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Effects of Poverty on Impatience: Preferences or Inattention?

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Abstract

We study two psychological channels how poverty may increase impatient behavior – an effect on time preference and reduced attention. We measured discount rates among Ugandan farmers who made decisions about when to enjoy entertainment instead of working. We find that experimentally induced thoughts about poverty-related problems increase the preference to consume entertainment early and delay work. The effect is equivalent to a 27 p.p. increase in the intertemporal rate of substitution. Using monitoring tools similar to eye tracking, a novel feature for this subject pool, we show this effect is not due to a lower ability to sustain attention.

Keywords: Poverty, Scarcity, Time Discounting, Preferences, Inattention, Decision-making Process

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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 the role of two plausible psychological channels: immediate effects on time preference and the ability to sustain attention. We study the behavior of extremely poor farmers in rural Uganda who made choices in a controlled longitudinal experiment, in which we elicit time discounting of entertainment and integrate monitoring tools to directly measure attention during decision-making.

Development economists have long observed that low-income individuals often behave impatiently: they 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 high-interest loans (Banerjee and Duflo 2007; De Mel, McKenzie, and Woodruff 2008; Duflo, Kremer, and Robinson 2011; Ananth, Karlan, and Mullainathan 2007). 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 behavior is important, because they may contribute to a self-reinforcing nature of poverty. However, little is known about whether the effects of low income on intertemporal decision-making are due only to shifts in economic constraints, such as liquidity constraints, life expectancy and arbitrage opportunities, or reflect changes in time discounting due to psychological constraints.

Much research in behavioral economics highlights that delaying gratification and exercising self-control (Bernheim and Rangel 2004; Fudenberg and Levine 2006; Muraven and Baumeister 2000) as well as paying attention (Sims 2003; Matejka and McKay 2014; Karlan et al. 2016) can be seen as costly mental processes. Furthermore, recent work has documented that living in an environment of ubiquitous scarcity consumes cognitive resources and adversely affects

¹ Several studies have shown that poor people tend to be more impatient than rich people (e.g., Lawrance 1991; Pender 1996). Furthermore, 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 more patient behavior. 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.

emotions (Mullainathan and Shafir 2013; Haushofer and Fehr 2014; Schilbach, Schofield, and Mullainathan 2016; Bertrand, Mullainathan, and Shafir 2004). Therefore, cognitive burdens associated with living in chronic poverty may manifest either by making temptations harder to resist, and thus directly affecting time preferences, or by making attention harder to sustain, and consequently lowering decision-making quality. These distinctions matter because the menu of appropriate policies targeting individuals who have high time preferences differs from policies tailored to address limited attention and low decision-making quality.

To shed light on these open questions, this paper offers three empirical innovations. First, we study time discounting of the consumption of a tempting good – watching entertaining videos instead of working. An important 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*.² Second, 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* are crucial to separate the two mechanisms by which poverty may lead to potentially disadvantageous effects on economic choices: reduced attention or systematically higher time preference. Similar measures of decision-making processes have been used fruitfully to tease apart different behavioral explanations of decision-making, such as the depth of strategic thinking, in computerized laboratory experiments among university students (Camerer and Johnson 2004; Crawford 2008). Here, we adapt these techniques to be feasible to implement even among subjects for whom computerized experiments are not suitable. Finally, to circumvent identification issues and income effects, we directly manipulate two important dimensions that characterize an environment of acute scarcity -- concerns about financial difficulties and consumption of calories.

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

² Most previous studies estimate time preferences using intertemporal choices over money both in developed (Andersen et al. 2008; Andreoni and Sprenger 2012; Sutter et al. 2013; Meier and Sprenger 2015) and in developing country settings (Tanaka, Camerer, and Nguyen 2010; Ashraf, Karlan, and Yin 2006; Bauer, Chytlova, and Morduch 2012; Giné et al. 2016). An important advance are recent experiments (Augenblick, Niederle, and Sprenger 2015; Augenblick and Rabin 2018), which measure discounting based on choice over time-dated effort among US undergraduate students, in order to avoid several potential confounds associated with using monetary rewards when measuring time preferences. Here, we adapt this experimental design to a developing country context and focus on choices of when to enjoy entertainment.

were given a budget of entertainment minutes which they could use to watch entertaining videos on tablet computers instead of working. To elicit discount rates for consumption of leisure, subjects were asked to allocate minutes of entertainment over the earlier and later work date, 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 when early entertainment could be consumed.

To test whether poverty affects discounting by taxing attention, we gathered rich data on the process of decision-making. For each substitution rate, subjects made their decisions by flipping through six pages in a small booklet, in which each page displayed one option. We used cameras embedded in glasses to monitor their decision-making time and information acquisition. Further, we manipulated an irrelevant feature of the choice architecture: the default option was either to allocate the whole budget of entertainment minutes to the earlier date or to the later date. We hypothesize that if poverty affects time discounting via impeding attention, it should reduce overall decision-making time, increase the period of time subjects do not focus on the task (i.e., look away from the booklet), and lower the number of options inspected prior to making a decision. In terms of choices, poverty should increase the likelihood of abstaining from making an active choice, by sticking to a default option (both patient and impatient). If, on the other hand, poverty directly increases time preference, it should systematically increase the prevalence of choices to consume entertainment early, while keeping the level of attention constant.

We exogenously manipulated two dimensions that characterize poverty. First, we experimentally induce thoughts about poverty by presenting subjects with poverty-related situations, as in Mani et al. (2013). Participants were asked how they would go about solving described scenarios which involved 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 (Bargh and Chartrand 2000; Cohn and Maréchal 2016). It refers to mental activation of primed concepts and enables the measurement of their pure psychological impact (via cognition

and emotions) on behavior in subsequent tasks. Such an approach has been employed to study the effects of a business cycle or recollections of violence on risk preferences, for example (Callen et al. 2014; Cohn et al. 2015).³ 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.⁴

Second, we exogenously manipulate the number of calories consumed by subjects in order to test the idea that too few calories may affect mental function, which can make attention harder to sustain, and temptations harder to resist (Gailliot et al. 2007; Wang and Dvorak 2010; Kuhn, Michael, Kuhn, and Villeval 2014). We offered participants a drink sweetened either with sugar, thereby increasing their average daily calorie intake by approximately 8.5 percent, or with a sugar substitute containing zero calories (a placebo condition). This approach allows a clean estimation of the pure biological effects of calories on economic decision-making.

We present four main findings. First, thinking about poverty systematically increases preferences for consuming entertainment earlier. This effect is relatively large in magnitude: the treatment effect is comparable to reducing the substitution rate between early and delayed consumption by 27 percentage points. 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 not driven by differences in the level of understanding of the task. Second, using our detailed data on decision-making process, we find no significant effects on decision-making time, patterns of information acquisition, or signs of being distracted while making a decision. We arrive at similar conclusions when analyzing the quality of decision-making based on patterns of choices:

³ Other prominent examples of research that uses priming techniques includes studies on the effects of ethnic, racial, religious, criminal and banker identity on preferences (Benjamin, Choi, and Strickland 2010; Cohn, Fehr, and Maréchal 2014; Cohn, Maréchal, and Noll 2010; Benjamin, Choi, and Fisher 2016). Cohn and Maréchal (2016) provide a recent comprehensive review of the economic literature on the topic, including discussion on the methodological trade-offs involved in using priming techniques, and conclude that its main limitations, in particular the difficulty to pin down which mental concept has been activated, is shared with other empirical approaches.

⁴ An alternative approach to overcome 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 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.

thinking about poverty does not reduce individual willingness to make an active choice (measured by distance from a default option), sensitivity to substitution rate, or rationality of individual decision-making (measured by violations of monotonicity). Thus, we conclude that our results do not support the view that poverty reduces attention. Third, several detailed patterns support the interpretation that thinking about poverty-related issues directly increases time preferences, by reducing the ability to exercise self-control. Thinking about poverty-related challenges has a strong, significant effect on impatient behavior when earlier entertainment is salient -- when it can be enjoyed immediately or when the default option is to behave impatiently -- whereas the effect is muted when the default option is to behave patiently and early consumption of entertainment is postponed by one week. Fourth, we do not find evidence supporting the calorie-based channel: increasing consumption of calories does not affect preference for enjoying entertainment early or measures of attention.

Our paper is related to several streams of literature. First, it contributes to the emerging literature on scarcity and the psychology of poverty. Previous work has shown that temporary changes in income and thinking about poverty-related problems can reduce the performance of low-income individuals in the US and rural India, in tasks that measure cognitive function (Mani et al. 2013). We build on this work, and document impacts on economic choices in an incentivized experiment. We focus on an important domain of individual preferences – whether to delay work and enjoy leisure early. Thus, the main finding can help to explain why sometimes the poor seem to place surprisingly low priority on taking part in income-generating activities, and high weight on consuming temptation goods (Banerjee and Duflo 2007; Schilbach 2017). We also show that the psychological effects of poverty are economically meaningful, by comparing them with the effects of changes in price (the rate of inter-temporal substitution). Furthermore, our direct measures of decision-making process reveal that increased impatience is unlikely to be due to difficulties in sustaining attention. Economists have also considered whether poverty has deeper, direct effects on time preferences (Haushofer and Fehr 2014; Haushofer, Schunk, and Fehr 2013; Lawrance 1991; Fisher 1930), and our findings strengthen the case for taking this mechanism seriously. Such effects could arise if the cognitive load associated with poverty reduces the ability to exercise self-control, as described above, but also if thinking about poverty makes people feel more miserable, and activates an implicit motivation to compensate for a sense of loss, an idea

denoted in psychology as myopic-misery hypothesis (Lerner, Li, and Weber 2013; Lerner et al. 2004).

Our findings also contribute to the experimental literature investigating the effect of calorie-consumption on inter-temporal decision-making. The existing evidence 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, Michael, 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, and thus among a subject pool for which the potential effects should be easier to detect -- if they exist. Yet, we do not find any effect of increased caloric intake on discounting, suggesting that calories per se are not the key resource for exerting self-control or sustaining attention. This does not rule out, however, that a more permanent improvement in diet may still 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.

The rest of the paper is organized as follows. Section I describes the sample and experimental design, Section II presents the results and provides a discussion of alternative mechanisms why thinking about poverty-related challenges increases impatience. Section III concludes.

I. Experimental design

To examine how poverty affects time discounting, we implement a longitudinal experiment conducted over three weeks among low-income farmers in Northern Uganda. We recruited subjects to perform a tedious manual task for a fixed period of time in the second and third week of the study. Subjects were given a budget of entertainment minutes, during which they could watch short films, and this reduced the length of working time in a given week. The participants were asked to allocate minutes of entertainment between an earlier and a later date. They made the

same allocation decisions twice: the initial allocation was made in the first week of the study, one week in advance of the first work hour, and the second allocation decision was made in week two, just before the first work hour. Prior to making their choices, we asked them to think about poverty-related challenges, and exogenously manipulated the severity of the scenarios. We also manipulated the number of calories subjects consumed. We measure the effects on time discounting choices and monitor subjects' attention and information acquisition during the decision-making process.

We present the experimental design in six sub-sections. First, we summarize the sample selection. Second, we describe the form of work and entertainment to be allocated over time. Third, we describe the tools to monitor attention allocation during the decision-making process. Then, we describe how we manipulated poverty-related concerns and the number of calories. 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 behavior of an extremely poor population, i.e. the type of population for which, a priori, the reasoning about behavioral sources of poverty should be the most relevant.

Table 1 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 a small minority, 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 experience, including violence witnessed, received and whether family members had been killed during the conflict (see Appendix E).

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 labor: sorting yellow and red dried beans by color. 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 entertainment time into one activity hour.

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 had 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 3.⁵

The subjects were endowed with a fixed budget of entertainment minutes. Using a discretized 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, 1.25, and 1.5. The subjects knew all 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.

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 Figure 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:

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

where e_t is the number of entertainment minutes consumed at the earlier date, i.e. either now or 7 days from now, e_{t+k} is the amount of entertainment minutes consumed at the later date, i.e. either in 7 ($t = 0, k = 7$) or in 14 days ($t = 7, k = 7$), p represents the substitution rate, and m is the

⁵ This also eliminates the role of discontinuity in preferences for work/entertainment.

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 (time-dated entertainment) that could not be traded outside of the laboratory. 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 should not have affected allocations either. 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 date-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.⁶ 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 (Andreoni and Sprenger 2012; Giné et al. 2018; Andersen et al. 2014). This concern is particularly relevant for the field setting of 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.⁷ In this experiment the incentives to come in later weeks were high,

⁶ 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 (Pender 1996; Dean and Sautmann 2014; Cubitt and Read 2007), especially in settings in which financial markets are thick and transaction costs are low.

⁷ To attenuate this confound, researchers sometimes use the "front end delay" method (Pender 1996; Bauer, Chytilova, and Morduch 2012; Giné et al. 2016), which introduces a short delay in the current income option and thus no rewards are disbursed on the day subjects make inter-temporal choices. A disadvantage of this approach is that rewards are not available sooner than one day after the choices were made and thus this approach limits the ability to study preferences regarding consumption in the present, and may under-estimate dynamic inconsistency if consumption at present is disproportionately attractive. Recently, to tackle the issue in an experiment in Kenya, Balakrishnan, Haushofer, and Jakiela (2017) exploit the possibility of using mobile payments, which induce no transaction costs when disbursing payments.

since the main 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 2 for a picture of the allocation environment). This allowed subjects to visually compare their choices across all five rates. 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 the default option presented to subjects. In the IMPATIENT default condition, when subjects approached the board, all 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 all ten choices (i.e. five in Week 1 and five in Week 2).

Gathering data about a decision-making process, using mouse-tracking or eye-tracking tools, is common in computerized laboratory experiments. Our aim was to develop a portable experimental set-up, 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.⁸ 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

⁸ 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.

uniquely detailed, direct measures of the decision-making process. The data allow us to test whether scarcity affects inter-temporal decision-making by reducing 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- sticking to the default option).

D. Manipulating Poverty-Related Concerns

Prior to making decisions, we exogenously manipulated poverty-related concerns and caloric intake. The aim is to estimate how these two fundamental dimensions of poverty may affect behaviorally revealed time preference, independent of liquidity constraints. The manipulations were implemented using a 2x2 factorial design, and individuals were assigned to the same treatment condition in each week of the study.

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 shocks. Immediately before making allocation decisions, subjects were presented with two hypothetical scenarios, which described negative income shocks originating in 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 crop that is enough to feed your family for one day.” The exact wording of the complete set of implemented scenarios appears in Appendix D. The order in which scenarios were presented was randomized.

The subjects were also asked to rank, on a four-point scale, how difficult it would be to face the given situation (not difficult at all, slightly difficult, moderately difficult, or very difficult) and how anxious they would be if facing the given situation (not anxious at all to very anxious). As expected, the average difficulty and self-reported anxiety indeed substantially increases in the HARD 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 primes 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 slightly smaller in Week 2 (21 percentage points), as compared to Week 1 (32 percentage points).

E. Manipulating Calories

To manipulate caloric intake and blood glucose levels⁹, 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.¹⁰ In the PLACEBO

⁹ Glucose is considered a vital fuel for the brain and low glucose has been linked with impaired performance on difficult and complex tasks. (Gailliot et al. 2007) find that self-control requires a certain amount of glucose to operate unimpaired.

¹⁰ 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, Michael, 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.

condition, the same amount of rooibos tea was mixed with an artificial sweetener which also tasted sweet but contained zero calories.¹¹

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.

Previous research using similar procedures complemented by direct measures of blood glucose¹² 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.¹³ 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.

F. 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

¹¹ 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.

¹² We did not measure subjects’ blood glucose levels, which would have required taking blood samples.

¹³ 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.

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), located in 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 shortly after noon (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. In the main analysis, their choices from Week 1 are included, and the results are robust to excluding these observations.

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).

Figure 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 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 series of comprehension

questions. In all, we asked nine separate questions. In the first week, subjects answered 8.59 of these correctly, on average, with 76.8 percent of subjects answering all questions correctly.

After cross-check questions, subjects were served tea containing either sugar (in the CALORIES condition) or artificial sweetener (in the PLACEBO condition). 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 experimental choices, subjects completed a short questionnaire about food consumption earlier in the day and basic demographic information.

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 were asked more questions about their personal characteristics, financial behavior and conflict history, and performed a Raven's progressive matrices task to measure cognitive function. After completing the activity hour, subjects were given the show up fee and completion bonus.

II. Results

Section II.A estimates the effects of the poverty-related conditions on inter-temporal choices. In order to separate potential mechanisms – reduced attention vs. shift in preferences- we study in detail how the experimental conditions influence measures of attention and rationality (in Section II.B), and how they interact with default option and an opportunity to consume entertainment immediately (in Section II.C).

A. Main patterns

In all, each subject made ten inter-temporal decisions: one for each of the five substitution rates in Week 1 and again in Week 2, for a total of 2870 decisions for 289 subjects.¹⁴ 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.¹⁵

There is also a great deal of variation in subjects' choices. The standard deviation for each substitution rate is between 10.52 and 11.72. 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 sooner date) accounts for less than 5 percent of all choices, and the most patient option (5 minutes of 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. Thus, choices do not seem to be systematically censored at either extreme.

Next, we observe several intuitive patterns (Table 2). First, as the cost of earlier entertainment increases, entertainment allocated to the earlier week decreases monotonically (Figure 3). This is generally true for individual decisions as well, although we do see a number of inconsistent choices. On average, 55.8 percent of decisions made in either week have no violations of monotonicity,¹⁶ and 88.9 percent of decisions would require two or fewer flips in the booklet so that the resulting choice no longer violates monotonicity. Second, in line with previous work (Dohmen et al. 2010; Burks et al. 2009; Benjamin, Brown, and Shapiro 2013), we find that cognitive ability (as measured by performance on Raven matrices) predicts patience (Table A7).

¹⁴ As noted above, due to attrition, we are missing data for four subjects in Week 2; results are robust to excluding these subjects from the analysis.

¹⁵ Appendix Table A6 reports structural estimates of parameters from a standard beta-delta quasi-hyperbolic discounting model, while Appendix B discusses how the parameters are estimated. We find that subjects are patient on average, with a discount rate of $\delta=1.11$. We find evidence of present bias: $\beta=0.91$, which is statistically different from 1 ($p=0.05$). The estimated parameters in Augenblick, Niederle, and Sprenger (2015) are $\delta=1.00$ and $\beta=0.91$.

¹⁶ Note that due to the discrete nature of the choices in our experiment we can only test for weak monotonicity, which implies $\frac{\partial e_{t+k}}{\partial p} > 0$.

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 ($p=0.08$).

Next, we study the effect of the poverty prime. 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 3). 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. Table 2 shows this pattern in a regression framework. We regress the minutes of entertainment allocated to the earlier week on the poverty prime and CALORIES treatment, and control for the indicator of patient default, the indicator for initial Week 1 allocations, substitution rate, age and gender, with robust standard errors clustered at the individual level. HARD poverty prime increases entertainment allocated to an earlier week by a 1.7-minute increase in ($p=0.04$). This is an economically meaningful effect. Given that a 100 percent increase in the cost of earlier entertainment leads to a 6.29-minute decrease in the number of minutes of entertainment allocated to the earlier date, the effect of HARD poverty prime is equivalent to a 27.09 percentage point decrease in the price of entertainment.

In columns 2-6, we break down the decisions by the substitution rate, and find that the difference due to 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 HARD and EASY conditions is 0.14. This stability across substitution rates argues 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.¹⁷ Also, the fact that we do not observe lower sensitivity to changes in the substitution rate in HARD compared to EASY provides the first indication that the shift in inter-temporal choices is not due to a lower level of attention, but rather due to a change in time preference. We revisit this question in more detail in Section II.C.

The effects of the HARD poverty prime treatment on time allocated to entertainment consumed at the earlier date is robust in several alternative specifications (Tables A5 and A7),

¹⁷ This can be also seen in a standard hyperbolic discounting framework that we consider in Appendix B. Appendix Table A6 shows that the gamma parameter capturing the curvature of utility function is stable across poverty prime treatments.

including individual-level random effects, village-level fixed effects, and experimenter fixed effects. It is also unlikely to be driven by differences in understanding of the task: the results are robust to excluding subjects who did not answer all comprehension questions correctly or who are illiterate.¹⁸ Lastly, the effect does not seem to operate through increased salience of subject's own mortality that would mechanically lead to an increased discount factor, 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).

Observation 1. Poverty-related concerns increase the preference to consume entertainment early and delay work.

Our second treatment manipulates caloric intake, and thus indirectly blood-sugar levels at the time of decision making. 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 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 2). This non-result does not seem to be due to lack of compliance since it 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), and those who consumed the whole cup of tea (Panel B, Column 5, Table A5).

Observation 2. Increasing the number of calories consumed does not affect time discounting.

Reassuringly, the effect of the poverty prime has large and statistically significant effects on discounting in the PLACEBO condition (Column 2, Table 2). Interestingly, the effect of the poverty prime is smaller and not significant statistically in the CALORIES condition. This is because in the EASY condition, consuming more calories somewhat increases allocation of entertainment minutes to the earlier date, while the effect goes in the opposite direction in the

¹⁸ As discussed above, the population we study was 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 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 6 and 7, Table A5), the effects are qualitatively similar for both groups.

HARD condition, although none of these effects, nor the interaction effect between the poverty prime and calories, is statistically significant.

B. Do poverty-related concerns reduce the ability to sustain attention?

In this section, we focus on whether poverty-related concerns increase time discounting because of their impacts on the ability to sustain attention. We first study the effects of the poverty prime on direct measures of attention, and then proceed to analyze the patterns of inter-temporal choices that may indicate a lack of attention, such as a greater prevalence of violations of monotonicity, a lower sensitivity to substitution rates and a higher likelihood of sticking to the default allocation.

The video data allows us to study several aspects of the decision-making process. First, in Columns 1-2 of Table 3, Panel A, we find that the poverty prime did not significantly affect the overall decision-making time, both when estimating the effects on the whole sample and when we exclude outliers (the 10 percent of observations with the highest decision-making time). Second, Column 3 shows that subjects in the HARD poverty condition were not more distracted than those in the EASY poverty condition, measured by the amount of time spent looking away from the decision environment. Third, recall that by flipping through the pages of each decision booklet, subjects could experiment with various outcomes and compare allocations across substitution rates, before making decisions. Subjects who pay closer attention to their decisions might be expected to view a greater number of potential outcomes, and thus this measure provides another proxy for subjects' attention. We find that the HARD poverty prime has virtually no influence on the number of options viewed. In column 4 the dependent variable measures the number of pages that were examined at least once (out of 6 possible options) at a given substitution rate. In Column 5 we examine the total number of page views, a measure that includes repeat visits. Last, in Table A9, we consider additional variables derived from the videos of subjects' decision making, including the number of the three most impatient and the three most patient options viewed, and indicator variables for whether the most patient, two most patient, and three most patient options were visited, respectively. We arrive at the same conclusion: none of the estimated coefficients suggests that the poverty prime reduces attention.¹⁹

¹⁹ 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).

Next, we analyze whether patterns of inter-temporal choices in the HARD condition indicate reduced attention, as compared to the EASY condition. We hypothesize that if subjects in the HARD condition were less able to sustain attention, they would be more likely to violate monotonicity, would be less sensitive to changes in the substitution rate and would be more likely to stick with the default option.

To measure violations of monotonicity, we consider two measures. The first is the number of inconsistencies, which yields values between 0 and 4 for each 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; for example, if 29 minutes are allocated at a substitution rate of 0.5, while 37 are allocated at a substitution rate of 0.75. The second measure takes a different approach, by defining the minimum number of flips through the five booklets required to make the allocation consistent with monotonicity. The coefficients for the HARD poverty prime are positive but not statistically significant for both measures (Columns 1-2, Panel B of Table 3). Also, the effect of the HARD poverty condition on inter-temporal choices is robust to limiting the analysis to the sub-sample of subjects that made no, or no more than one inconsistent choice, respectively (Panel A, Columns 4 and 5, Table A5).

Next, as previously noted, the effect of the HARD poverty prime is relatively stable across different substitution rates. As a formal test, we interact the poverty prime with the substitution rate in Column 3 of Table 3, Panel B. The coefficient for the interaction term is small and statistically insignificant ($p=0.80$), while the coefficient for the poverty prime is similar to the main specification and the poverty prime and interaction coefficients are jointly significant ($p=0.04$).

Last, we examine the effect of the default option, which we varied between subjects randomly. When they began making their decision, for half of the subjects the booklets were open to the last page, displaying the most patient option for each substitution rate, while the other half of subjects had booklets open on the first page, displaying the most impatient option. If the HARD poverty prime reduces the ability to sustain attention, we would expect subjects to be less active in making their choices, and thus they should be more likely to stick with the default, independent of whether they were presented with the patient or impatient allocations. We find that subjects in

the HARD poverty prime are not more likely to stick with default option (Column 5, Panel B of Table 3), as compared to the EASY poverty prime.

To assess whether the lack of statistically significant effects on attention measures could be due to insufficient power, we calculate minimum detectable effects (MDEs) for the HARD poverty prime for each measure (Table A11). Appendix C describes how MDEs are calculated. The median MDE obtained is 15 percent (the range is between 9 percent and 61 percent), 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 either of the 15 measures of attention, including those with relatively low MDEs.

Observation 3. Direct measures of attention as well as detailed patterns of inter-temporal choices do not support the view that poverty-related concerns inhibit the ability to sustain attention when making decisions.

C. Further results

In this sub-section, we explore whether the HARD poverty prime increases impatience in choices mainly in situations in which the impatient option is salient and in which entertainment can be consumed immediately, i.e. in situations in which individuals with reduced self-control might find it particularly hard to resist the temptation to enjoy entertainment rather than to work.

First, we re-visit the influence of default (Columns 1-2 of Table 4). If the HARD poverty prime reduced the ability to exercise self-control, it should increase impatience in choices in the IMPATIENT default condition, when earlier consumption is more salient. In the PATIENT default condition, the effects of the HARD poverty prime are predicted to be qualitatively similar but smaller in magnitude. Although inattention-based reasoning also implies the possibility that the default interacts with the poverty prime, the predictions differ: the HARD poverty prime should increase impatience in choices in the IMPATIENT default condition, but, at the same time, *reduce* impatience in choices in the PATIENT default condition. 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 the HARD poverty prime and the IMPATIENT default condition is positive, but not significant at conventional levels.

Second, we study whether the effect of the HARD poverty prime is stronger when choosing the earlier option implies that the entertainment can be enjoyed immediately, and thus it is more tempting (Columns 3-4). We estimate the effects of the HARD prime separately for decisions made in Week 1, in which subjects decided how to allocate entertainment over two future dates, and for decisions made in Week 2, in which subjects faced a trade-off between immediate and future entertainment consumption. We find that the effect of the HARD poverty is larger for immediate rewards. The effect is somewhat weaker 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.²⁰

Last, we study the combined role of situational factors that can make early consumption less tempting, and test whether they can eliminate the role of the poverty prime (Columns 5-6 and Figure 4). We find a strong effect of the HARD poverty prime when early consumption of entertainment can be enjoyed immediately or when it is the default allocation. In contrast, we find virtually zero effects of the HARD condition when consumption of early entertainment is delayed by one week and it is not the salient option.

Observation 4: We find that the effect of the poverty prime on discounting is driven by choices in decision situations, in which earlier consumption is made more tempting.

III. Conclusions

This paper presents experimental evidence on the psychological effects of poverty on time preference. Among farmers in Uganda, we exogenously manipulated the extent of subjects' thinking about financial pre-occupations, and then measured their inter-temporal choices in an entertainment discounting task. The results show that concerns about poverty-related problems

²⁰ We come to similar conclusions when comparing values of β 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 (See Appendix Table A6). The treatment difference in present bias is not statistically significant ($p=0.29$).

increase individual preference for earlier consumption of entertainment. In addition to measuring choices, we employed monitoring techniques and gathered uniquely detailed data on decision-making process, which reveal that the behavioral change induced by the poverty scenario cannot be attributed to differences in attention to the task. Finally, we study whether the effects on time preference are due to increased self-control problems, by manipulating contextual features. We find that the effect of a poverty prime on discounting is generally robust, but can be muted when the option to consume entertainment early is made less salient. 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 (e.g., Bernheim & Rangel, 2004; Frederick, Loewenstein, & O’Donoghue, 2002; Fudenberg & Levine, 2006) treat decision-making as a result of a strategic interplay between an impulsive player and a forward-looking player who can reduce the influence of the impulsive player 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 behavior due to a cognitive load associated with poverty. Also, since such an effect may create a potential feedback loop between poverty and impatience, our findings provide empirical support for recent modelling efforts of behavioral poverty traps (see recent classification of Ghatak 2015), in particular the type that rests on the assumption that poverty directly reduces self-control (Bernheim, Ray, and Yeltekin 2015; Banerjee and Mullainathan 2010).

An interesting question for further research would be to pin down whether thinking about poverty related problems affects time preferences by raising the cognitive load or by creating a greater level of stress. In this context, it is intriguing that cognitive abilities are among the most robust correlates of patient behavior across many settings (Burks et al. 2009; Dohmen et al. 2010; Falk et al. 2018), including this study (Table A7), while the evidence on the effects of stress so far does not find much support for direct effects on time discounting (Haushofer et al. 2013).

These findings are potentially important for policy. First, if thinking about poverty-related problems directly increases time preference, then there may be an additional mechanism, besides the standard economic channels, why 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 (De Mel, McKenzie, and Woodruff 2008; 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 fertilizer (Duflo, Kremer, and Robinson 2011), crop insurance (Casaburi and Willis 2018), and re-enrolment of children to school (Barrera-Osorio et al. 2011).

Our paper offers one methodological direction in which to make progress when empirically studying determinants of time and risk preferences. Recent papers have cautioned against automatically interpreting heterogeneity in risky or impatient *behavior* in experiments as reflecting differences in the underlying *preferences*, since choices may as well capture differences in the quality of the decision-making process. This empirical challenge has become the subject of an important debate about the nature of the effect of cognitive ability on risk behavior (Dohmen et al. 2010; Andersson et al. 2018; Dohmen et al. 2018)), but the concern applies more broadly to any study that aims to estimate the causal effect of environmental factors or individual characteristics on preferences. Our approach is inspired by techniques used in computerized experiments, either in labs among student subject pools or in online field experiments, in which researchers have complemented choice data with eye-tracking or mouse-tracking techniques, to get measures of decision-making time or information about acquisition patterns, to sort through alternative explanations of observed choices (Costa-Gomes, Crawford, and Broseta 2001; Brocas et al. 2014; Bartoš et al. 2016). We adapt monitoring tools to be feasible in the field setting, and among an important population, for which computerized experiments are not suitable. We believe this approach to data collection in the field - which combines choices, measures of decision-making process and variation in choice architecture (random default option) - adds to the portfolio of empirical tools that can help researchers to make progress toward better understanding of the determinants of preferences, and separate those from determinants of attention, or decision-making quality more broadly.

Last, 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; Almås et al. 2010; Fong 2001). Negative views on helping the poor are often tied to a presumption that poverty originates in reckless behavior. Enjoying entertainment while putting off work until later – the choice in our experiment - is frequently featured as an example of such condemnable behavior. 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. Consequently, our findings support a perspective on poverty that may help to moderate views that the poor are undeserving, even when they choose to act impatiently.

References

- Almås, Ingvild, Alexander W. Cappelen, Erik Ø. Sørensen, and Bertil Tungodden. 2010. “Fairness and the Development of Inequality Acceptance.” *Science* 328 (5982): 1176–78. doi:10.1126/science.1187300.
- Ananth, Bindu, Dean S. Karlan, and Sendhil Mullainathan. 2007. “Microentrepreneurs and Their Money: Three Anomalies.” <https://scholar.harvard.edu/files/sendhil/files/microentrepreneurs-and-their-money-three-anomalies.pdf>
- Andersen, Steffen, Glenn W. Harrison, Morten I. Lau, and E. Elisabet Rutström. 2014. “Discounting Behavior: A Reconsideration.” *European Economic Review* 71: 15–33. doi:10.1016/j.euroecorev.2014.06.009.
- Andersen, Steffen, Glenn W Harrison, Morten I Lau, and E Elisabet Rutström. 2008. “Eliciting Risk and Time Preferences.” *Econometrica* 76 (3): 583–618. doi:10.3982/ECTA9183.
- Andersson, Ola, Hakan J. Holm, Jean Robert Tyran, and Erik Wengström. 2018. “Risk Aversion Relates to Cognitive Ability: Preferences or Noise.” *Journal of European Economic Association* 14 (June): 1129–54. doi:10.1111/jeea.12179.
- Andreoni, James, and Charles Sprenger. 2012. “Estimating Time Preferences from Convex Budgets.” *American Economic Review* 102 (7): 3333–56. doi:10.1257/aer.102.7.3333.
- Ashraf, Nava, Dean Karlan, and Wesley Yin. 2006. “Tying Odysseus to the Mast: Evidence from a Commitment Savings Product in the Philippines.” *Quarterly Journal of Economics* 121 (2): 635–672.
- 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. doi:10.1016/j.jfluchem.2010.02.012.
- Augenblick, Ned, and Matthew Rabin. 2018. “An Experiment on Time Preference and Misprediction in Unpleasant Tasks.” *Review of Economic Studies* forthcoming. doi:10.1093/restud/rdy019/4996235.

- Balakrishnan, Uttara, Johannes Haushofer, and Pamela Jakiela. 2017. "How Soon Is Now? Evidence of Present Bias from Convex Time Budget Experiments." *NBER Working Paper Series*, no. 23558: 57. doi:10.3386/w23558.
- Banerjee, Abhijit V., and Esther Duflo. 2007. "The Economic Lives of the Poor." *Journal of Economic Perspectives* 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.
- Bargh, John A, and Tanya L. Chartrand. 2000. "The Mind in the Middle: A Practical Guide to Priming and Automaticity Research." In *Handbook of Research Methods in Social and Personality Psychology*, edited by Harry T. Reis and Charles M. Judd, 253–85. New York: Cambridge University Press.
- Barrera-Osorio, Felipe, Marianne Bertrand, Leigh L. Linden, and Francisco Perez-Calle. 2011. "Improving the Design of Conditional Transfer Programs: Evidence from a Randomized Education Experiment in Colombia." *American Economic Journal: Applied Economics* 3 (2): 167–95.
- Bartoš, Vojtěch, Michal Bauer, Julie Chytilová, and Filip Matějka. 2016. "Attention Discrimination: Theory and Field Experiments with Monitoring Information Acquisition." *American Economic Review* 106 (6): 1437–75.
- Bauer, Michal, and Julie 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 Chytilová, and Jonathan Morduch. 2012. "Behavioral Foundations of Microcredit: Experimental and Survey Evidence from Rural India." *American Economic Review* 102 (2): 1118–1139.
- Benjamin, Daniel J., Sebastian A. Brown, and Jesse M. Shapiro. 2013. "Who Is 'Behavioral'? Cognitive Ability and Anomalous Preferences." *Journal of the European Economic Association* 11 (6): 1231–55. doi:10.1111/jeea.12055.
- Benjamin, Daniel J., James J. Choi, and Geoffrey Fisher. 2016. "Religious Identity and Economic Behavior." *Review of Economics and Statistics* 96 (4): 638–47. doi:10.1162/REST.
- 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. doi:10.3982/ECTA11374.
- Bernheim, B. Douglas, and Antonio Rangel. 2004. "Addiction and Cue-Triggered Decision Processes." *American Economic Review* 94 (5): 1558–90.
- Bertrand, Marianne, Sendhil Mullainathan, and Eldar Shafir. 2004. "A Behavioral Economics View of Poverty." *American Economic Review* 94 (2): 419–23.
- Blattman, Christopher, and Nathan Fiala. 2014. "Generating Skilled Self-Employment in Developing Countries: Experimental Evidence from Uganda." *Quarterly Journal of*

- Economics* 129 (2): 697–752. doi:10.1016/j.jfluchem.2010.02.012.
- Brocas, Isabelle, Juan D. Carrillo, Stephaniew Wang, and Colin F. Camerer. 2014. “Imperfect Choice or Imperfect Attention? Understanding Strategic Thinking in Private Information Games.” *Review of Economic Studies* 81 (3): 944–70. doi:10.1093/restud/rdu001.
- Burks, S. V, J. P Carpenter, L. Goette, and A. Rustichini. 2009. “Cognitive Skills Affect Economic Preferences, Strategic Behavior, and Job Attachment.” *Proceedings of the National Academy of Sciences* 106 (19): 7745.
- 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. doi:10.1257/aer.104.1.123.
- Camerer, C., and E. Johnson. 2004. “Thinking about Attention in Games: Backward and Forward Induction.” <http://authors.library.caltech.edu/22241/>.
- 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.
- Casaburi, Lorenzo, and Jack Willis. 2018. “Time vs. Space in Insurance: Experimental Evidence from Contract Farming in Kenya.” *American Economic Review* forthcoming.
- 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. doi:10.1257/aer.20131314.
- Cohn, Alain, Ernst Fehr, and Michel André Maréchal. 2014. “Business Culture and Dishonesty in the Banking Industry.” *Nature* 516: 86–89. doi:10.1038/nature13977.
- Cohn, Alain, and Michel André Maréchal. 2016. “Priming in Economics.” *Current Opinion in Psychology* 12: 17–21. doi:10.1016/j.copsyc.2016.04.019.
- 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. doi:10.1093/restud/rdv025.
- Costa-Gomes, Miguel, Vincent P. Crawford, and Bruno Broseta. 2001. “Cognition and Behavior in Normal-Form Games: An Experimental Study.” *Econometrica* 69 (5): 1193–1235. <http://www.jstor.org/stable/2692219>.
- Crawford, Vincent P. 2008. “Look-Ups as the Windows of the Strategic Soul.” In *The Foundations of Positive and Normative Economics: A Handbook*, edited by Andrew Caplin and Andrew Schotter, 249–80. Oxford, UK: Oxford University Press.
- Cubitt, Robin P., and Daniel Read. 2007. “Can Intertemporal Choice Experiments Elicit Time Preferences for Consumption?” *Experimental Economics* 10 (4): 369–89. doi:10.1007/s10683-006-9140-2.
- De Mel, Suresh, David McKenzie, and Christopher Woodruff. 2008. “Returns to Capital in Microenterprises: Evidence from a Field Experiment.” *Quarterly Journal of Economics* 123

(4): 1329–1372.

- Dean, Mark, and Anja Sautmann. 2014. “Credit Constraints and the Measurement of Time Preferences.” http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2423951.
- Di Falco, Salvatore, Maria Damon, and Gunnar Köhlin. 2011. “Environmental Shocks, Rates of Time Preference and Conservation: A Behavioural Dimension of Poverty Traps?” Working Paper.
- 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, Esther, Michael Kremer, and James Robinson. 2011. “Nudging Farmers to Use Fertilizer: Theory and Experimental Evidence from Kenya.” *American Economic Review* 101 (6). National Bureau of Economic Research Cambridge, Mass., USA: 2350–90.
- Falk, Armin, Anke Becker, Thomas Dohmen, Benjamin Enke, David Huffman, and Uwe Sunde. 2018. “Global Evidence on Economic Preferences.” *Quarterly Journal of Economics* forthcoming.
- Fisher, Irving. 1930. *The Theory of Interest*. New York: Macmillan.
- Fong, Christina. 2001. “Social Preferences, Self-Interest, and the Demand for Redistribution.” *Journal of Public Economics* 82: 225–246.
- 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.
- 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. doi:10.1037/0022-3514.92.2.325.
- Ghatak, Maitreesh. 2015. “Theories of Poverty Traps and Anti-Poverty Policies.” *World Bank Economic Review* 29 (August): S77–105. doi:10.1093/wber/lhv021.
- 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. doi:10.1007/s13398-014-0173-7.2.
- Haushofer, Johannes, Sandra Cornelisse, Maayke Seinstra, Ernst Fehr, Marian Joels, and Tobias Kalenscher. 2013. “No Effects of Psychosocial Stress on Intertemporal Choice.” *PLoS ONE* 8 (11): 1–13. doi:10.1371/journal.pone.0078597.
- Haushofer, Johannes, and Ernst Fehr. 2014. “On the Psychology of Poverty.” *Science* 344 (6186): 862–67. doi:10.1126/science.1232491.
- 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.

- Haushofer, Johannes, Daniel Schunk, and Ernst Fehr. 2013. "Negative Income Shocks Increase Discount Rates." http://web.mit.edu/joha/www/publications/Haushofer_Schunk_Fehr_2013.pdf.
- Karlan, Dean, Margaret McConnell, Sendhil Mullainathan, and Jonathan Zinman. 2016. "Getting to the Top of Mind: How Reminders Increase Saving." *Management Science* 62 (12): 3393–3411. doi:10.2139/ssrn.1596281.
- Kuhn, Michael, A., Peter Kuhn, and Marie Claire Villeval. 2014. "Self Control and Intertemporal Choice: Evidence from Glucose and Depletion Interventions." 4609. CESifo.
- 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, and Elke U Weber. 2013. "The Financial Costs of Sadness." *Psychological Science* 24 (1): 72–79. doi:10.1177/0956797612450302.
- Lerner, Jennifer S., Deborah A. Small, George Loewenstein. 2004. "Heartstrings and Pursestrings: Carryover Effects of Emotions on Economic Decisions." *Psychological Science* 15 (5): 337–41.
- Mani, Anandi, Sendhil Mullainathan, Eldar Shafir, and Jiaying Zhao. 2013. "Poverty Impedes Cognitive Function." *Science* 341 (6149): 976–80. doi:10.1126/science.1238041.
- Matějka, Filip, and Alisdair McKay. 2014. "Rational Inattention to Discrete Choices: A New Foundation for the Multinomial Logit Model." *American Economic Review* 105 (1): 272–98.
- Meier, Stephan, and Charles Sprenger. 2015. "Temporal Stability of Time Preferences." *Review of Economics and Statistics* 96 (4): 638–47. doi:10.1162/REST.
- 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. doi:10.1037//0033-2909.126.2.247.
- Pender, John L. 1996. "Discount Rates and Credit Markets " Theory and Evidence from Rural India." *Journal of Development Economics* 50: 257–96.
- Schilbach, Frank. 2017. "Alcohol and Self-Control: A Field Experiment in India." *Working Paper*.
- Schilbach, Frank, Heather Schofield, and Sendhil Mullainathan. 2016. "The Psychological Lives of the Poor." *American Economic Review* 106 (5): 435–40. doi:10.1257/aer.p20161101.
- 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. doi:10.1016/S0031-9384(01)00476-0.
- Sims, C.A. 2003. "Implications of Rational Inattention." *Journal of Monetary Economics* 50 (3): 665–690.
- Sutter, Matthias, Martin G. Kocher, Daniela Glätzle-Rützler, and Stefan T. Trautmann. 2013. "Impatience and Uncertainty: Experimental Decisions Predict Adolescents' Field Behavior." *American Economic Review* 103 (1): 510–31.

- Tanaka, Tomomi, Colin F Camerer, and Quang Nguyen. 2010. "Risk and Time Preferences: Experimental and Household Survey Data from Vietnam." *American Economic Review* 100 (1): 557–71.
- Voors, Maarten J., Eleonora E.M. Nillesen, Philip Verwimp, Erwin H. Bulte, Robert Lensink, Daan P. Van Soest. 2012. "Violent Conflict and Behavior: A Field Experiment in Burundi." *American Economic Review* 102 (2): 941–64.
- Wang, Xiao-Tian, and Robert D. Dvorak. 2010. "Sweet Future: Fluctuating Blood Glucose Levels Affect Future Discounting." *Psychological Science* 21 (2): 183–88. doi:10.1177/0956797609358096.

Figures and Tables

Figure 1: Summary of the timeline

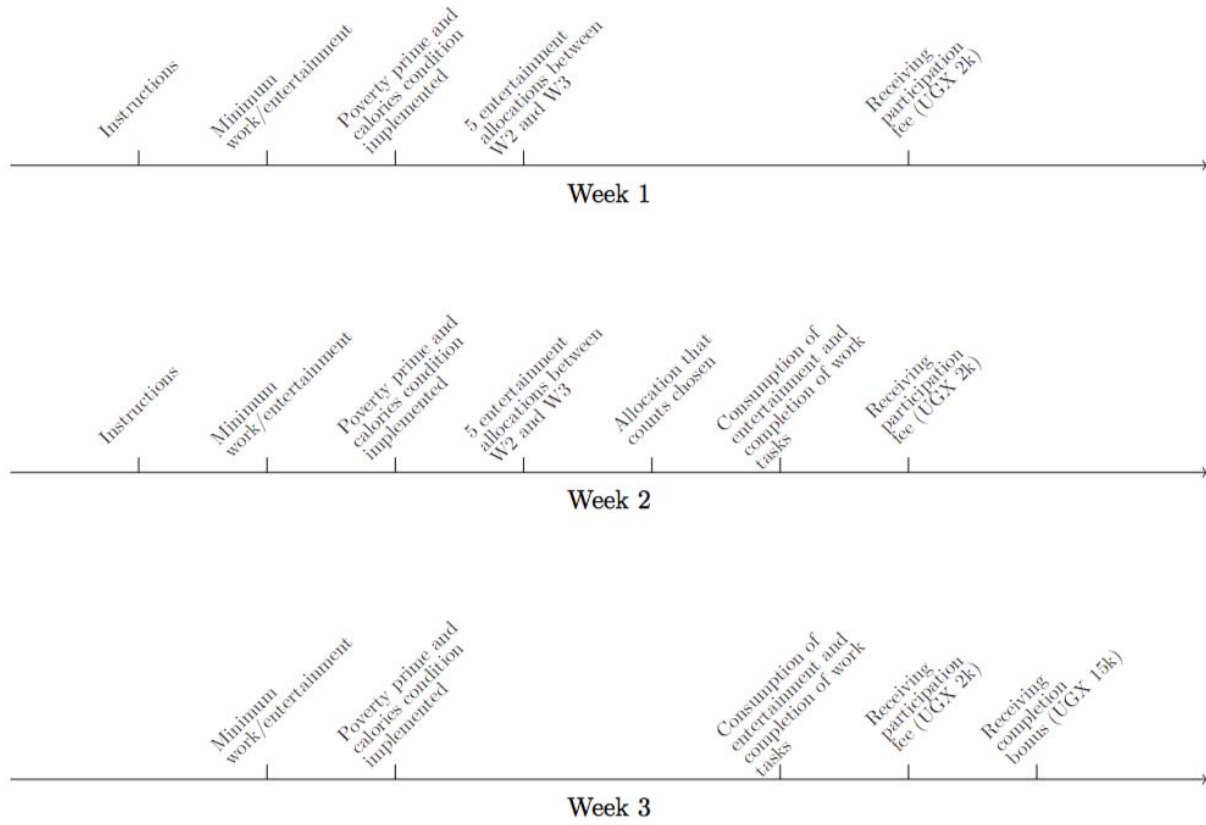
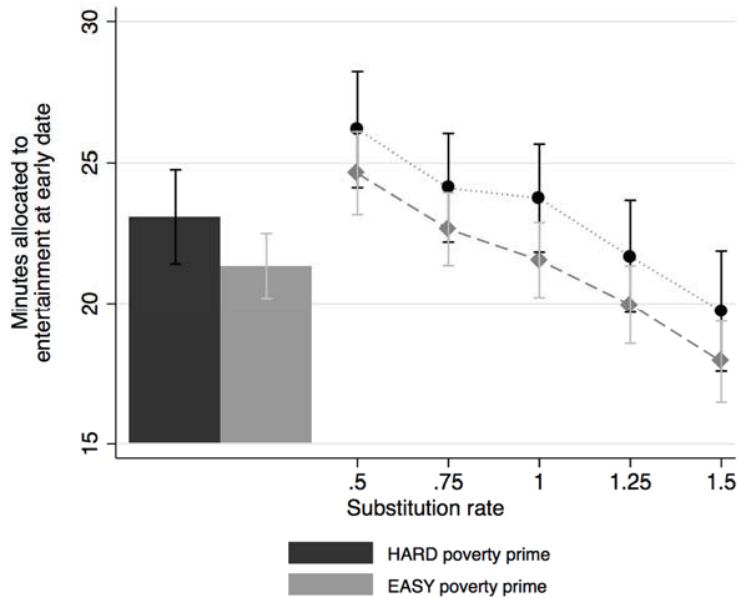


Figure 2: Entertainment allocation environment



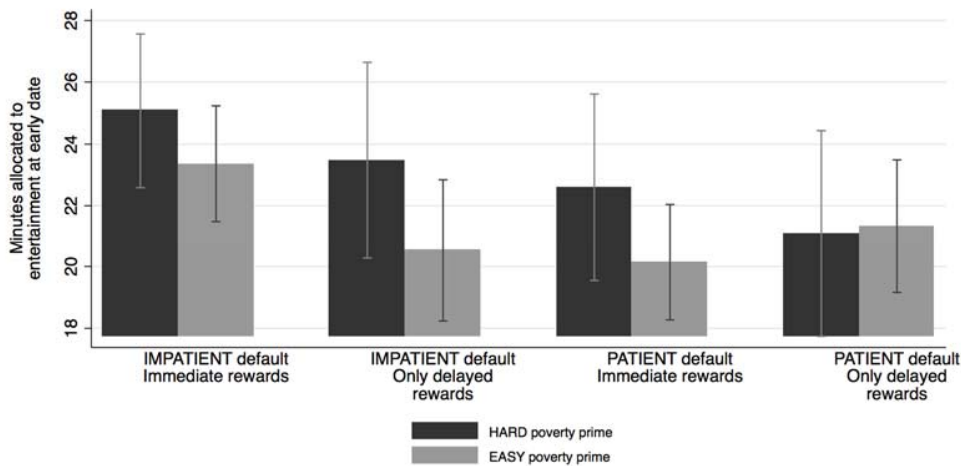
Notes: Decision-making booklet shown to participants. The left-hand side refers to Week 2 allocation of work and entertainment. The numbers inside the small TV icon (top right corner of each of the cards) and the blue part of the pie-charts refer to minutes of entertainment. The remaining white part of the pie-chart represents the number of minutes of work to the full hour in that week. Analogously, the right-hand side of the 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 3: Minutes allocated to entertainment at an early date: by poverty prime and substitution rate



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 percent level confidence intervals from a regression with standard errors clustered at the individual level.

Figure 4: Minutes allocated to entertainment at an early date: by poverty prime, default, and timing of choices



Notes: The PATIENT default is an indicator for when the decision-making booklet is opened at the most patient option for every substitution rate. The IMPATIENT default is defined analogously. *Immediate rewards* is an indicator for decisions made in Week 2. *Only delayed rewards* is an indicator for decisions made in Week 1. Error bars represent 95 percent level confidence intervals from a regression with standard errors clustered at the individual level.

Table 1: Summary statistics

	Mean (1)	Std. Dev. (2)	Min (3)	Max (4)	N (5)
<i>Panel A: Experimental choices</i>					
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
<i>Panel B: Process of decision-making</i>					
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
<i>Panel C: Observable characteristics</i>					
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

Notes: Panel A 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 B 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. Panel C 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 sums up positive responses to 12 questions on different types of exposure to violence (see Appendix E for details).

Table 2: Time discounting

Dependent variable	Entertainment sooner (minutes)						
			Substitution rate				
Choices	All	All	0.5	0.75	1	1.25	1.5
	(1)	(2)	(3)	(4)	(5)	(6)	(6)
HARD poverty prime	1.71** (0.85)	2.86** (1.16)	1.56 (1.03)	1.42 (0.97)	2.13** (0.96)	1.69* (1.02)	1.76 (1.08)
CALORIES condition	0.34 (0.84)	1.48 (1.17)	0.42 (1.02)	0.18 (0.97)	0.34 (0.96)	0.58 (1.00)	0.16 (1.08)
HARD prime x CALORIES		-2.30 (1.69)					
PATIENT default	-1.79** (0.85)	-1.84** (0.85)	-1.57 (1.03)	-2.89*** (0.96)	-2.67*** (0.97)	-1.64 (1.01)	-0.19 (1.08)
Only delayed rewards	-1.19* (0.68)	-1.18* (0.68)	-1.11 (0.91)	-1.98** (0.83)	-0.94 (0.77)	-0.96 (0.81)	-0.94 (0.81)
Substitution rate	-6.29*** (0.61)	-6.29*** (0.61)					
Constant	29.45*** (1.80)	28.88*** (1.84)	29.76*** (2.12)	26.73*** (1.98)	23.18*** (1.95)	20.06*** (2.04)	16.08*** (2.30)
Observations	2,870	2,870	574	574	574	574	574
R-squared	0.054	0.056	0.028	0.036	0.029	0.018	0.013

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 3: 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 (12.67)	-2.47 (7.80)	0.07 (0.66)	-0.06 (0.13)	-0.24 (0.44)
CALORIES condition	-10.70 (12.58)	0.10 (7.84)	0.25 (0.65)	-0.02 (0.13)	-0.10 (0.45)
PATIENT default	21.53* (12.88)	20.46*** (7.81)	1.10 (0.68)	-0.14 (0.13)	0.68 (0.43)
Only delayed rewards	32.22*** (9.35)	24.18*** (5.89)	1.55** (0.66)	0.17* (0.09)	0.62* (0.37)
Substitution rate				-0.58*** (0.11)	-1.27*** (0.32)
Constant	187.69*** (31.42)	122.89*** (14.99)	2.55** (1.28)	4.31*** (0.28)	8.83*** (1.11)
Observations	506	456	506	2,530	2,530
R-squared	0.028	0.078	0.023	0.023	0.018
Panel B: Patterns of choices					
Dependent variable	Inconsistency in choices		Automatic decision-making		
	Number of inconsistencies (0-4)	Distance from consistency	Entertainment sooner (minutes)	Distance from default allocation at a given price	Sticking to the default allocation at a given price (dummy)
HARD poverty prime	0.10 (0.07)	0.13 (0.13)	1.40 (1.44)	-0.10 (0.11)	0.01 (0.02)
CALORIES condition	-0.05 (0.07)	-0.07 (0.13)	0.34 (0.84)	0.04 (0.11)	-0.01 (0.02)
Substitution rate			-6.44*** (0.86)	0.14 (0.09)	0.04** (0.01)
HARD poverty prime*Substitution rate			0.32 (1.23)		
PATIENT default	0.12* (0.07)	0.27** (0.13)	-1.79** (0.85)	-1.73*** (0.10)	0.15*** (0.02)
Only delayed rewards	-0.01 (0.05)	0.03 (0.09)	-1.19* (0.68)	0.14 (0.08)	0.01 (0.02)
Constant	0.19 (0.15)	0.24 (0.28)	29.61*** (1.88)	3.11*** (0.24)	-0.05 (0.04)
Observations	574	574	2,870	2,870	2,870
R-squared	0.041	0.033	0.054	0.278	0.071

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) 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, (2) the minimum number of flips through the decision-making booklet required to make the allocation consistent with the law of demand, (3) the number of minutes allocated to entertainment in Week 2, (4) the number of page flips from the default allocation in the booklet at a given substitution rate, and (5) an indicator for whether the individual selected the allocation provided by the experimenter by default at a given substitution rate.

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

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

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

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 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

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Online Appendix
for

Effects of Poverty on Impatience: Preferences or Inattention?

Vojtěch Bartoš, Michal Bauer, Julie Chytilová and Ian Levely

Contents

- A. Additional tables
- B. Structural estimation of model parameters
- C. Minimum detectable effects
- D. Exact wording of poverty primes
- E. Conflict exposure questions

Appendix A: Additional tables

Table A1: Choice sets across the five substitution rates

	Substitution rate				
	0.5	0.75	1	1.25	1.5
Entertainment minutes allocated to early date (Week 2)	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)
<i>Panel A: Share of subjects who would feel very anxious</i>			
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)
<i>Panel B: Share of subjects who think the situation would be very difficult to deal with</i>			
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	0.23	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*** (0.04)	0.20*** (0.04)	0.34*** (0.04)	0.32*** (0.04)
CALORIES condition	0.00 (0.04)	0.00 (0.04)	0.00 (0.04)	0.00 (0.04)
PATIENT default	-0.06* (0.04)	-0.06* (0.04)	0.01 (0.04)	0.01 (0.04)
Only delayed rewards	0.03 (0.03)	-0.02 (0.03)	0.00 (0.03)	-0.02 (0.04)
HARD poverty prime*Only delayed rewards		0.11** (0.05)		0.04 (0.05)
Constant	0.09 (0.08)	0.12 (0.08)	0.08 (0.08)	0.09 (0.08)
Observations	523	523	523	523
R-squared	0.124	0.128	0.199	0.199

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 (1)	EASY (2)	Difference (ttest p- value) (3)	PLACEBO (4)	CALORIES (5)	Difference (ttest p- value) (6)	PATIENT (7)	IMPATIENT (8)	Difference (ttest p- value) (9)
Age	36.20 (10.49)	34.73 (9.39)	1.48 (0.21)	35.56 (10.15)	35.35 (9.78)	0.21 (0.86)	35.35 (10.29)	34.92 (9.61)	1.06 (0.37)
Female (dummy)	0.49 (0.50)	0.52 (0.50)	-0.02 (0.68)	0.53 (0.50)	0.48 (0.50)	0.05 (0.38)	0.48 (0.50)	0.47 (0.50)	0.08 (0.18)
Married (dummy)	0.39 (0.49)	0.31 (0.46)	0.09 (0.12)	0.33 (0.47)	0.37 (0.49)	-0.05 (0.41)	0.37 (0.49)	0.31 (0.47)	0.07 (0.19)
Household size	7.72 (3.48)	7.98 (3.46)	-0.25 (0.54)	7.69 (3.37)	8.03 (3.57)	-0.34 (0.41)	8.03 (3.59)	7.56 (3.31)	0.57 (0.17)
Education (years)	5.44 (3.45)	4.89 (3.50)	0.55 (0.18)	5.09 (3.43)	5.24 (3.54)	-0.15 (0.71)	5.24 (3.46)	5.24 (3.51)	-0.16 (0.70)
Able to write a letter (dummy)	0.57 (0.50)	0.48 (0.50)	0.09 (0.12)	0.49 (0.50)	0.57 (0.50)	-0.08 (0.18)	0.57 (0.50)	0.54 (0.50)	-0.02 (0.71)
Monthly earnings (in thousands UGX)	309.73 (879.31)	176.12 (311.15)	133.62 (0.08)*	259.73 (757.03)	223.18 (537.09)	36.55 (0.64)	223.18 (542.26)	251.92 (757.58)	-20.22 (0.79)
Household owns a bicycle (dummy)	0.82 (0.80)	0.84 (0.76)	-0.02 (0.86)	0.91 (0.82)	0.74 (0.74)	0.17 (0.07)*	0.74 (0.80)	0.82 (0.77)	0.01 (0.94)
Household owns a radio (dummy)	0.64 (0.66)	0.58 (0.76)	0.07 (0.44)	0.60 (0.72)	0.62 (0.70)	-0.02 (0.86)	0.62 (0.78)	0.60 (0.64)	0.03 (0.72)
Household owns cattle (dummy)	2.01 (3.37)	2.06 (6.57)	-0.05 (0.94)	2.16 (3.56)	1.91 (6.56)	0.25 (0.69)	1.91 (6.71)	1.89 (2.98)	0.29 (0.64)
Household owns a mobile phone (dummy)	0.85 (1.00)	0.81 (1.14)	0.04 (0.75)	0.85 (1.00)	0.80 (1.15)	0.06 (0.67)	0.80 (1.24)	0.73 (0.86)	0.19 (0.13)
Brick walls (dummy)	0.37 (0.48)	0.36 (0.48)	0.01 (0.83)	0.34 (0.48)	0.39 (0.49)	-0.05 (0.41)	0.39 (0.48)	0.36 (0.48)	0.01 (0.92)
Number of meals taken during a day	1.82 (0.53)	1.97 (0.51)	-0.15 (0.01)**	1.89 (0.52)	1.90 (0.53)	-0.01 (0.82)	1.90 (0.52)	1.88 (0.53)	0.03 (0.68)
Number of days unable to work due to sickness during the last 4 weeks	2.83 (5.30)	2.56 (4.86)	0.26 (0.67)	2.76 (5.23)	2.63 (4.92)	0.13 (0.83)	2.63 (5.41)	2.55 (4.72)	0.28 (0.65)
Cognitive skills (0-5)	2.85 (1.42)	2.87 (1.23)	-0.03 (0.87)	2.99 (1.32)	2.73 (1.32)	0.26 (0.09)*	2.73 (1.26)	2.80 (1.39)	0.12 (0.45)
Index of conflict exposure (0-12)	5.78 (2.95)	5.95 (3.24)	-0.17 (0.68)	5.98 (3.15)	5.75 (3.04)	0.24 (0.56)	5.75 (3.24)	5.97 (2.95)	-0.20 (0.62)

Video data available (dummy)	0.85 (0.36)	0.88 (0.33)	-0.03 (0.53)	0.88 (0.33)	0.85 (0.36)	0.03 (0.53)	0.85 (0.34)	0.86 (0.35)	0.01 (0.85)
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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 cognitive skills variable measures the number of Raven's matrices solved correctly by the individual (out of 5). The index of conflict exposure sums up positive responses to 12 questions on different types of exposure to violence.

Table A5: Robustness checks

Dependent variable		Entertainment sooner (minutes)					
		(1)	(2)	(3)	(4)	(5)	(6)
Sample	All	Decision-making process data available	Comprehension questions answered correctly	Maximum one inconsistency	Always consistent	All	Literate
HARD poverty prime	1.71** (0.85)	1.78** (0.89)	2.11** (0.90)	1.82 (1.12)	1.83 (1.44)	1.59* (0.84)	3.05*** (1.03)
CALORIES condition	0.34 (0.84)	0.49 (0.89)	-0.47 (0.90)	0.34 (1.07)	0.03 (1.39)	0.38 (0.84)	-0.27 (1.02)
PATIENT default	-1.79** (0.85)	-1.34 (0.89)	-1.40 (0.92)	-2.51** (1.12)	-3.20** (1.44)	-1.95** (0.86)	-1.92* (1.04)
Only delayed rewards	-1.19* (0.68)	-1.42* (0.73)	-1.44** (0.71)	-1.19 (0.86)	-1.79 (1.09)	-1.18* (0.68)	-1.41* (0.72)
Substitution rate	-6.29*** (0.61)	-6.46*** (0.66)	-6.66*** (0.72)	-9.27*** (0.70)	-10.89*** (0.94)	-6.29*** (0.61)	-7.37*** (0.83)
Number of inconsistencies							
Constant	29.45*** (1.80)	29.73*** (1.87)	29.67*** (1.89)	33.87*** (2.24)	36.65*** (3.04)	29.23*** (1.83)	29.33*** (2.16)
Observations	2,870	2,530	2,310	1,900	1,130	2,870	1,880
R-squared	0.054	0.056	0.063	0.106	0.152	0.058	0.091
Dependent variable		Entertainment sooner (minutes)					
		All	All	All	Did not eat prior the experiment	Drank the whole cup of tea	Lower conflict exposure
HARD poverty prime	1.60* (0.83)	1.50* (0.84)	1.71** (0.83)	1.37 (1.02)	2.01** (0.96)	1.52 (1.20)	2.49* (1.48)
CALORIES condition	0.29 (0.83)	0.81 (0.89)	0.29 (0.84)	0.34 (1.04)	0.28 (0.94)	0.14 (1.16)	0.61 (1.47)
PATIENT default	-1.88** (0.83)	-2.32** (1.10)	-1.60* (0.83)	-1.45 (1.03)	-2.02** (0.95)	-3.21*** (1.18)	-1.55 (1.51)
Only delayed rewards	-1.17* (0.68)	-1.17* (0.68)	-1.15* (0.68)	-1.24 (0.83)	-1.93** (0.76)	0.20 (0.97)	-1.44 (1.17)
Substitution rate	-6.29*** (0.61)	-6.29*** (0.66)	-6.29*** (0.72)	-5.67*** (0.70)	-5.94*** (0.94)	-7.10*** (0.97)	-6.23*** (0.83)

Number of inconsistencies		(0.61)	(0.61)	(0.61)	(0.79)	(0.63)	(0.77)	(1.22)
Constant		31.50*** (2.45)	31.48*** (2.51)	31.06*** (1.95)	27.37*** (2.26)	29.01*** (2.04)	29.77*** (2.54)	32.84*** (3.59)
Controlling for village fixed effects	yes		yes	no	no	no	no	no
Individual level random effects	no		yes	no	no	no	no	no
Controlling for experimenter fixed effects	no		no	yes	no	no	no	no
Observations		2,870	2,870	2,870	1,900	2,335	1,425	960
R-squared (overall with RE)		0.075	0.075	0.063	0.043	0.058	0.075	0.065
Number of IDs			289					

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. 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 (1)	HARD poverty prime (2)	EASY poverty prime (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)			(0.29)
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 B. 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	1.72** (0.85)	1.92** (0.82)	1.87** (0.81)	1.78** (0.82)	1.79** (0.82)
CALORIES condition	0.32 (0.84)	0.19 (0.85)	0.11 (0.86)	0.06 (0.86)	0.06 (0.86)
PATIENT default	-1.94** (0.85)	-1.81** (0.84)	-1.79** (0.84)	-1.75** (0.83)	-1.74** (0.83)
Only delayed rewards	-1.18* (0.68)	-1.19* (0.68)	-1.19* (0.68)	-1.20* (0.68)	-1.20* (0.68)
Substitution rate	-6.29*** (0.61)	-6.29*** (0.61)	-6.29*** (0.61)	-6.29*** (0.61)	-6.29*** (0.61)
Age	-0.03 (0.05)	-0.05 (0.05)	-0.05 (0.05)	-0.06 (0.06)	-0.06 (0.06)
Female (dummy)	-0.02 (0.84)	-1.10 (0.92)	-1.07 (0.95)	-0.99 (0.95)	-0.95 (0.97)
Married (dummy)	0.37 (1.12)	0.48 (1.10)	0.47 (1.10)	0.44 (1.10)	0.46 (1.10)
Household size	0.17 (0.12)	0.22* (0.12)	0.25* (0.14)	0.28** (0.14)	0.28** (0.14)
Education (years)		-0.10 (0.17)	-0.08 (0.16)	-0.07 (0.16)	-0.07 (0.16)
Able to write a letter (dummy)		-1.43 (1.13)	-1.69 (1.15)	-1.57 (1.18)	-1.63 (1.20)
Cognitive skills (0-5)		-0.57* (0.32)	-0.62* (0.33)	-0.66* (0.34)	-0.66* (0.34)
Monthly earnings (in thousands UGX)			0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Household owns a bicycle (dummy)			0.05 (0.65)	0.13 (0.66)	0.11 (0.67)
Household owns a radio (dummy)			1.06* (0.64)	1.16* (0.64)	1.16* (0.63)
Household owns cattle (dummy)			-0.11 (0.09)	-0.11 (0.09)	-0.11 (0.09)
Household owns a mobile phone (dummy)			-0.31 (0.59)	-0.34 (0.58)	-0.34 (0.58)
Brick walls (dummy)			0.37 (0.89)	0.52 (0.90)	0.53 (0.90)
Number of meals taken during a day				-0.74 (0.70)	-0.73 (0.70)
Number of days unable to work (last 4 weeks)				-0.02 (0.08)	-0.02 (0.08)
Index of conflict exposure (0-12)					0.04 (0.13)
Constant	28.63*** (2.15)	32.27*** (2.45)	31.95*** (2.46)	33.19*** (2.77)	33.09*** (2.76)
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** (0.99)	1.23 (1.17)
CALORIES condition	0.16 (0.98)	0.50 (1.20)
PATIENT default	-1.56 (0.98)	-1.89 (1.22)
Only delayed rewards	-0.49 (1.01)	-2.24* (1.22)
Substitution rate	-6.76*** (0.72)	-5.66*** (0.86)
Constant	29.02*** (2.07)	29.90*** (2.64)
Observations	1,630	1,240
R-squared	0.058	0.056

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)
Sample	All (1)	All (2)	All (3)	All (4)	All (5)
HARD poverty prime	0.04 (0.07)	-0.10 (0.09)	-0.05* (0.03)	-0.02 (0.03)	-0.00 (0.03)
CALORIES condition	0.04 (0.07)	-0.06 (0.09)	-0.02 (0.03)	-0.03 (0.03)	-0.03 (0.03)
PATIENT default	-1.25*** (0.07)	1.11*** (0.09)	0.65*** (0.03)	0.48*** (0.03)	0.34*** (0.03)
Only delayed rewards	0.06 (0.06)	0.12** (0.06)	0.03 (0.02)	0.05** (0.02)	0.06** (0.03)
Substitution rate	-0.49*** (0.06)	-0.09 (0.07)	0.02 (0.02)	-0.09*** (0.03)	-0.08*** (0.03)
Constant	3.09*** (0.15)	1.22*** (0.20)	0.16** (0.06)	0.30*** (0.08)	0.31*** (0.08)
Observations	2,530	2,530	2,530	2,530	2,530
R-squared	0.298	0.222	0.453	0.237	0.129

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, and (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. 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 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

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 3 and A9)

	(1)	(2)	(3)	(4)	(5)
<i>Panel A: Direct measures of attention</i>					
Dependent variable	Decision-making time		Distraction time	Information acquisition	Total number of page views at a given price
	Seconds	Seconds	Seconds	Number of options viewed at a given price (out of 6)	
Sample	All	Excluding outliers	All	All	All
HARD poverty prime	-8.17 (12.67)	-2.47 (7.80)	0.07 (0.66)	-0.06 (0.13)	-0.24 (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
<i>Panel B: Additional measures of attention</i>					
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)
Sample	All	All	All	All	All
HARD poverty prime	-0.24 (0.07)	-0.10 (0.09)	-0.10 (0.03)	-0.02 (0.03)	-0.00 (0.03)
Minimum detectable effect	0.18	0.22	0.07	0.08	0.08
EASY poverty prime mean	1.86	1.81	0.62	0.49	0.40
Percent of EASY poverty prime mean	0.10	0.12	0.12	0.17	0.21
<i>Panel C: Indirect measures of attention (based on patterns of choices)</i>					
Dependent variable	Inconsistency in choices		Automatic decision-making		Sticking to the default allocation at a given price (dummy)
	Number of inconsistencies (0-4)	Distance from consistency	Entertainment sooner (minutes)	Distance from default allocation at a given price	

Sample	All	All	All	All	All
HARD poverty prime	0.10 (0.07)	0.13 (0.13)	1.40 (1.44)	-0.10 (0.11)	0.01 (0.02)
Minimum detectable effect	0.18	0.33	3.58	0.26	0.05
EASY poverty prime mean	0.54	0.84	21.34	2.92	0.08
Percent of EASY poverty prime mean	0.33	0.39	0.17	0.09	0.61

Notes: OLS estimates for HARD poverty prime from full estimations in Table 3 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, and (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.

The dependent variables in Panel C are: (1) 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, (2) the minimum number of flips through the decision-making booklet required to make the allocation monotone, (3) number of minutes allocated to entertainment in Week 2, (4) number of page flips from the default allocation in the booklet at a given substitution rate, and (5) an indicator for whether the individual selected the allocation provided by the experimenter by default at a given substitution rate.

Minimum detectable effects calculated as described in Appendix C.

Appendix B: 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. Following Andreoni and Sprenger (2012), we assume that participants in our experiment have constant relative risk aversion (CRRA) risk preferences and 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 $u = (e_s + \omega)^\gamma$,²¹ 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 ω 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.²² We assume that $u' > 0$ and $u'' < 0$, i.e. that $\gamma \in (0,1)$.

Formally, we model the individual utility function as:

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

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 β . The weekly discount rate is represented by the parameter $\delta/7$.

²¹ 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.

²² Similar argumentation for background consumption of the choice variable in intertemporal decision has been used in earlier experimental work (Andersen et al. 2008; Andreoni and Sprenger 2012; Augenblick, Niederle, and Sprenger 2015).

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

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

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):

$$\begin{aligned} \max_{e_t, e_{t+k}} & \left((e_t + \omega)^\gamma + \beta^{\mathbb{I}\{t=0\}} \delta^{k/7} (e_{t+k} + \omega)^\gamma \right) \quad (3) \\ \text{s.t.} & \quad e_t + \frac{e_{t+k}}{p} = m \end{aligned}$$

we derive the following intertemporal Euler equation:

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

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:

$$\log \left(\frac{e_t + \omega}{e_{t+k} + \omega} \right) = \underbrace{\frac{\log(\delta)}{\gamma-1}}_a (k/7) + \underbrace{\frac{\log(\beta)}{\gamma-1}}_b \mathbb{I}\{t=0\} - \underbrace{\frac{1}{\gamma-1}}_c \log \left(\frac{1}{p} \right) + \varepsilon \quad (5)$$

In Table A4 we report the estimates of β , $\delta/7$, and γ 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).²³

²³ By further assuming that γ is constant across the individuals, our design also allows for estimation of individual level δ and β parameters. We do not present the individual-level results here.

Appendix C: 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:

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

where $t_{1-\kappa}$ is the t-statistic required to obtain the power of κ , where we fix $\kappa = 0.8$ throughout our analysis; $t_{\alpha/2}$ is the t-statistic required to produce a significance level of α , 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 σ^2 and the population variables as:

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

Given Equation 2, Equation 1 simplifies to:

$$MDE = 2.485 \times SE(\hat{\beta}) \quad (3)$$

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 D: 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?

Appendix E: 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.

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