2) how many of the three most patient and impatient options, respectively, were visited at least once at a given substitution rate, (3-5) are indicator variables for whether the most patient, two of the most patient, or three of the most patient options were visited at least once, respectively, (6) is a standardized index of equally weighted average of z-scores of all attention measures in Panel A of Table 5 and Table A9 following Kling, Liebman, and Katz (2007),[20] and (7) is the first principal component constructed using all attention measures in Panel A of Table 5 and Table A9.
The dependent variables in Panel C are: (1) number of minutes allocated to entertainment in Week 2, (2) an indicator for whether the individual selected the allocation provided by the experimenter by default at a given substitution rate, (3) the number of page flips from the default allocation in the booklet at a given substitution rate, (4) the number of inconsistencies (0 to 4) defined as the number of violations of the law of demand at adjacent substitution rates within a given week, i.e. if fewer minutes are allocated to an earlier date at a lower substitution rate, compared to the number of minutes allocated at a higher substitution rate, and (5) the minimum number of flips through the decision-making booklet required to make the allocation monotone.
Minimum detectable effects calculated as described in Appendix D.

[20] Kling, J.R., Liebman, J.B. and Katz, L.F., 2007. "Experimental analysis of neighborhood effects." *Econometrica*, *75*(1), pp.83-119.

**Appendix B:**

We provide a formal framework that aims to illuminate possible mechanisms through which poverty related concerns can affect impatience in our experiment. Since economic constraints, such as time and liquidity constraints, are closed down by design, we do not consider these factors as potential explanations. Also, since we do not find effects of the HARD poverty prime on measures of inattention, we do not formalize this mechanism.

We document three patterns: (1) Participants are more impatient under the HARD poverty prime than under the EASY poverty prime. (2) The effect of the HARD poverty prime is stronger when combined with the IMPATIENT default. (3) Although statistically insignificant, the effect of the HARD poverty prime is higher when decisions are made just before the first activity hour, in Week 2.

We first consider the well-established dual-self model of Fudenberg and Levine (2012), which assumes that individuals are in constant conflict between a short-run self, seeking immediate gratification, and a forward-looking long-run self. We show that under a plausible assumption that costs of self-control increase with cognitive load, anxiety and salience of the tempting option, the model can fully explain the set of findings. Next, we discuss the idea that, while similar results may be obtained by assuming that individuals have immediate disutility from negative affect or that individuals have state-dependent time preferences, the assumptions would have to be fairly strong to explain the full set of results we find.

*A. Costly self-control*

We assume that individuals have a strictly increasing, concave utility function, and derive utility from consumption of minutes of entertainment, $e_t$ and disutility from minutes of work, $w_t$, both varying in time $t$. As in the experiment, minutes of work can be expressed in terms of minutes of entertainment as $60 - e_t$. The period-specific utility function component is $u(e_t)$. The parameter $\delta$ is a discount factor. For tractability, individuals only live for three periods as in the experiment, i.e. $t \in \{1,2,3\}$. As in the experiment, individuals make their choices in period 1 or 2, while consumption of entertainment and work occurs in periods 2 and 3.

When making choices, individual long-run selves maximize their lifelong discounted utility:[21]

$$\max_{e_2,e_3} u(e_2) + \delta u(e_3), \quad (1)$$

while short-run selves maximize their lifelong utility with a discount factor $\delta$ further discounted by a constant $\mu$, where $\mu \in (0,1]$,[22]

$$\max_{e_2,e_3} u(e_2) + \mu\delta u(e_3), \quad (2)$$

Individuals are subject to the budget constraint:

$$e_2 + \frac{e_3}{p} = m \quad (3)$$

where $p$ represents the substitution rate and $m$ is the total budget allocation of entertainment minutes across the two weeks, i.e. 45 minutes in each decision.

The short-run self is the one that makes the ultimate decision, while the long-run self can impose its preferences on the short-run self at a cost (i.e., that at a cost, the short-run self ends up maximizing utility following the problem in (1), instead of (2) when no such cost is paid). This is a cost of self-control $CS_{st\sigma}$.[23] Following the linear specification of the cost function in Fudenberg and Levine (2012), we assume that the cost parameter is subtracted from the expected discounted present value of the lifelong utility. We allow the cost to differ by 1) state of mind *s*, 2) time of decision-making *t*, and 3) salience of temptations $\sigma$. Our experimental design manipulates the costs across all three dimensions.[24]

[21] We leave out the expectations operator, as the experimental design satisfies that the exact consumption within the experiment in all periods is determined by the present choice.

[22] Note that a fully myopic short-run self with $\mu = 0$ is equivalent to the model of Fudenberg and Levine (2006).

[23] In our experiment, the duration between respective periods is fixed. In contrast to the original model, we disregard the period length in modelling self-control cost. As in Fudenberg and Levine (2012), the cost can be understood as the utility foregone by the short-run self if the long-run self's decision were implemented if one allows for cost of self-control to be a function of $s$, $t$, and $\sigma$, instead of the period length in the original model.

[24] In the parameters of Fudenberg and Levine (2012), the three dimensions correspond to different states of the world, defined as $y_n$ in the original model.

The state of mind, $s$, is manipulated through the HARD poverty prime that triggers poverty related thoughts (in this case $s = 1$). When mental processing resources are scarce, individuals are more likely to succumb to tempting options (Shiv and Fedorikhin 1999). Thinking about poverty consumes mental processing resources through having individuals actively think about how to resolve frustrating poverty related thoughts. Thus, we assume that the cost of self-control increases with the HARD poverty prime.

Next, the cost of self-control increases with the proximity of temptation (Gul and Pesendorfer 2001; Toussaert 2018)—be it temporal, mental, or physical—which motivates many individuals to voluntarily restrict their choice sets to avoid having to face the tempting option. In our experiment, this implies that the cost of self-control increases when individuals are making their choices in period 2 when they can obtain instant gratification from consuming entertainment immediately rather than having to wait. [25] The salience of temptations is also manipulated by the default, where we denote the PATIENT default as $\sigma = 0$ and the IMPATIENT default as $\sigma = 1$. The cost of self-control also increases in $\sigma$.

It immediately follows that the short-run self consumes more entertainment earlier compared to the optimal entertainment allocation of the long-run self ($e_2^{*|\mu\delta}$ and $e_2^{*|\delta}$, respectively). This is true for the strictly increasing, concave utility functions we assume, and the budget constraint, which is always binding by design:

$$\frac{u'(e_2^{*|\delta})}{u'(\left(m-e_2^{*|\delta}\right)p)} = \delta > \mu\delta = \frac{u'(e_2^{*|\mu\delta})}{u'(\left(m-e_2^{*|\mu\delta}\right)p)} \qquad => \qquad e_2^{*|\delta} < e_2^{*|\mu\delta}$$

If we assume that the discount parameter remains unaffected by the three manipulations above, we also see that the long-run self overrules the decision of the short-run self less often with an increasing cost of self-control. An individual chooses $e_2^*$ in line with the long-run self objectives if the following is true:

$$u\left(e_2^{*|\delta}\right) + \delta u\left(\left(m - e_2^{*|\delta}\right)p\right) - CS_{st\sigma} > u\left(e_2^{*|\mu\delta}\right) + \delta u\left(\left(m - e_2^{*|\mu\delta}\right)p\right)$$

If the inequality is not satisfied, the individual chooses in line with the objectives of the short-run self. This results in an average decrease in patience for each of the three manipulations,

[25] Result (3) formally requires a supermodularity assumption: $CS_{s=1,t=2,\sigma} - CS_{s=0,t=2,\sigma} > CS_{s=1,t=1,\sigma} - CS_{s=0,t=1,\sigma}$.

which all increase $CS_{st\sigma}$, as the fraction of individuals choosing $e_2^{*|\mu\delta}$ instead of $e_2^{*|\delta}$ increases.[26] Taken together, the simple dual-self model in which costs of self-control are sensitive to cognitive load, anxiety, and salience of temptations can explain all of our findings (1)-(3).

*B. Alternative explanations: negative affect or state-dependent preferences*

Next, we consider alternative mechanisms that could potentially explain why individuals exposed to poverty related thoughts consume more entertainment early: direct disutility from a negative affect and state-dependent preferences.

Individuals may derive disutility from a negative affect when experiencing poverty related thoughts.[27] As long as the negative affect enters a utility function, individuals may compensate themselves for the immediate negative affect by consuming more entertainment. To formalize this intuition, assume that individuals feel disutility from the immediate negative affect, which is state specific, $a_s$. We assume that the period-specific utility function component including the negative affect is $u(e_t - a_s)$. The utility function that individuals making choices in period 1 are maximizing over looks as follows:

$$\max_{e_2,e_3} u(-a_s) + \delta u(e_2) + \delta^2 u(e_3) \quad (4)$$

And when making choices in period 2, it looks as follows:

$$\max_{e_2,e_3} u(e_2 - a_s) + \delta u(e_3) \quad (5)$$

The budget constraint is the same as in Equation 3. An immediate implication is that since the utility is no longer affected by $\sigma$—by definition—the model cannot explain our finding (2) that the effect of the HARD poverty prime increases with the IMPATIENT default relative to the PATIENT default. Moreover, since period 1 decisions on allocation of entertainment in periods 2 and 3 are not influenced by the negative affect, the HARD poverty prime should not

[26] Our data from a between subject design does not allow us to empirically differentiate between the case when all individuals are facing the same cost of self-control or when each individual faces a different cost of self-control. Also note that the $\beta - \delta$ model of quasi-hyperbolic preferences has the same predictions as the effect of the temporal dimension on the cost of self control.

[27] In their emotions-imbued choice model, Lerner et al. (2015) implicitly assume that even emotions not triggered by the choice itself—*incidental influences*—affect decision making.

affect levels of patience. Although our result (3) is marginally insignificant, the direction and the magnitude of the point estimate suggests that, with more power, the effect of the HARD poverty prime may be present even in period 1 decisions.[28] Taken together, the negative affect model is unlikely to be the sole explanation for our findings.

Lastly, we consider state-dependent preferences. Although, traditionally, economists treat preferences as stable parameters, the effects of poverty on impatience can also be modelled by changes in underlying parameters of $\delta$. This is similar to the approach taken by Becker and Mulligan (1997), albeit the states we consider are psychological states of mind, rather than the actual wealth levels, mortality rates, etc. in their model. Assuming that the discounting parameter differs by state $s$, i.e. $\delta_s$, the case when $\delta_0 > \delta_1$ explains our main finding (1). But in order to support findings (2) and (3), we would need to also impose such state-dependency on the domains of time $t$[29] and default $\sigma$. While this is theoretically plausible, we believe it is rather unlikely that such specifically state-dependent parameters would drive all of our results.

[28] These predictions rely on a strict interpretation of the effects of negative affect on behavior by assuming myopic beliefs about future negative affect. This is consistent with the case described in social psychology by Lerner, Li, and Weber (2013). They refer to increased impatience in response to negative emotions as *myopic misery*. The assumption of an inability to predict future emotions is plausible, as people seem to be rather poor in predicting their future emotions—termed *affective forecasting* in social psychology (Wilson and Gilbert 2003). Similar mis-predictions about future emotions provide foundations for present biased behavior (Frederick, Loewenstein, and O'Donoghue 2002). The prediction that the negative affect model cannot explain our finding (3) holds even if we relax the assumption and allow individuals to expect a future negative affect. The prediction for the difference between consumption of early entertainment across the two periods becomes ambiguous, depending on model parameters. Recall that in the experiment we administer the poverty thoughts manipulation in every week and the participants are aware of this. In our data we see that the HARD poverty prime makes participants equally worried and they think that the situation would be difficult to deal with in both periods 1 and 2 (Tables A2 and A3).

[29] The quasi-hyperbolic discounting model is a special case of this.

**Appendix C: Structural estimation of model parameters**

Our experimental design allows us to recover the parametric estimates of discount rates, of present bias, and of the curvature of the utility function. We assume that participants in our experiment have quasi-hyperbolic preferences. Further, we assume that the utility from minutes of entertainment, the main choice variable in our experiment, is time separable and attains a value of $u = (e_s + \omega)^\gamma$,[30] where $s$ attains values of $t$ and $t + k$, and where $e_t$ and $e_{t+k}$ stand for consumption of minutes of entertainment at the earlier date, Week 2, and at the later date, Week 3, respectively. The parameter $t$ attains values of 0 and 7, which stand for decisions made in Week 2 and Week 1, respectively. We fix $k = 7$, since our design only allows for a one-week delay between the earlier and the later date of entertainment consumption. In the analysis we estimate weekly discount rates. The parameter $\omega$ represents the minimum level of entertainment consumed in each week in a similar fashion as a Stone-Geary subsistence consumption level that is, by design, always satisfied: $\omega = 5$, representing the minutes of entertainment in the practice period of each week.[31] We assume that $u' > 0$ and $u'' < 0$, i.e. that $\gamma \in (0,1)$.

Formally, we model the individual utility function as:

$$U(e_t, e_{t+k}) = (e_t + \omega)^\gamma + \beta^{\mathbb{I}\{t=0\}}\delta^{k/7}(e_{t+k} + \omega)^\gamma \qquad (1)$$

where $\mathbb{I}\{t = 0\}$ is an indicator for whether the decision is made in Week 1, i.e. when the allocation decision is about two future dates. In this period, present bias manifests itself, represented by the parameter $\beta$. The weekly discount rate is represented by the parameter $\delta/7$.

The present value budget constraint the individuals are facing is as follows:

[30] Notice that we assume that the utility from entertainment in the given period does not change with time. One potential source of such changes might be temporary. For example, an unexpected demand for an individual's time might reduce the utility by causing feels of irresponsibility for spending time consuming fun, while there are more pressing issues that deserve a subject's attention. Our experimental design attenuates such a possibility by the requirement that our participants are present in the experimental session, and only decide between entertainment and work allocation within the "contracted" hour. Further, since the participants have experienced both work and entertainment in the five-minute trial period before making the actual decision, it is rather implausible that a permanent shift due to over- or under-optimistic beliefs about the utility gains would confound our estimates.

[31] Similar argumentation for background consumption of the choice variable in intertemporal decision has been used in earlier experimental work (Andreoni and Sprenger 2012; Augenblick, Niederle, and Sprenger 2015; Andersen et al. 2008).

$$e_t + \frac{e_{t+k}}{p} = m \qquad (2)$$

where $p \in \{0.5, 0.75, 1, 1.25, 1.5\}$ stands for the intertemporal rate of substitution and $m = 45$ stands for the total allocation of minutes of entertainment that can be consumed at the earlier date, in Week 2.

By maximizing the utility function (Equation 1) with respect to the budget constraint (Equation 2):

$$\max_{e_t, e_{t+k}} \left((e_t + \omega)^\gamma + \beta^{\mathbb{I}\{t=0\}} \delta^{k/7} (e_{t+k} + \omega)^\gamma\right) \qquad (3)$$

$$s.t. \;\; e_t + \frac{e_{t+k}}{p} = m$$

we derive the following intertemporal Euler equation:

$$\left(\frac{e_t + \omega}{e_{t+k} + \omega}\right)^{\gamma - 1} = \frac{\beta^{\mathbb{I}\{t=0\}} \delta^{k/7}}{p} \qquad (4)$$

Using a logarithmic transformation of Equation 4, we obtain a linearized equation that can be transformed into a following regression equation by adding an additive error term with standard assumptions:

$$\log\left(\frac{e_t + \omega}{e_{t+k} + \omega}\right) = \underbrace{\frac{\log(\delta)}{\gamma - 1}}_{a} (k/7) + \underbrace{\frac{\log(\beta)}{\gamma - 1}}_{b} \mathbb{I}\{t = 0\} - \underbrace{\frac{1}{\gamma - 1}}_{c} \log\left(\frac{1}{p}\right) + \varepsilon \qquad (5)$$

In Table A4 we report the estimates of $\beta$, $\delta/7$, and $\gamma$ parameters. Since the choice space is limited but the truncation occurs at different values of $e_{t+k} + \omega$ with different substitution rates, we estimate Equation 5 using censored-normal regression. Since the parameters of our interest enter the equation in a non-linear fashion, we recover them using non-linear combinations of the estimated coefficients $a$, $b$, and $c$. By simple rearranging, it is easy to show that $\beta = e^{-\frac{b}{c}}$, $\delta/7 = e^{-\frac{a}{c}}$, and $\gamma = \frac{c-1}{c}$. For testing purposes, we estimate the standard errors using the delta method.

Since the method employed requires some variation in responses to the intertemporal substitution rate in order to recover reasonable parameter estimates, we drop observations for all subjects who stick to the default in all five choices in a particular week (10 subjects in Week 1 and 10 subjects in Week 2; four subjects stick to the default in both weeks).[32] The fraction of excluded choices is the same in the EASY and HARD poverty prime (in each condition, Week 1 choices were excluded for five subjects and Week 2 choices were excluded for five subjects, for two of these subjects we excluded choices in both weeks).

[32] By further assuming that $\gamma$ is constant across the individuals, our design also allows for estimation of individual level $\delta$ and $\beta$ parameters. We do not present the individual-level results here.

## Appendix D: Minimum detectable effects

It can be argued that the non-results presented in the paper are due to insufficient power. For this reason, we also present minimum detectable effects (MDEs). Following Duflo, Glennerster, and Kremer (2007), we calculate MDE for two-tailed tests as follows:

$$MDE = \left(t_{1-\kappa} + t_{\frac{\alpha}{2}}\right) \times \sqrt{\frac{1}{P(1-P)}} \sqrt{\frac{\sigma^2}{N}} \qquad (1)$$

where $t_{1-\kappa}$ is the t-statistic required to obtain the power of $\kappa$, where we fix $\kappa = 0.8$ throughout our analysis; $t_{\alpha/2}$ is the t-statistic required to produce a significance level of $\alpha$, which we set as $\alpha = 0.1$. The t-values for large samples are given by the t-tables: $t_{1-\kappa} = 0.84$ and $t_{\alpha/2} = 1.645$. $P$ is the fraction of population treated and N is the total population, i.e. in our case this is equal to the number of individuals or observations under the HARD poverty treatment, our main variable of interest. We can calculate the standard error of the treatment population using the variance $\sigma^2$ and the population variables as:

$$SE\left(\hat{\beta}\right) = \sqrt{\frac{1}{P(1-P)}} \sqrt{\frac{\sigma^2}{N}} \qquad (2)$$

Given Equation 2, Equation 1 simplifies to:

$$MDE = 2.485 \times SE\left(\hat{\beta}\right) \qquad (3)$$

We use clustered standard errors from regressions for the calculation of MDEs using Equation 3. As in Haushofer and Shapiro (2016), to set a reasonable benchmark, we also report the MDEs as a proportion of EASY poverty prime means.

## References


Duflo, E., Glennerster, R., & Kremer, M. (2007). Using Randomization in Development Economics Research: A Toolkit. In T. P. Schultz & J. A. Strauss (Eds.), *Handbook of Development Economics*, volume 4 chapter 61, (pp. 3895–3962). Elsevier.

Haushofer, J. & Shapiro, J. (2016). The short-term impact of unconditional cash transfers to the poor: Experimental evidence from Kenya. *Quarterly Journal of Economics*, 131(4), 1973–2042.

## Appendix E: Manipulating calories

We exogenously manipulated the number of calories consumed by subjects in order to test the idea that too few calories may affect mental function, which can make temptations harder to resist. This approach allows an estimation of the biological effects of calories on economic decision-making. The existing evidence on the effect of calorie-consumption on inter-temporal decision-making in developed countries is mixed. While initial studies from psychology found a positive effect of an increased number of calories on patience and self-control (Gailliot et al. 2007; Wang and Dvorak 2010), more recent lab experiments have not replicated this finding (Kuhn, Kuhn, and Villeval 2014). Here, we move away from relying on samples of undergraduate students in developed countries and investigate the impact of calories among very poor subjects who have a notoriously low caloric intake.

*Experimental design*

To manipulate caloric intake and blood glucose levels,[33] we followed a standard procedure in which the participants are given a drink sweetened either with sugar or with a sugar substitute (as in, e.g., Gailliot et al. 2007; Kuhn, Michael, Kuhn, and Villeval 2014; Wang and Dvorak 2010). In the CALORIES condition, we mixed 300 milliliters (app. ten ounces) of rooibos tea which is naturally caffeine free and contains zero calories with 50 grams of sugar which contains approximately 190 calories. This is equivalent to an 8.5 percent increase in the average daily energy consumption of 2,220 calories in Uganda in 2006-8. The number of calories in the drink was slightly higher than the number of calories provided in other studies using a similar procedure.[34] In the PLACEBO condition, the same amount of rooibos tea was mixed with an artificial sweetener which also tasted sweet but contained zero calories.[35]

[33] Low glucose has been linked with impaired performance on difficult and complex tasks. Gailliot et al. (2007) find that exerting self-control consumes glucose.

[34] For comparison, (Gailliot et al. 2007) served 14 ounces of a soft drink which contained 140 calories in the glucose treatment and 0 calories in the placebo treatment. (Kuhn, Kuhn, and Villeval 2014) served the same amount of a soft drink which contained 158 calories in the glucose treatment and 10 calories in the placebo treatment.

[35] We administered Tesco brand "Tablet Sweetener", which contains sodium cyclamate. The amount administered follows the manufacturer recommendations for an equivalent of 50 grams of sugar.

The participants were informed that the tea provided was sweet, but whether it was sweetened with sugar or the artificial sweetener was unknown to the participants as well as to the experimenter, since the tea was prepared by a different research assistant in a double-blind procedure. The participants were free to finish the drink but were not forced or pressured to do so. The proportion who finished the whole drink was 85.7 percent in the CALORIES condition and 79.6 percent in the PLACEBO condition. At least half of the drink was consumed by 95 percent of the participants in the CALORIES condition and 89.8 percent in the PLACEBO condition. Note that participants in the CALORIES condition perceived the tea as better tasting – 78% answered that they perceived the tea as pleasant or neutral (as opposed to strange, bitter or negative), compared to 59% in the PLACEBO condition. In the robustness checks, we show that the results hold when we control for individual perceptions of taste, and for sub-samples of those who drank the whole cup of tea and those who liked the taste of the tea (Panel B of Table A5, Columns 5-7).

Previous research using similar procedures complemented by direct measures of blood glucose[36] has shown that blood glucose levels are elevated in the time window between 10 and 40 minutes following consumption of a drink sweetened with sugar.[37] The experiment was designed so that for the entire period subjects made choices in the entertainment discounting task blood-glucose levels should have remained elevated. In order to allow the glucose to reach the bloodstream, the drink was served ten minutes before the participants started to make choices in the task. During this time, the participants were presented with the HARD or EASY poverty prime. The total decision-making time was short enough for the blood glucose levels not to drop back down. The average decision-making time was 3.7 minutes and none of the participants spent more than 15 minutes to make their choices.

*Results and interpretation*

We do not find that consuming sugar before making decisions affects time discounting. Averaging all ten decisions made by each subject across price levels and weeks, subjects

[36] We did not measure subjects' blood glucose levels, which would have required taking blood samples.

[37] Wang and Dvorak (2010) found a significant increase (by 33 percent) in glucose levels ten minutes after consumption of a Sprite drink. Scholey, Harper, and Kennedy (2001) observed significantly higher blood glucose levels in the condition in which a drink was sweetened with 25 grams of glucose powder (app. 100 calories) than in the placebo condition 40 minutes after consumption of the drink.

assigned to the CALORIES condition allocated 22.26 minutes to entertainment in the earlier session, compared to 22.02 in the PLACEBO condition (p-value=0.91, Table 3). This non-result does not seem to be due to lack of compliance. The result holds for the sub-samples of subjects who refrained from eating before the experiment, and who thus arguably had lower initial blood sugar levels (Panel B, Column 4, Table A5), those who consumed the whole cup of tea (Column 5), and those who perceived the taste of tea as pleasant or neutral (Column 6). The point estimate is even smaller, although insignificantly, when we restrict the sample to those who eat at least two meals per day (Panel A, Column 9). This suggests that relative difference in nourishment does not affect the result.

While we do not find a significant effect of increased caloric intake on discounting in our experiment, we cannot rule out that a larger caloric boost would have an effect. Also, a more permanent improvement in diet may affect decision-making via channels other than biological effects of diet on mental function, such as perception of food security, not feeling hungry or long-term effects on health, since our treatment involved a one-time provision of calories to participants unaware of the treatment. This interpretation is consistent with evidence from a recent experiment (Schofield 2014), which found improvements in cognitive capacity among rickshaw drivers in India who received daily snacks for five weeks.

Another potential explanation for why we do not find effects of glucose relates to systematic differences in the metabolism of glucose among well-nourished and malnourished individuals. Importantly, this is not limited to current nutrition. There is evidence that low birth weight and acute malnutrition during early childhood leads to slower absorption of glucose in the bloodstream as an adult (Gluckman et al. 2008; Francis-Emmanuel et al. 2014). Especially given the history of conflict in Northern Uganda, subjects in our study are very likely to have faced serious food security issues at some point during childhood.[38] Our choice of timing sugar consumption and the window in which decisions were made was informed by studies that measured blood glucose changes among well-nourished individuals in developed countries. We cannot rule out that the sugar we administered was metabolized too gradually or with too long a delay to affect decision-making, preventing us from detecting the true effects. Although we do

[38] Ravelli et al. (1998) show that in utero exposure to war-related famine in 1944-5 in the Netherlands led to slower metabolism of blood-glucose levels in adults aged around 50 years.

not find that consumption of more sugar would influence behavior even among the relatively better nourished individuals within our sample, this can still be seen as an imperfect test, given that virtually all individuals in our sample are very poor.

## References


Francis-Emmanuel, P., D. Thompson, A. Barnett, C. Osmond, C. Byrne, M. Hanson, P. Gluckman, T. Forrester, and M. Boyne. 2014. "Glucose Metabolism in Adult Survivors of Severe Acute Malnutrition." *Journal of Clinical Endocrinology and Metabolism* 99 (6): 2233–40.

Gailliot, Matthew T, Roy F Baumeister, C Nathan DeWall, Jon K Maner, E Ashby Plant, Dianne M Tice, Lauren E Brewer, and Brandon J Schmeichel. 2007. "Self-Control Relies on Glucose as a Limited Energy Source: Willpower Is More than a Metaphor." *Journal of Personality and Social Psychology* 92 (2): 325–36.

Gluckman, P., M. Hanson, C. Cooper, and K. Thornburg. 2008. "Effect of In Utero and Early-Life Conditions on Adult Health and Disease." *The New England Journal of Medicine* 359 (1): 61–73.

Kuhn, Michael A, Peter Kuhn, and Marie Claire Villeval. 2014. "Self Control and Intertemporal Choice: Evidence from Glucose and Depletion Interventions." 4609. CESifo.

Ravelli, A., J. van der Meulen, R. Michels, C. Osmond, D. Barker, C. Hales, and O. Bleker. 1998. "Glucose Tolerance in Adults after Prenatal Exposure to Famine." *Lancet* 351 (9254): 173–77.

Schofield, Heather. 2014. "The Economic Costs of Low Caloric Intake: Evidence from India." *Working Paper*.

Scholey, Andrew B., Susan Harper, and David O. Kennedy. 2001. "Cognitive Demand and Blood Glucose." *Physiology and Behavior* 73 (4): 585–92.

Wang, X T, and Robert D Dvorak. 2010. "Sweet Future: Fluctuating Blood Glucose Levels Affect Future Discounting." *Psychological Science* 21 (2): 183–88.

**Appendix F: Exact wording of poverty primes**

- HARD condition: Imagine that **locusts destroy your entire crop and the whole harvest is lost**. How do you deal with this situation? Does it cause you serious financial hardship? Does it require you to make sacrifices? If so, what kind of sacrifices? EASY condition: Imagine that **worms destroy a small part of crop that is enough to feed your family for one day**. How do you deal with this situation? Does it cause you serious financial hardship? Does it require you to make sacrifices? If so, what kind of sacrifices?

- HARD condition: Imagine that **hail stones destroy your entire crop and the whole harvest is lost**. How do you deal with this situation? Does this require you to liquidate your savings? Do you need to borrow? Do you need to eat less?
- EASY condition: Imagine that **hail stones fall on your crops after the harvest is nearly finished, destroying a small part of crop that is enough to feed your family for one day**. How do you deal with this situation? Does this require you to liquidate your savings? Do you need to borrow? Do you need to eat less?

- HARD condition: Imagine that the roof on your main **hut catches fire, burning down the whole hut, including all the things you have inside**. How do you solve this problem? How do you get the materials to make the repairs? Do you need to borrow money for the repair and buying the equipment? If yes, from whom? Are you able to make the repairs on your own or do you need to ask others for help? [not sure about the last question – we are concerned that this may prime social occasion instead of a problem]
- EASY condition: Imagine that the **roof on your main hut has a small hole in it**. How do you solve this problem? How do you get the materials to make the repairs? Do you need to borrow money for the repair and buying the equipment? If yes, from whom? Are you able to make the repairs on your own or do you need to ask others for help?

- HARD condition: Imagine that you **fall ill, and cannot dig in your garden for 2 months and need to buy expensive medicine**. How do you deal with this problem? Do you let the fields sit unattended, or find someone else to do it for you? Do you need to pay that person and how? What about your other responsibilities around the homestead?
- EASY condition: Imagine that you **fall ill, and cannot dig in your garden for 1 day**. How do you deal with this problem? Do you let the fields sit unattended, or find someone else to do it for you? Do you need to pay that person and how? What about your other responsibilities around the homestead?

- HARD condition: Imagine that your **parent or other close relative falls ill and asks you for USh. 25,000** so that he can pay for medical treatment. How do you deal with this problem? Does it cause you serious financial hardship? Does it require you to make sacrifices? If so, what kind of sacrifices?
- EASY condition: Imagine that your **parent or other close relative falls ill and asks you for USh. 200** so that he can pay for medical treatment. How do you deal with this problem? Does it cause you serious financial hardship? Does it require you to make sacrifices? If so, what kind of sacrifices?

- HARD condition: Imagine that after planting your major crop in your garden, **there is a big problem with the seeds that you've used, and they were all spoiled. As a result, none of that crop grows**. Do you have to make up for the lost food in some other way? How do you accomplish this? Do you buy new seeds? Do you need to borrow money?
- EASY condition: Imagine that after planting your major crop in your garden, **there is a small problem with the seeds that you've used, and a few of them were spoiled. As a result, a tiny part of the crop does not grow**. Do you have to make up for the lost food in some other way? How do you accomplish this? Do you buy new seeds? Do you need to borrow money?

*Repeated after each question:*

- How anxious would this situation make you feel? Very anxious, moderately anxious, slightly anxious, or not anxious at all?
- How difficult would it be to face this situation? Very difficult, moderately difficult slightly difficult, or not difficult at all?

**Appendix G: Conflict exposure questions**

*Enumerator, read:" Now I would like to ask you about your experiences during the conflict. Some of these experiences are upsetting to think or talk about. If so, feel free not to answer. Say, "I prefer to go to the next question" or "I prefer to stop talking about the conflict and move on". Also, remember that your answers are very confidential."*

1. Someone took or destroyed your personal property.
2. Someone shot bullets at you or your home
3. You witnessed an attack by the LRA or battle with UPDF
4. You received a severe beating or were attacked by someone
5. You were tied up or locked up as a prisoner
6. You received a serious physical injury in a battle or rebel attack
7. You were forced to carry heavy loads or do other forced labor
8. Someone you know betrayed you and put you at risk of death or injury
9. You witnessed beatings or torture of other people
10. You witnessed a killing
11. You witnessed the rape or sexual abuse of a woman
12. Another family member or friend was murdered or died violently
13. Another family member or friend disappeared or was abducted
14. Subject refused to answer some questions on conflict.

## Appendix H: Experimental Protocol

**Contents:**

**Group Instructions**
Hello, my name is ……. and this is ….. Thank you for coming to our study, which concerns the economics of decision making.

*Week 1:*

This study will take place over three weeks. We will be in your village today, next week on **[day]** and the week after as well. Each time, we will come in the [**morning/afternoon]** as we have today. Each session will take about four hours. If you cannot stay for the full time today or cannot come to either of next two sessions, it is important that you let us know as soon as possible. Also, it must be you, personally that comes to each of these sessions; you cannot send someone else to the session if you are unable to come. We will photograph you at the end of the session and ask for your thumbprint to make sure that only participants attend in person. If you do not come to one of the sessions or leave early, you will not be allowed to attend sessions in the future. It is important to keep this rule in mind, because there will be absolutely no exceptions.

Now I'll tell you about the payments you'll receive for participating in the study. You'll get 2000 Ush. today for coming today, 2000 Ush. for showing up next week and 2000 Ush. for coming the week after as well. That money will be paid to you at the meeting on each of the 3 days that you come (including today). You will also be provided with food, **[describe food]** after each session, including today.

At the end of the 3 sessions, you'll receive a payment of 17,000. This money will only be available if you stay for all three sessions: for the full time today, next week, and the week after, and if you complete the tasks that are required during all three sessions. We will explain what those tasks will be in a moment.

You should understand that this is not our own money. This money was given to us by our University for research. This is a onetime payment and will not be repeated in the future. The activities you will perform are part of a scientific study. They will NOT be used to evaluate you or your community.

Before we proceed any further, let me stress something that is very important. Many of you were invited here without understanding very much about what we are planning to do today. If at any time you find that this is something that you do not wish to participate in for any reason, you are of course free to leave whether we have started the task or not and the 2000 Ush for coming today is yours to keep.

If you have heard about a task that has been done here in the past you should try to forget everything that you have been told. This is a completely different task.

I'd like to ask all of you not to talk amongst yourselves from this point on. This is really important and we will have to ask you to leave and you will not have a chance to receive extra money. This is very important and please be sure that you obey this rule, because it is

possible for one person to spoil the task for everyone, in which case we would not be able to continue with the study.
If you have a question or concern at any time, feel free to ask me or one of my colleagues. There will be plenty of time for doing so. During and after the explanation.

*Week 2*

Hello, my name is ……. and this is ….. Thank you for coming to our study, which concerns the economics of decision making.

Let me remind you of the timeline of the study. We will be in your village today and again this week Each time, we will come in the [**morning/afternoon]** as we have today. Each session will take about four hours. Also, it must be you, personally that comes to each of these sessions; you cannot send someone else to the session if you are unable to come.

Now I'll remind you about the payments you'll receive for participating in the study. You'll get 2000 Ush. today for coming today and 2000 Ush. for showing up this week. You will also be provided with food, **[describe food]** after each session, including today.

At the end of the 3 sessions, you'll receive a payment of 17,000. This money will only be available if you stay for all three sessions: for the full time today and this week
You should understand that this is not our own money. This money was given to us by our University for research. This is a onetime payment and will not be repeated in the future.
The activities you will perform are part of a scientific study. They will NOT be used to evaluate you or your community.
If at any time you find that this is something that you do not wish to participate in for any reason, you are of course free to leave whether we have started the task or not and the 2000 Ush for coming today is yours to keep.

I'd like to ask all of you not to talk amongst yourselves from this point on. This is really important and we will have to ask you to leave and you will not have a chance to receive extra money. This is very important and please be sure that you obey this rule, because it is possible for one person to spoil the task for everyone, in which case we would not be able to continue with the study.
If you have a question or concern at any time, feel free to ask me or one of my colleagues. There will be plenty of time for doing so. During and after the explanation.

**Task instructions**

During the sessions next week and the week after, there will be a one-hour period during which you will work. This work will be sorting these beans by color. You'll receive a number of cups of mixed beans [**demonstrate**], then you'll sort the mixed beans into containers, putting the white ones in one container, and the red beans in another. For the rest of the explanation today, when I talk about "work" I mean sorting beans.

Simply put all of the red beans in the red container and all of the white beans in the white container. You must sort all of the beans in each cup. Notice that all of the cups are the same

size.  You'll always have 1 cup to sort per minute. This should be enough time for you to sort all of the beans required. If you finish before this time is up, we'll ask you to wait patiently. So there is no pressure to work faster.

However, you won't have to work the entire work hour. You will have the chance to take spend some of the hour on entertainment in both weeks. The entertainment time will consist of watching videos on these tablets. There are videos of premier league football, music and jokes [show videos]. In the rest of the explanation, when I refer to "entertainment," I mean watching video clips on these tablets and relaxing.

Now we'll have a brief *warm-up period,* during which you can try the entertainment and work for yourselves. You will have 5 minutes of entertainment, followed by 5 minutes of work—which means sorting 5 cups of beans: one for every minute. During this time, we ask that you work quietly and individually. If you finish early, please wait quietly and patiently until the time is up.

**[Warm-up period: 5 minutes work followed by 5 minutes of entertainment.]**
**[During entertainment:]**

Which video would you like to watch? You can choose between premier league goals, music videos and jokes. If you want to switch to something else, just raise your and let me know. I'll come over and switch it for you.

**[Re-group subjects for explanation of decision task:]**

*Week 1*

Today you will not have any more entertainment or work. Next week and the week after, however, the session will include the *work hour* that I mentioned earlier. Remember that the work hour is 60 min.

*Week 2*

This week and the week after, the session will include the *work hour* that I mentioned earlier. Remember that the work hour is 60 min.

The decisions that you make, which we'll explain in a moment, will determine how long your entertainment time in each week will be, in other words, the number of minutes for entertainment during the work hour next week and the week after. The rest of the hour, you will work. You'll be responsible for 1 cup ever minute: the less time you spend on entertainment, the more time you will need to work, and you'll be responsible for sorting more beans during this time. Regardless of how quickly you finish the sorting during the work time, the time that you have for your entertainment is determined by your choices. If you sort faster, and finish sorting before the work time has finished, you'll need to wait patiently until the time runs out. In other words, you can't get more entertainment time by working faster.

The work and entertainment time will both be done individually, just like today, and the choice of videos that we have are different from person to person. You will not be able to talk to other participants or friends during this time.

To summarize the timeline of the study:

*Week 1:*

- This week you will make a series of decisions to determine how long your entertainment time will be next week, and how long your entertainment time will be two weeks from today. You will receive 2000 Ush. for coming today.
- Next week, you will complete the work hour. Part of that time you will have entertainment time, and the length of your entertainment time will depend on the decisions that you make. Regardless of how long you choose to have entertainment time, you will receive 2000 Ush. for coming next week.
- In two weeks from today, there will be a second work hour. Part of that time you will have entertainment, and the length of your entertainment time will depend on the decisions that you make. Regardless of the amount of work you do that week, you will receive 2000 Ush. for coming. If you come all three weeks, you will receive the XXXX after the session, two weeks from today.
- Each week will include a 10 minute warm-up period, like the one today, and you will also receive food in each week.

*Week 2*

- Last week, you made a series of decisions to determine how long your entertainment time will be this week, and how long your entertainment time will be next week. we paid you 2000 Ush. for coming today.
- This week, you will complete the *work hour*. Part of that time you will have entertainment time, and the length of your entertainment time will depend on the decisions that you make. Regardless of the how long you choose to have entertainment time, you will receive 2000 Ush. for coming this week.
- Next week from today, there will be a second *work hour.* Part of that time you will have entertainment, and the length of your entertainment time will depend on the decisions that you make. Regardless of the amount of work you do that week, you will receive 2000 Ush. for coming. If you come all three weeks, you will receive the XXXX after the session, two weeks from today.
- Each week you have a 10 minute warm-up period, like the one today, and you will also receive food in each week.

Now I will tell you about the decisions to determine how long your entertainment time will be during each of the *work hour*s.

*Week 1*

You will decide how long you will have for entertainment such that the more time you spend on entertainment one week, the less time will be spent on entertainment in the other week.

Now we'll take a more detailed look at the decisions.

*Week 2*

You will decide how long you will have for entertainment such that the more time you spend on entertainment one week, the less time will be spent on entertainment in the other week. The decision that you make this week will be exactly the same as the decision you made last week. You can choose anything that you would like this week, regardless of what you chose last week.
Now we'll take a look at the decisions again to remind you how it works.

Now we'll take a look at the decisions again to remind you how it works. Take a look at this chart. **[Begin with only the center panel open, the remaining 4 closed].** Notice that there are two circles here. Both these represent one hour on a clock. The clock on the left-hand side represents the *work hour* for next week *(this week)*. The clock on the right-hand side represents the *work hour* two weeks from today *(next week)*.

The colored portion—the blue or green part— on each clock represents your entertainment time. You will choose by flipping through the pages. Let's try flipping the pages from left to right: [**demonstrate**]. Here, on the first page, notice that the clock on the left hand side has 45 minutes filled in with blue, and the clock on the right hand side is empty. What this means, is that if you picked this page, you'll spend all of your entertainment time next week *(this week)*, so you'll have a 45-minute entertainment time next week *(this week)*, and in two weeks *(next week)*, no entertainment —only work.

Let's try flipping the page once to the right **[C2]**. Two things have happened here: next week, the amount of entertainment time has gone down—your entertainment time is 8 minutes shorter. That means that next week, you'd have 37 minutes of entertainment time, as illustrated by the blue TV in the corner. The rest of the hour, you'd work. But, although you've given up these 8 minutes of entertainment next week, you've gained 8 minutes of entertainment time in two weeks! Now, when we look at the clock on the right-hand side, we can see that you have 8 minutes of entertainment, which is shown by the green TV here, and the rest of the hour will be spent working.

As you flip through the rest of the pages in this panel, you are transferring entertainment time from next week to two weeks from today. For each page turn, you give up eight minutes of entertainment next week, but gain the same amount of entertainment in two weeks.

**[slowly flip through rest of pages in panel C]**

…8 minutes given up, 8 minutes gained…

I'll put this blue card here next to this panel to represent the eight minutes of entertainment that you give up with each page flip.

I'll also put this green card next to the panel, which is the same size as the blue one, to represent the 8 minutes of entertainment that you gain with each page flip

We can a flip through the pages the other way: each page turn to the left, you get 8 minutes less in two weeks, and 8 minutes more next week…. [flip through pages in reverse order].
Notice in the picture that the blue section (representing the entertainment that you give up in next week) is equal to the green section (representing the entertainment that you gain in two weeks).

Today, you will make 5 decisions [**point to the 5 panels]**, one on each of these 5 panels, to determine how long your entertainment time will be next week and two weeks from today. However, although only one decision may actually count, as I'll explain in a moment. Now, let's go over all of the decisions.

Let's look at the top panel **[A1—same as C1 above].** Here, as in the middle panel, the clock on the left represents next week, and the clock on the right represents two weeks from today. The colored section represents the amount of time for entertainment in each week.

So, you start off here, with 45 minutes devoted to entertainment next week, and all of two weeks spent working. Let's flip the page to the right **[A2]**. Notice that the amount of entertainment in next week has gone down by the same amount as before: as we turn the pages, we have 8 minutes less entertainment in next week. But, there is one important difference: though we still gained some entertainment in two weeks, we gained less than we gave up! More specifically we gave up 8 minutes in next week, and gained only 4 minutes in two weeks. This pattern continues as we go through the rest of the pages: each page turn means giving up 8 more minutes of entertainment in next week, and gaining 4 minutes in two weeks.

I'll put cards next to the top panel as well, to help you remember. When you give up 8 minutes of entertainment next week, as represented by the blue card, you gain some amount of entertainment in two weeks, but much less than what you've given up. The green card, represents entertainment two weeks from today. Notice that the blue cared is bigger than the green card. You can see how big the difference is by comparing them.

In the second panel, we start the same way as the others **[B1]**. In this panel, the situation is very similar to the top panel. Each time you give up some portion of entertainment next week, you'll gain some in two weeks, but less than the amount that you have given up. However, you'll gain a bit more than in the top panel. In panel 2, for each 8 min. of entertainment that you give up in next week, you'll gain six minutes in two weeks.

You don't have to remember the specific numbers though: I'll put these cards here to help you compare. As before, the blue card is what you give up in next week, and the green card is what you gain in two weeks from today. You can compare the difference here **[compare cards].**
Now, there are two panels that we haven't talked about. Let's go to panel 5. On the first page, we still have a 45 minutes of entertainment time next week for, and no entertainment time in two weeks. As before, each time you turn the page, you give up 8 minutes of your entertainment time next week. This time, however, you'll gain more two weeks from today than you give up next week. So, each time you flip the page, you give up 8 minutes of your entertainment time next week, but you'll gain 12 minutes two weeks from today!
**[flip through pages of E].**

Here's the picture to demonstrate how the bottom panel works: the blue card represents what you give up in next week each time you flip the page. The green card is one and a half times bigger than the blue card though, because you gain more in two weeks than you give up next week. **[gap between black line and green section]**

That just leaves one more panel, the 4th one. This one's similar to the bottom panel: you gain more in two weeks than you give up next week. But, you don't get quite as much more as you do in the bottom panel. Here, for each page, when you give up 8 min next week, you'll gain 10 minutes in two weeks. **[Flip from D1 to D2].**

As before, you can easily see these cards. For each 8 minutes of entertainment you give up next week, in blue, you gain this much (green) two weeks from today. You can see that here, what you gain is more than what you give up.

Let's take a second to compare the panels:

All 5 panels have the same first page [flip to 1st pages]. So, you always have the option of spending all of your entertainment time during the work hour next week and working for the entire hour in two weeks.

In all 5 panels, as you move the pages from left to right, you're giving up some entertainment time in next week—8 minutes per page. That means that during the work hour next week, you'll work more—8 minutes more. [flip to 2nd pages]. You can see this by noticing that the blue card next to each panel is the same size.

In all 5 panels, as you give up entertainment time next week, you gain some entertainment time in two weeks.

But, the panels are all different in one way: the amount of time you gain in two weeks is different in each panel. **[Refer to subst. rate pictures].**

- In the top panel, you gain much less in two weeks than what you give up next week.
- In the next panel, you gain a bit less in two weeks than you give up next week.
- In the middle panel, you gain exactly the same in two weeks as what you give up next week.
- In the 4th panel, you gain a bit more in two weeks than what you give up next week.
- In the bottom panel, you gain much more in two weeks than you give up next week.

As you give up entertainment next week, you are rewarded with more and more entertainment in two weeks as we move from panels 1 to 5. You can see this by looking at the green cards, which get bigger and bigger.

Don't worry if you don't remember all of the details. All of these pictures that I've just shown you will be available when you make the decisions, so you don't have to remember any of the specific amounts. You'll have plenty of time to ask questions too.
Any questions? **[Take and answer questions].**

*Week 1*

There is one more detail that we need to go over. When you come next week, you `1will make 5 more decisions. That means that next week, before you begin the *work hour*, you will have made 10 decisions in all: 5 today, one for each of the panels on this board, and another 5 decisions next week. Only one of these 10 decisions will actually count though. We'll decide which one by placing 10 balls in this bag, each one representing each of the 5 decisions that you make today and the 5 that you'll make next week. We'll pick just one ball, and the decision corresponding to that ball will determine how much time will be spent on work and how much on entertainment during the 2 work hours next week and two weeks from today.

If we pick one of the decisions that you make today, then you won't be able to change it later. so you should think about each decision carefully, as if it were the one the counts. Any questions? **[Take and answer questions].**

*Week 2*

Remember that you made 5 decisions last week. That means that this week, before you begin the *work hour*, you will have made 10 decisions in all: 5 today, one for each of the panels on this board, and 5 decisions last week. Only one of these 10 decisions will actually count though. We'll decide which one by placing 10 balls in this bag, each one representing each of the 5 decisions that you made last week and the 5 that you'll make this week. We'll pick just one ball, and the decision corresponding to that ball will determine how much time will be spent on work and how much on entertainment during the 2 work hours this week and two weeks from today.

If we pick one of the decisions that you make today, then you won't be able to change it later. so you should think about each decision carefully, as if it were the one the counts. Any questions? **[Take and answer questions].**

**Individual Instructions**
Hello, before we move on to the decisions, let's go over everything one more time.
While you're making decisions today, we'll ask you to were these glasses with a small camera. Notice that the camera doesn't record your body or face, just your hands and the decisions that you'll make. We'll use the video to help us record your decisions.

As we discussed earlier, the decisions you make today (and next week) will determine how long your entertainment will be during the work hour next week and in two weeks. You will use these panels to make your decisions. Each circle is a like a clock, and it shows the length of the entertainment for each week.

The clock on the left represents next week, and the blue portion of the clock is the entertainment time for next week *(this week).*

The clock on the right represents two weeks from today, and the green portion of the clock is the entertainment time for two weeks from today.

In both weeks, the rest of the work hour-when you don't have entertainment—will be spent working on sorting beans.

You'll make 5 decisions today. One for each of these 5 panels. In all of the decisions, you will choose how much entertainment time will be *next week (this week)* and how much you will have *two weeks from today (next week).*

In all 5 panels, as you move the pages from left to right, you're giving up some entertainment time *next week (this week)* —8 minutes per page. **[flip to 2nd pages]**. You can see this by noticing that the blue card next to each panel is the same size.

In all 5 panels, as you give up entertainment time *next week (this week)*, you gain some entertainment time *in two weeks (next week).*

But, the panels are all different in one way: the amount of time you gain in two weeks is different in each panel. **[Refer to subst. rate pictures].**

- In the top panel, you gain much less *in two weeks (next week)* than what you give up *next week (this week).*
- In the next panel, you gain a bit less *in two weeks (next week)* than you give up *next week (this week).*
- In the middle panel, you gain exactly the same *in two weeks (next week)* as what you give up *next week (this week).*
- In the 4th panel, you gain a bit more *in two weeks (next week)* than what you give up *next week (this week).*
- In the bottom panel, you gain much more *in two weeks (next week)* than you give up *next week (this week).*

As you give up entertainment *next week (this week)*, you are rewarded with more and more entertainment in *two weeks (next week)* as we move from panels 1 to 5. You can see this by looking at the green cards, which get bigger and bigger.

Now we'll go over a few examples, to make sure you understand. If you have any questions, feel free to ask.

**Example:** Great, now please look at this page **[example page]**.

- Which section represents how much entertainment time you'll have *next week (this week)*, for this choice?
- Which section represents the amount of entertainment time you'll have *two from today weeks (next week)*, for this choice?

**[Open to all panels to page 1]**

Look at the top panel, and flip the pages from left to right.

- What happens to the entertainment time for *next week (this week)* as you turn the pages from left to right? **[Less entertainment.]**
- What happens to the entertainment time *in two weeks (next week)* as you turn the pages from left to right? **[More entertainment]**

In this panel, for each page, when you give up some entertainment in *next week (this week)* by flipping the page from left to right, do you gain more, less or the same amount of entertainment *in two weeks (next week)* than you gave up *next week (this week)*?

You gain less entertainment *two weeks from now (next week)* than you give up *in next week (this week)* for panel 1(other panel). You can remember this by looking at this picture here. Notice that the green section is smaller/larger than the blue section. This is to help you remember the difference in what you give up in next week (in blue) and what you gain two weeks from today (in green).

**[Repeat Example for each panel]**

Okay, now look at this page here **[flip to example page]**. Please point to the amount of entertainment time you'll have *next week (this week)* **[blue portion].** Let's turn the page once. On this page, do you have more or less entertainment time next week? **[flip back and forth between pages to give subject time to compare]**. Lets' look at the same two pages, but at the entertainment time for the work hour in two weeks. Which page gives you more entertainment time in two weeks? **[flip back and forth between pages to give subject time to compare]**. **[More examples]**

Since there's no way to tell right now which decision will actually matter, you should carefully consider all of the decisions you make.

If we look at the entertainment that you choose in each of the 5 panels for *two weeks from now (next week)*, the reward *in two weeks (next week)* is larger and larger. This means that in panel B,

it makes sense to give up at least as much entertainment *next week (this week)* as you give up in panel A. And, it makes sense to give up at least as much entertainment *next week (this week)* in panel C as in panel B (and so forth…)

The reason is that as we go down the panels, you get more and more entertainment *in two weeks (next week)* for giving up the same amount of entertainment *this week (next week)* **[point to cards]**.

We can also look at the entertainment for *two weeks from today (next week)*. It makes sense to choose as much or more in B as in A, and as much in C as in B (and so forth...). The reason is that you gain more and more entertainment in *two weeks (next week)* for giving up the same amount this week, as you move from panels A to E.

It never makes sense to choose more in one panel, then the previous, then less, then more. The reason is that the reward in *two weeks (next week)* for up entertainment *next week (this week)* only gets bigger and bigger.

Do you have any questions so far about the timing of the work and decisions?
**Comprehension questions:**
Now, I want to ask a few more questions, just so that I'm sure you understand.

1. What does the blue part of the clock on the left **[point]** of each panel represent?

   **[Entertainment for *next week (this week)*.]**
2. What does the green part clock on the right **[point]** of each panel represent?

   **[Entertainment for *two weeks from today (next week)*].**

3. What will you do during the work hour when you are not on your entertainment time?

   **[Work/sort beans]**

4. If I flip the pages from left to right [demonstrate] what happens to the entertainment time for *next week (this week)*?

   **[Goes down.]**

5. What happens to the entertainment time *two weeks from today (next week)*?

   **[Goes up]**

6. In the top panel, when you give up entertainment *next week (this week)*, do you gain more, less or the same entertainment *two weeks from today (next week)*. Remember, you can refer to the picture here.

   **[Less]**

7. In the middle panel, when you give up entertainment in *next week (this week)*, do you gain more less or the same entertainment *in two weeks (next week)*. Remember, you can refer to the picture here.

   **[Same]**

8. In the bottom panel, when you give up entertainment in *next week (this week)*, do you gain more less or the same entertainment *in two weeks (next week)*. Remember, you can refer to the picture here.

   **[More]**

9. Please compare these two pages [example pages]. On which page do you have a longer entertainment time *next week (this week)*? On which page do you have a longer entertainment time *two weeks from today (next week)*?

**[Priming procedure – see below]**

Okay, now I will leave you to make your decision. Take as much or as little time as you want, and just call me when you are finished. Whatever pages you leave open when you finish will count as your decision. You will also wear the camera as we discussed before, to record your decisions.

**[According to Default Treatment]**

**Patient Default Treatment:**

> Now I'll leave the pages open to the option that gives you the most amount of entertainment time *in two weeks (next week)*, and the least amount of entertainment time possible for *next week (this week)*, but of course you can choose any page that you'd like.

**Impatient Default Treatment:**

> Now I'll leave the pages open to the option that gives you the most amount of entertainment *next week (this week)*, and the least amount of entertainment time possible for *two weeks from now (next week)*, but of course you can choose any page that you'd like.

*Week 2 Only:*

> **[After decision, leave pages open to same as decision]**
> These are the decisions that you made today. Now, I'd like you to look at the panels and to flip the pages to the decisions that you made last week, as best as you can.

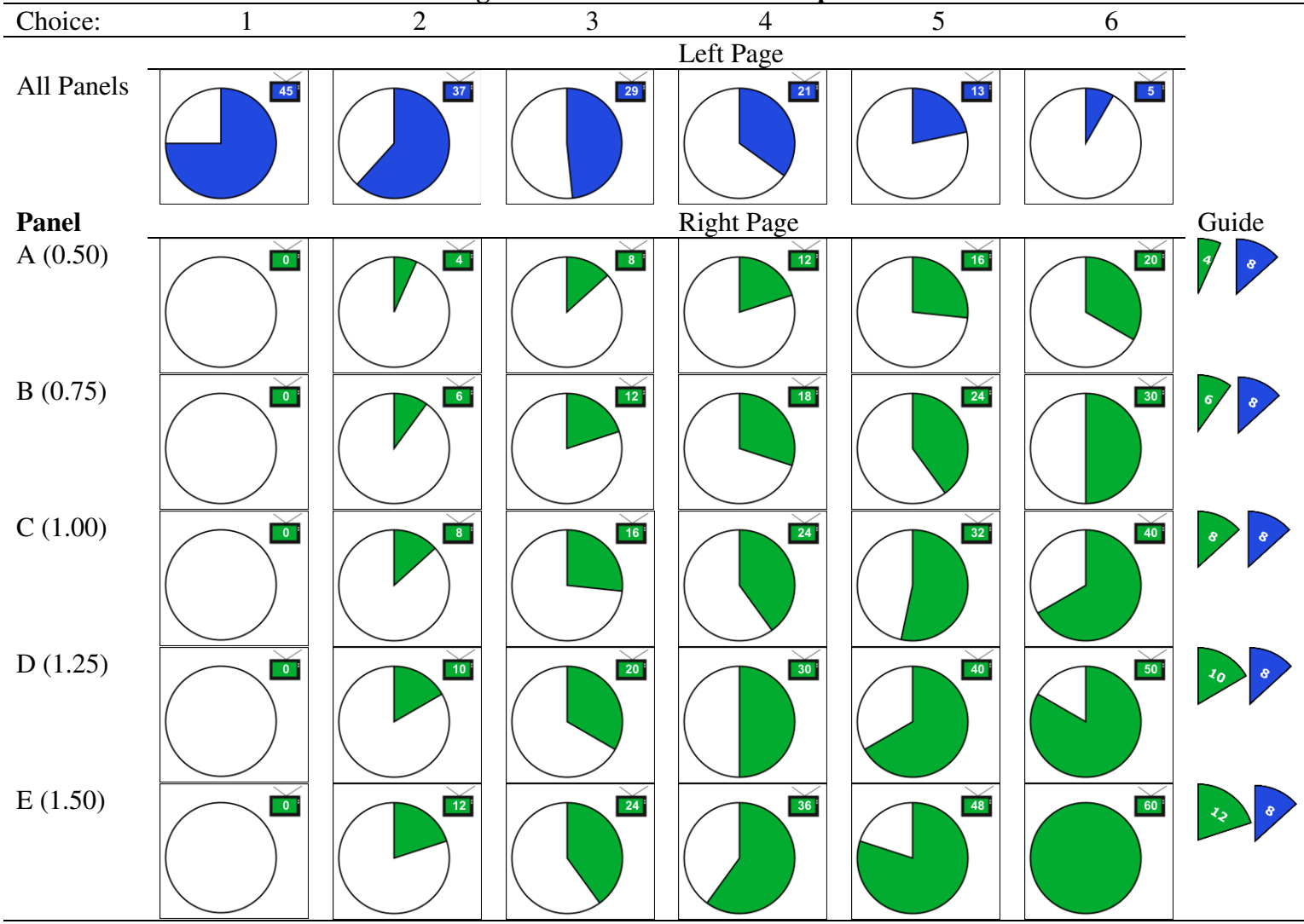
If you think that last week you choose less entertainment for today's week than you did just now, for a given panel, you'd flip the pages to the left. If you think that last week you chose more entertainment for today's work hour than you did just now, then you'd flip the pages to the right. If you think that you chose the same amount of entertainment both times, you'd keep it as it is.

Please do your best to remember the decisions you made last week.

Note that we have the information about actual decisions to tell us how much entertainment you'll have during the work hour today and next week—in case we pick one of the decisions from last week when we draw numbers out of the bag. In other words, the pages you leave open won't change how much work or entertainment you'll actually have this week or next.

Let me know with the red flag when you are finished.

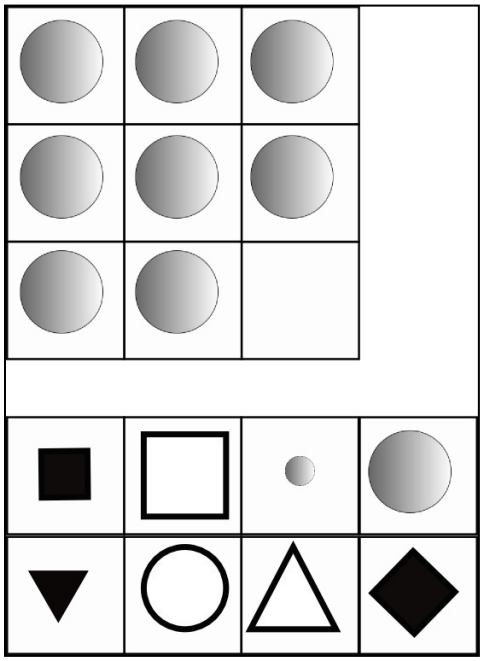
**Figure F1: Visual aids for time preference choices**



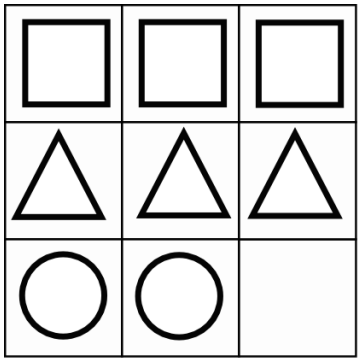

Note: Each "panel" consisted of a seperate booklet (See Figure 1). The left/right page (blue/green) represents entertainment minutes consumed in the earlier/later week. Each panel represents a different inter-temporal discount rate. Subjects could flip through each booklet, and visually compare choices acros panels. To help subjects visualize the substitution rate, we included a "guide" for each panel. For 8 minutes of entertainment in Week 1 (blue), they would gai the specified amount (green) in Week 2.

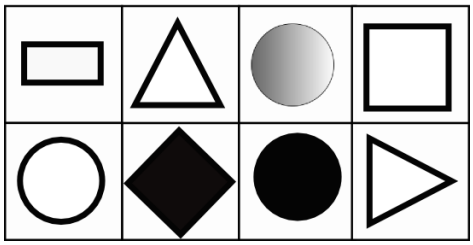
**Raven Matrices**

**1.**

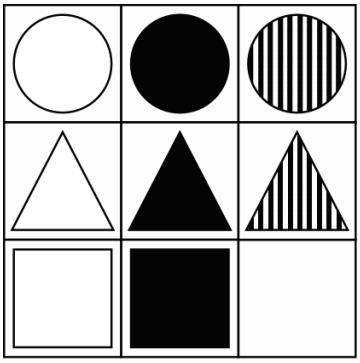


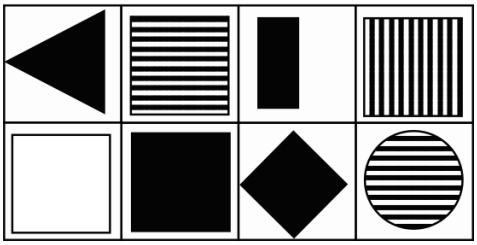
**2.**



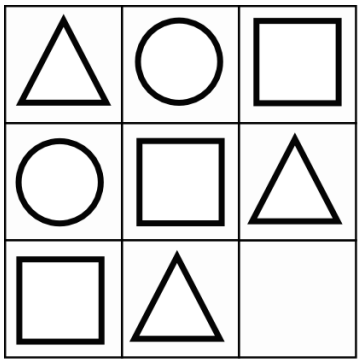


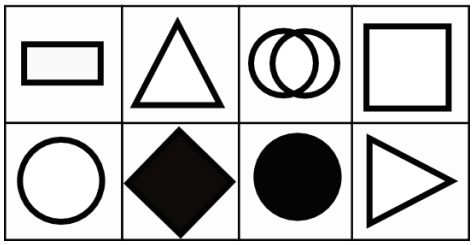
**3.**



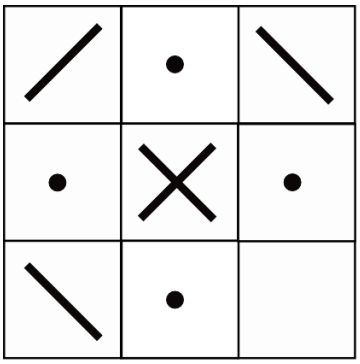


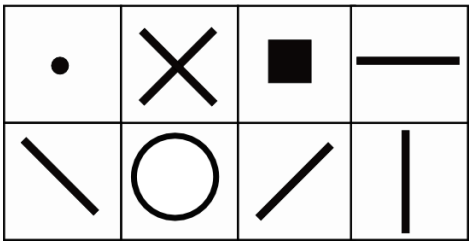
**4.**





**5.**





## Appendix I: Surveys

### Week 1 survey

*(Comprehension question, treatments, and intertemporal choices here)*

| 5 | | |
|---|---|---|
| 5.1 | **Have you eaten breakfast today?** □ Yes □ No | |
| 5.2 | **What did you have for breakfast today?**<br>□ Casava □ Irish potatoes □ Sweet potatoes □ Beans □ Peas □ Fruit □ Posho □ Rice<br>□ Vegetables □ Eggs □ Bread □ Other | Skip if 5.1="No"<br>Multiple Choice |
| 5.3 | **Other food for breakfast:** | Only if applicable |
| 5.4 | **Was it a large meal?** | Skip if 5.1="No" |
| 5.5 | **Have you eaten lunch today?** □ Yes □ No | |
| 5.6 | **What did you eat for lunch today?**<br>□ Casava □ Irish potatoes □ Sweet potatoes □ Beans □ Peas □ Fruit □ Posho □ Rice<br>□ Vegetables □ Eggs □ Bread □ Other | Skip if 5.5="No"<br>Multiple Choice |
| 5.7 | **Other food for lunch:** | Only if applicable |
| 5.8 | **Was it a large meal?** | Skip if 5.5="No" |
| 5.9 | **Did you eat dinner last night?** □ Yes □ No | |
| 5.10 | **What did you eat for dinner last night?**<br>□ Casava □ Irish potatoes □ Sweet potatoes □ Beans □ Peas □ Fruit □ Posho □ Rice<br>□ Vegetables □ Eggs □ Bread □ Other | Skip if 5.9="No"<br>Multiple Choice |
| 5.11 | **Other food for dinner:** | Only if applicable |
| 5.12 | **Was it a large meal?** | Skip if 5.9="No" |
| 5.13 | **How many days did you work last week?** | |
| 5.14 | **What happened on that day/those days that you didn't work?**<br>□ Due to illness □ Attending a celebration □ No work to do □ Don't work on Sundays<br>□ Other reason | Skip if 5.13=0 |
| 5.15 | **How many days do you expect to work next week?** | |
| 5.16 | **What is the reason you expect to not work on that day/those days?**<br>□ Due to illness □ Attending a celebration □ No work to do □ Don't work on Sundays<br>□ Other reason | |
| 5.17 | **Have you attended any holidays or celebrations over the past week? If so, which ones?**<br>□ Wedding □ Funeral □ Sport event □ Other community event | |
| 5.18 | **Do you plan on attending any holidays or celebrations over the next week? If so, which ones?**<br>□ Wedding □ Funeral □ Sport event □ Other community event | |
| 5.19 | **How old are you?** | |
| 5.20 | **What is your marital status?**<br>□ Married □ Single □ Divorced □ Widow/widower □ Cohabiting □ Separated<br>□ Spouse disappeared/abducted | |
| 5.21 | **How many sons do you have?** | |
| 5.22 | **How many daughters do you have?** | |
| 5.23 | **How many people are currently living in your household?** | |
| 5.24 | **What's the highest level of schooling that you have reached?**<br>□ P1 □ P2 □ P3 □ P4 □ P5 □ P6 □ P7 □ S1 □ S2 □ S3 □ S4 □ S5 □ S6<br>□ None or nursery | |

### Week 2 survey

*(Comprehension question, treatments, and intertemporal choices + remembering last week choices here)*

| 5 | | |
|---|---|---|
| 5.1 | **Have you eaten breakfast today?** □ Yes □ No | |
| 5.2 | **What did you have for breakfast today?**<br>□ Casava □ Irish potatoes □ Sweet potatoes □ Beans □ Peas □ Fruit □ Posho □ Rice<br>□ Vegetables □ Eggs □ Bread □ Other | Skip if 5.1="No"<br>Multiple Choice |
| 5.3 | **Other food for breakfast:** | Only if applicable |
| 5.4 | **Was it a large meal?** | Skip if 5.1="No" |
| 5.5 | **Have you eaten lunch today?** □ Yes □ No | |

| | | |
|---|---|---|
| 5.6 | **What did you eat for lunch today?**<br>□ Casava □ Irish potatoes □ Sweet potatoes □ Beans □ Peas □ Fruit □ Posho □ Rice □ Vegetables □ Eggs □ Bread □ Other | Skip if 5.5="No"<br>Multiple Choice |
| 5.7 | **Other food for lunch:** | Only if applicable |
| 5.8 | **Was it a large meal?** | Skip if 5.5="No" |
| 5.9 | **Did you eat dinner last night?** □ Yes □ No | |
| 5.10 | **What did you eat for dinner last night?**<br>□ Casava □ Irish potatoes □ Sweet potatoes □ Beans □ Peas □ Fruit □ Posho □ Rice □ Vegetables □ Eggs □ Bread □ Other | Skip if 5.9="No"<br>Multiple Choice |
| 5.11 | **Other food for dinner:** | Only if applicable |
| 5.12 | **Was it a large meal?** | Skip if 5.9="No" |
| 5.13 | **How many days did you work last week?** | |
| 5.14 | **What happened on that day/those days that you didn't work?**<br>□ Due to illness □ Attending a celebration □ No work to do □ Don't work on Sundays □ Other reason | Skip if 5.13=0 |
| 5.15 | **How many days do you expect to work next week?** | |
| 5.16 | **What is the reason you expect to not work on that day/those days?**<br>□ Due to illness □ Attending a celebration □ No work to do □ Don't work on Sundays □ Other reason | |
| 5.17 | **Have you attended any holidays or celebrations over the past week? If so, which ones?**<br>□ Wedding □ Funeral □ Sport event □ Other community event | |
| 5.18 | **Do you plan on attending any holidays or celebrations over the next week? If so, which ones?**<br>□ Wedding □ Funeral □ Sport event □ Other community event | |
| 5.19 | **Have you spoken about the experiment with anyone, either with other participants or anyone else?** □ Yes □ No | |
| 5.20 | **With whom have you talked about the project?**<br>□ Participants from your group □ Participants from your village, but from a different group □ Participants from a session in a different village □ Friends who did not participate in this project □ Family who did not participate in this project | Skip if 5.19="No"<br>Multiple Choice |
| 5.21 | **What did you tell these people about the session?**<br>□ Sorting beans □ Watching videos □ Making the decisions □ The prime questions □ Other questions □ Something else (add to notes) | Skip if 5.19="No"<br>Multiple Choice |

## Week 3 survey: Part 1

| 2 | | |
|---|---|---|
| 2.1 | **What was the highest level of education attained by your biological mother?**<br>□ None □ Some primary □ Completed primary □ Some secondary or junior □ Completed secondary □ Post-secondary □ Don't know | Multiple choice |
| 2.2 | **What was the highest level of education attained by your biological father?**<br>□ None □ Some primary □ Completed primary □ Some secondary or junior □ Completed secondary □ Post-secondary □ Don't know | Multiple choice |
| 2.3 | **How many older brothers do you have?** | |
| 2.4 | **How many younger brothers do you have?** | |
| 2.5 | **How many older sisters do you have?** | |
| 2.6 | **How many younger sisters do you have?** | |
| 2.7 | **What adults are you currently living with?**<br>□ Mother □ Father □ Aunt or Uncle □ Grandparent □ Brother or Sister □ Spouse □ Other | Multiple choice |
| 2.8 | **How many people are in your present household? We mean only the people that usually eat from the same pot as you.** | |
| 2.9 | **Who is the head of your household?**<br>□ Self □ Spouse □ Father □ Mother □ Grandfather □ Grandmother □ Uncle □ Aunt □ Brother □ Sister □ Other | |
| 2.10 | **Who is responsible for making decisions about expensive purchases for your household?**<br>□ Me □ Husband/Wife □ Me and my husband/wife jointly □ Someone else from the family | |

| | | |
|---|---|---|
| 2.11 | **Who is responsible for making decisions about small (day-to-day) purchases for your household?**<br>□ Me □ Husband/Wife □ Me and my husband/wife jointly<br>□ Someone else from the family | |
| 2.12 | **Who is responsible for making financial decisions regarding your children?**<br>□ Me □ Husband/Wife □ Me and my husband/wife jointly<br>□ Someone else from the family | |
| 2.13 | **Who is responsible for making decisions on health spending for your household?**<br>□ Me □ Husband/Wife □ Me and my husband/wife jointly<br>□ Someone else from the family | |
| 3 | | |
| 3.1 | **Digging in someone else's garden:** □ Yes □ No | |
| 3.2 | **How many days over the past month have you spent digging in other's gardens?** | Skip if 3.1 = "No" |
| 3.3 | **How much money have you earned over the past month for digging in others' gardens?** | Skip if 3.1 = "No" |
| 3.4 | **Digging in your own garden:** □ Yes □ No | |
| 3.5 | **How many days over the past month have you spent digging your own garden?** | Skip if 3.4 = "No" |
| 3.6 | **How much money have you earned over the past month from selling crops from your garden?** | Skip if 3.4 = "No" |
| 3.7 | **Taking care of someone else's animals:** □ Yes □ No | |
| 3.8 | **How many days over the past month have you spent taking care of someone else's animals?** | Skip if 3.7 = "No" |
| 3.9 | **How much money have you earned over the past month for taking care of someone else's animals?** | Skip if 3.7 = "No" |
| 3.10 | **Taking care of (raising) your own animals:** □ Yes □ No | |
| 3.11 | **How much money have you earned over the past year from selling livestock?** | Skip if 3.10 = "No" |
| 3.12 | **A vocation such as carpentry or blacksmithing:** □ Yes □ No | |
| 3.13 | **How many days over the past month have you spent on vocational work (carpentry or blacksmithing)?** | Skip if 3.10 = "No" |
| 3.14 | **How much money have you earned over the past month from vocational work?** | Skip if 3.13 = "No" |
| 3.15 | **Construction:** □ Yes □ No | |
| 3.16 | **How many days over the past month have you spent working on construction?** | Skip if 3.15 = "No" |
| 3.17 | **How much money have you earned over the past month from construction?** | Skip if 3.15 = "No" |
| 3.18 | **Quarrying:** □ Yes □ No | |
| 3.19 | **How many days over the past month have you spent quarrying?** | Skip if 3.18 = "No" |
| 3.20 | **How much money have you earned over the past month from quarrying?** | Skip if 3.18 = "No" |
| 3.21 | **As a boda boda:** □ Yes □ No | |
| 3.22 | **How many days over the past month have you spent working as a boda boda?** | Skip if 3.21 = "No" |
| 3.23 | **How much money have you earned over the past month from working as a boda boda?** | Skip if 3.21 = "No" |
| 3.24 | **In a shop, hotel or saloon.** □ Yes □ No | |
| 3.25 | **How many days over the past month have you spent working in a shop?** | Skip if 3.24 = "No" |
| 3.26 | **How much money have you earned over the past month from working in a shop?** | Skip if 3.24 = "No" |
| 3.27 | **As a teacher or a public employee.** □ Yes □ No | |
| 3.28 | **How many days over the past month have you spent working as a teacher/public employee?** | Skip if 3.27 = "No" |
| 3.29 | **How much money have you earned over the past month from working as a teacher/public employee?** | Skip if 3.27 = "No" |
| 3.30 | **As a health or NGO worker.** □ Yes □ No | |
| 3.31 | **How many days over the past month have you spent working for an NGO?** | Skip if 3.30 = "No" |
| 3.32 | **How much money have you earned over the past month from NGO work?** | Skip if 3.30 = "No" |
| 3.33 | **Doing any repairs for sale.** □ Yes □ No | |
| 3.34 | **How many days over the past month have you spent doing repairs for sale?** | Skip if 3.33 = "No" |
| 3.35 | **How much money have you earned over the past month from doing repairs?** | Skip if 3.33 = "No" |
| 3.36 | **Vending of food, vegetables, or small items.** □ Yes □ No | |
| 3.37 | **How many days over the past month have you spent selling food?** | Skip if 3.36 = "No" |
| 3.38 | **How much money have you earned over the past month from selling food?** | Skip if 3.36 = "No" |
| 3.39 | **Brewing alcohol for sale.** □ Yes □ No | |
| 3.40 | **How many batches of alcohol have you made for sale over the past month?** | Skip if 3.39 = "No" |
| 3.41 | **How much money have you earned over the past month from selling alcohol?** | Skip if 3.39 = "No" |

| | | |
|---|---|---|
| 3.42 | **Making bricks for sale.** □ Yes □ No | |
| 3.43 | **How many days over the past month have you spent making bricks for sale?** | Skip if 3.42 = "No" |
| 3.44 | **How much money have you earned over the past month from making bricks?** | Skip if 3.42 = "No" |
| 3.45 | **Making charcoal for sale.** □ Yes □ No | |
| 3.46 | **How many days over the past month have you spent making charcoal for sale?** | Skip if 3.45 = "No" |
| 3.47 | **How much money have you earned over the past month from making charcoal?** | Skip if 3.45 = "No" |
| 3.48 | **Collecting firewood or grass for sale.** □ Yes □ No | |
| 3.49 | **How many days over the past month have you spent collecting firewood or grass for sale?** | Skip if 3.48 = "No" |
| 3.50 | **How much money have you earned over the past month from collecting grass/firewood?** | Skip if 3.48 = "No" |
| 3.51 | **A political job.** □ Yes □ No | |
| 3.52 | **How many days over the past month have you spent working at a political job?** | Skip if 3.51 = "No" |
| 3.53 | **How much money have you earned over the past month from your political job?** | Skip if 3.51 = "No" |
| 3.54 | **Any other activity that we have not mentioned?** □ Yes □ No | |
| 3.55 | **Describe the other job.** | Skip if 3.54 = "No" |
| 3.56 | **How many days over the past month have you spent on the [other job]?** | Skip if 3.54 = "No" |
| 3.57 | **How much money have you earned over the past month from your [other job]?** | |
| 3.58 | **About how much cash did you earn in total in the past 7 days?** | |
| 3.59-0 | **How many of the following items does your household own?** | |
| 3.59-1 | **Jerry cans?** | |
| 3.59-2 | **Wash basins?** | |
| 3.59-3 | **Bicycles?** | |
| 3.59-4 | **Mattresses?** | |
| 3.59-5 | **Radios?** | |
| 3.59-6 | **Plates for eating?** | |
| 3.59-7 | **Cattle / Oxen?** | |
| 3.59-8 | **Pigs, goats or sheep?** | |
| 3.59-9 | **Birds (chickens, turkeys, pigeons, ducks)?** | |
| 3.59-10 | **Chairs?** | |
| 3.59-11 | **Mobile Phone?** | |
| 3.59-12 | **Ox ploughs?** | |
| 3.60 | **What are the walls of your house made out of?** □ mud/unfired bricks □ brick □ other | |
| 3.61 | **Can you read well enough to read a book or a newspaper?** □ Yes □ With difficulty □ No | |
| 3.62 | **Can you read a poster or notice?** □ Yes □ No | Skip if 3.73 = "No" |
| 3.63 | **Can you write a letter?** □ Yes □ No | |
| 3.64 | **Have you completed any technical training or vocational program?** □ Yes □ No | |
| 3.65 | **Do you have any access to land for digging?** □ Yes □ No | |
| 3.66 | **Do you dig on any land that does not belong to you?** □ Yes □ No | |
| 3.67 | **Do you pay for the right to dig on any of this land?** □ Yes □ No | |
| 3.68 | **Are you part of a burial society?** □ Yes □ No | |
| 3.69 | **Anyone else in the family part of a burial society?** □ Yes □ No | |
| 3.70 | **Would you describe your general health as:** □ Good □ Somewhat good □ Not good | |
| 3.71 | **How many days during the past 4 weeks were you unable to work, go to school, or carry out your normal duties because of sickness or injury?** | |
| 3.72 | **Are you currently a member, participant or a volunteer for any of the following groups?**<br>□ Drama, music, or dance club □ Peace club □ Farmers group or cooperative<br>□ Water committee □ Church, prayer or bible study group<br>□ School committee or school club or a school prefect □ Sports team<br>□ Volunteer for an NGO □ Someone who mobilizes the community for meetings<br>□ Member of any other community or church group we have not mentioned | Multiple Choice |
| 3.73 | **What is your current religion or denomination?**<br>□ Catholic/Christ the King □ Savedee □ Protestant □ Muslim □ Other | |
| 3.74 | **Do you attend church often?** □ Yes □ No | |
| 3.75 | **How many times do you usually take food in a day?** | |
| 3.76-0 | **How often do you eat the following foods?** | |
| 3.76-1 | **Meat (goat, beef, chicken, pork)?**<br>□ Daily □ Weekly □ At least once a moth □ Rarely □ Never | |

| | | |
|---|---|---|
| 3.76-2 | **Fish?**<br>□ Daily □ Weekly □ At least once a moth □ Rarely □ Never | |
| 3.76-3 | **Drink milk?**<br>□ Daily □ Weekly □ At least once a moth □ Rarely □ Never | |
| 3.76-4 | **Fruits like ripe mangoes, pawpaw, pineapples, jack fruit?**<br>□ Daily □ Weekly □ At least once a moth □ Rarely □ Never | |
| 3.76-5 | **Bananas or plantains?**<br>□ Daily □ Weekly □ At least once a moth □ Rarely □ Never | |
| 3.76-6 | **Dark green leafy vegetables like spinach, amaranths, cassava leaves, bean leaves?**<br>□ Daily □ Weekly □ At least once a moth □ Rarely □ Never | |
| 3.76-7 | **Orange colored vegetables such as pumpkins, carrots or squash?**<br>□ Daily □ Weekly □ At least once a moth □ Rarely □ Never | |
| 3.76-8 | **Other vegetables like cabbages, egg-plants, tomatoes, etc?**<br>□ Daily □ Weekly □ At least once a moth □ Rarely □ Never | |
| 3.76-9 | **Rice?**<br>□ Daily □ Weekly □ At least once a moth □ Rarely □ Never | |
| 3.76-10 | **Posho?**<br>□ Daily □ Weekly □ At least once a moth □ Rarely □ Never | |
| 3.76-11 | **Millet?**<br>□ Daily □ Weekly □ At least once a moth □ Rarely □ Never | |
| 3.76-12 | **Maize?**<br>□ Daily □ Weekly □ At least once a moth □ Rarely □ Never | |
| 3.76-13 | **Casava?**<br>□ Daily □ Weekly □ At least once a moth □ Rarely □ Never | |
| 3.76-14 | **Irish potatoes?**<br>□ Daily □ Weekly □ At least once a moth □ Rarely □ Never | |
| 3.76-15 | **Sweet potatoes (yams)?**<br>□ Daily □ Weekly □ At least once a moth □ Rarely □ Never | |
| 3.76-16 | **Processed food (tins, cans of food)?**<br>□ Daily □ Weekly □ At least once a moth □ Rarely □ Never | |
| 3.76-17 | **Sweets?**<br>□ Daily □ Weekly □ At least once a moth □ Rarely □ Never | |
| 3.76-18 | **How often do you use cooking oil in preparing food?**<br>□ Daily □ Weekly □ At least once a moth □ Rarely □ Never | |

## Week 3 survey: Part 2

*(Treatments implemented here)*

| 3 | | |
|---|---|---|
| 3.1 | **Imagine that we repeated the project again, starting from today, and everything was the same as before, so that there would be a work hour next week and two weeks from today. You would again decide how much entertainment you would have during the work hour next week and in two weeks. Again, you would make this decision today and one week from now. The only difference would be that you could choose whether one of the decisions from today or from next week would count. Which would you choose? The decisions that you would make today or the decisions that you would make one week from today?**<br>□ Decisions from this week □ Decisions from next week | |
| 3.2 | **Answer to raven matrix 1**<br>□ 1 (top left) □ 2 □ 3 □ 4 (top right) □ 5 (bottom left) □ 6 □ 7 □ 8 (bottom right) | |
| 3.3 | **Answer to raven matrix 2**<br>□ 1 (top left) □ 2 □ 3 □ 4 (top right) □ 5 (bottom left) □ 6 □ 7 □ 8 (bottom right) | |
| 3.4 | **Answer to raven matrix 3**<br>□ 1 (top left) □ 2 □ 3 □ 4 (top right) □ 5 (bottom left) □ 6 □ 7 □ 8 (bottom right) | |
| 3.5 | **Answer to raven matrix 4**<br>□ 1 (top left) □ 2 □ 3 □ 4 (top right) □ 5 (bottom left) □ 6 □ 7 □ 8 (bottom right) | |
| 3.6 | **Answer to raven matrix 5**<br>□ 1 (top left) □ 2 □ 3 □ 4 (top right) □ 5 (bottom left) □ 6 □ 7 □ 8 (bottom right) | |
| 3.7 | **All things considered, how satisfied are you with your life as a whole these days?**<br>□ Completely dissatisfied □ Somewhat dissatisfied □ Somewhat satisfied<br>□ Completely satisfied □ Don't know | |

| | | |
|---|---|---|
| 3.8 | **How dissatisfied or satisfied are you with your life overall?**<br>□ Completely dissatisfied □ Somewhat dissatisfied □ Somewhat satisfied<br>□ Completely satisfied □ Don't know | |
| 3.9 | **Subject's pulse:** | |
| | **Does the decision between work and entertainment that you made remind you of any choices that you make in your everyday life?** | |
| 3.10 | **Have you eaten breakfast today?** □ Yes □ No | |
| 3.11 | **What did you have for breakfast today?**<br>□ Casava □ Irish potatoes □ Sweet potatoes □ Beans □ Peas □ Fruit □ Posho □ Rice<br>□ Vegetables □ Eggs □ Bread □ Other | Skip if 3.10 = "No"<br>Multiple Choice |
| 3.12 | **Other food for breakfast:** | Only if applicable |
| 3.13 | **Was it a large meal?** | Skip if 3.10="No" |
| 3.14 | **Have you eaten lunch today?** □ Yes □ No | |
| 3.15 | **What did you eat for lunch today?**<br>□ Casava □ Irish potatoes □ Sweet potatoes □ Beans □ Peas □ Fruit □ Posho □ Rice<br>□ Vegetables □ Eggs □ Bread □ Other | Skip if 3.14 ="No"<br>Multiple Choice |
| 3.16 | **Other food for lunch:** | Only if applicable |
| 3.17 | **Was it a large meal?** | Skip if 3.14="No" |
| 3.18 | **Did you eat dinner last night?** □ Yes □ No | |
| 3.19 | **What did you eat for dinner last night?**<br>□ Casava □ Irish potatoes □ Sweet potatoes □ Beans □ Peas □ Fruit □ Posho □ Rice<br>□ Vegetables □ Eggs □ Bread □ Other | Skip if 3.18="No"<br>Multiple Choice |
| 3.20 | **Other food for dinner:** | Only if applicable |
| 3.21 | **Was it a large meal?** | Skip if 3.18="No" |
| 3.22 | **Did you like the tea that we provided you during the study?**<br>□ Positive response: (tastes good/I like it) □ Neutral response (not good or bad, okay)<br>□ Neutral response, but tea is strange (bitter) □ Negative response (tastes bitter)<br>□ Negative response (doesn't taste good) | |
| 3.23 | **Did you like the food that was served for lunch/dinner?**<br>□ Yes, it was good □ Yes, it was good, but the servings were too small □ The food was neither good nor bad □ The food was neither good nor bad, but the servings were too small<br>□ No, the food was not good □ No, the food was not good, and the servings were too small | |
| 3.24 | **Did you enjoy watching the videos on the tablets?** □ Yes □ No | |
| 3.25 | **Have you ever watched TV or video?**<br>□ Daily □ Weekly □ At least once a month □ Rarely □ Never | |
| 3.26 | **How far away is the nearest place to watch movies/tv?** | In kilometers |
| 3.27 | **How often do you frequent video halls?**<br>□ Daily □ Weekly □ At least once a month □ Rarely □ Never | |
| 3.28 | **Do you ever watch videos on a mobile phone?**<br>□ Daily □ Weekly □ At least once a month □ Rarely □ Never | |
| 3.29 | **Have you borrowed money from anybody in the past year?** □ Yes □ No | |
| 3.30 | **How much have you borrowed from friends?** | In the past year.<br>Enter zero if none. |
| 3.31 | **How much have you borrowed from neighbors?** | In the past year.<br>Enter zero if none. |
| 3.32 | **How much have you borrowed from banks?** | In the past year.<br>Enter zero if none. |
| 3.33 | **How much have you borrowed from moneylenders?** | In the past year.<br>Enter zero if none. |
| 3.34 | **How much have you borrowed from shopkeepers?** | In the past year.<br>Enter zero if none. |
| 3.35 | **How much have you borrowed from community members?** | In the past year.<br>Enter zero if none. |
| 3.36 | **How much have you borrowed from NGOs?** | In the past year.<br>Enter zero if none. |
| 3.37 | **How much have you borrowed from a VSLA?** | In the past year.<br>Enter zero if none. |
| 3.38 | **How much have you borrowed from a SACCO?** | In the past year.<br>Enter zero if none. |
| 3.39 | **How much have you lent to family member?** | In the past year. |

| | | |
|---|---|---|
| | | Enter zero if none. |
| 3.40 | **How much have you lent to friends** | In the past year.<br>Enter zero if none. |
| 3.41 | **How much have you lent to neighbors** | In the past year.<br>Enter zero if none. |
| 3.42 | **Someone else from the community?** | In the past year.<br>Enter zero if none. |
| 3.43 | **Are you a member of a VSLA?** □ Yes □ No | |
| 3.44 | **How much money do you have deposited with the VSLA?** | Skip if 3.43="No" |
| 3.45 | **Is anyone else in your household a member of a VSLA?** □ Yes □ No | |
| 3.46 | **Are you a member of a SACCO?** □ Yes □ No | |
| 3.47 | **How much money do you have deposited with the SACCO?** | Skip if 3.46="No" |
| 3.48 | **Is anyone else in your household a member of a SACCO?** □ Yes □ No | |
| 3.49 | **Do you have a bank account?** □ Yes □ No | |
| 3.50 | **Do you have a mobile money account?** | |
| 3.51 | **How much money do you have saved on your mobile money account?** | Skip if 3.50="No" |
| 3.52 | **Do you have any cash savings at home? How much cash?** | |

*(Conflict exposure questions asked here, see Appendix G)*