

# Can Positive Psychology Improve Psychological Well-being and Economic Decision-Making? Experimental Evidence from Kenya

Victoria Baranov\* Johannes Haushofer† Channing Jang‡

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## Abstract

We conduct a randomized experiment to evaluate the effect of a light-touch low-cost psychological intervention on psychological well-being and economic decision-making in a developing-country setting. Residents of an informal settlement in Kenya were randomly assigned to participate in best-practice exercises designed to promote gratitude, self-affirmation, and aspirations. We show that although we were successful in manipulating the psychological construct (reported gratitude increased 0.3SD), there is no evidence that the intervention affected overall psychological well-being, beliefs, or aspirations. We also see no effects on real-incentive tasks measuring cognitive control or temporal discounting. Our results are important because light-touch positive psychology interventions are being widely promoted in workplaces and schools worldwide as a low-cost solution to dramatically improve psychological well-being.

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\*The University of Melbourne. Email: victoria.baranov@unimelb.edu.au

†Princeton University and Busara Center for Behavioral Economics. Email: joha@princeton.edu

‡Princeton University and Busara Center for Behavioral Economics. Email: cjang@princeton.edu

## 1 Introduction

Psychological well-being has become an increasingly important factor in understanding the persistence of poverty. As a first-order welfare outcome, poor mental health is considered one of the most burdensome non-communicable diseases in the developing world (Kessler et al., 2009; Collins et al., 2011) and is associated with a host of detrimental economic consequences, including impaired human capital development (Heckman et al., 2006; Currie and Stabile, 2006; Currie, 2009; Krishnan and Krutikova, 2013) and reduced productivity (Kessler and Frank, 1997; Currie and Madrian, 1999; World Health Organization, 2013; Frijters et al., 2014).<sup>1</sup> Furthermore, there is growing evidence that psychological factors associated with poor mental health can lead to poverty traps through sub-optimal economic decision-making (Haushofer and Fehr, 2014; Genicot and Ray, 2017; Bernard et al., 2014). This evidence is particularly concerning in light of the fact that mental health care is underprovided among low-income populations (The WHO World Mental Health Survey Consortium, 2004).

Targeted psychotherapy-based interventions have shown promising results, capable of improving mental health even in low-income settings (Bolton et al., 2003; Rahman et al., 2008), and impacting sustained behavioral change. For example, Cognitive Behavioral Therapy-based interventions have reduced antisocial behavior among high-risk populations in Liberia and the US (Blattman et al., 2017; Heller et al., 2016) and increased empowerment and human capital investment among perinatally depressed mothers in Pakistan (Baranov et al., 2017). However, such interventions are resource-intensive and difficult to scale.

A large and growing literature in psychology argues that simple, light-touch psychological interventions, described collectively as *positive psychology interventions*, are also effective at improving psychological well-being, particularly in sub-clinical populations (Seligman et al., 2005; Cohen and Sherman, 2014; Meyers et al., 2013). Positive psychology broadens the focus of clinical psychology beyond mental illness to overall well-being and optimal functioning (Lee Duckworth et al., 2005). A recent meta-analysis based on 39 randomized studies totaling 6,139 participants found that positive psychology interventions improved subject well-being by 0.34 standard deviations and reduced depression symptoms by 0.23 standard deviations (Bolier et al., 2013). Since 2013, the NIH has provided over \$6 million USD in research funding toward incorporating positive psychology interventions in clinical settings from heart disease to diabetes, and 27 clinical trials enrolling a total of 3179 individuals have been registered on clinicaltrials.gov. Due to their low cost and ease of administration, positive psychology interventions have been incorporated into workplaces (Meyers et al., 2013), schools (Shankland and Rosset, 2017), as well as clinical settings (Chakhssi et al., 2018).<sup>2</sup> These interventions are of great interest because they can be easily adapted and deployed in developing country settings.

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<sup>1</sup>Economists now routinely measure mental health as an outcome of poverty alleviation programs. For example, see the literature on the effects of ultra-poor programs Banerjee et al. (2015) and studies documenting the effects of cash transfers on the mental health (Baird et al., 2013; Haushofer and Shapiro, 2016; Kilburn et al., 2015).

<sup>2</sup>Several studies in economics have now found that modest interventions that engender a sense of hope can lead to surprising improvements in economic outcomes (Bernard et al., 2014; Lybbert and Wydick, 2016; Riley, 2017).

This study investigates whether a light-touch and low-cost positive psychology intervention can improve psychological well-being, and ultimately, change behaviors and decisions that can affect the perpetuation of poverty. We deploy three of the most successful protocols from the psychology literature in a developing country setting. The combined intervention provides daily exercises to promote gratitude, self-affirmation, and primes aspirations.<sup>3</sup> This intervention targets belief formation to improve individuals' beliefs about their life in general, about their own abilities, and about their potential.<sup>4</sup> In contrast to experiments that have induced a scarcity mindset by reminding individuals of their weaknesses (for example, reminding the poor of their financial demands, see Mani et al. (2013a)), the gratitude and self-affirmation exercises aim to shift individuals' mindset to focus on their strengths or assets.

We implement the intervention in a field setting in Nairobi, Kenya, using a randomized controlled trial with 220 participants. Participants received daily SMS reminders and in-person field visits several days into the experiment to ensure that they understood and completed the exercises. We measure a number of psychological well-being outcomes, including self-reported happiness, subjective well-being, depression symptoms, positive and negative affect, and sleep quality. Since the intervention was aimed at improving an individuals' general sense of optimism and self-efficacy, we also collect reported beliefs, intentions, and aspirations. In addition, we assess the effect of the intervention on decision-making using two real-incentive tasks: time preference using a multiple price list and cognitive control using the Stroop task.

We find that the intervention worked as intended with regards to improving gratitude: reported feelings of gratitude increased by 0.31 standard deviations (SD). However, we find weak evidence that the program affects our other outcomes; none of the pre-specified indices (psychological well-being, sleep quality, aspirations, beliefs, or intentions) or individual measures show significant effects. This finding contrasts with similar interventions in developed countries, which have produced large effects; e.g., Hall et al. (2014) report an increase of 0.45 SD in cognitive control after a self-affirmation intervention, and recent meta-analyses of positive psychology interventions find effects of 0.34-0.61 SD on subjective well-being (Bolier et al., 2013; Sin and Lyubomirsky, 2009). Importantly, our study was highly powered compared to existing ones; for example, we estimate the effect on subjective well-being with greater precision than any study in the meta-analysis by Bolier et al. (2013).

We also find that decision-making was unaffected. We find no effect on real-incentive tasks that measure temporal discounting or cognitive control. Additionally, in a *post hoc* analysis, we

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<sup>3</sup>The aspirations priming component was not derived from the psychology literature, but rather a recent literature in economics (Ray, 2006; Bernard et al., 2011; Macours and Vakis, 2014). Aspirations summarize the preferences, the beliefs, and possibly the constraints acknowledged by an individual about aspects of the future (Bernard and Taffesse, 2012).

<sup>4</sup>Lybbert and Wydick (2018) develop an economic framework that links aspirations and positive psychology in what they refer to as hope. The article also contains a thorough review of the psychology literature (primarily citing the works on positive psychology upon which our intervention is drawn) and also provides a framework for economists to engage in experimental work seeking to understand the role of hope in economic development. Our intervention, largely based on positive psychology, is precisely in line with testing if one can manipulate "hope" to affect well-being and decision-making.

checked for long-run effects on a measure of labor supply using administrative data. Our results indicate that, if anything, the intervention had a slightly negative impact on our measure of labor supply up to three years after our endline survey, and we rule out even small positive impacts.

Together, these results raises doubts that light-touch psychological interventions will be an easy and affordable way to improve well-being or decision-making in developing countries. Our findings contribute to an emerging literature on the effects of psychological interventions on economic outcomes, especially among disadvantaged populations and in developing countries. Our results contrast with those of Ghosal et al. (2013), who provided eight sessions of self-esteem training to sex workers in India and found strong increases in psychological well-being, as well as in saving and health-seeking behavior. Aspirations interventions consisting of one-off screenings of videos or movies have also yielded positive results: Bernard et al. (2014) find increases in educational investment in Ethiopia, while Riley (2017) find improvements in math performance in Uganda. Yet in our context, we find no effects above and beyond an increase in reported gratitude.

## 2 Intervention

The goal of our intervention was not to evaluate any one particular protocol, but rather to find a light-touch intervention that has a measurable impact on psychological well-being and decision-making in a general population. Based on a review of the literature (see Appendix Section B for a listing of studies in psychology for Count Your Blessings and self-affirmation), we combined three of the most successful light-touch interventions into a single intervention adapted to the Kenyan context: Count Your Blessings, self-affirmation, and aspirations priming.

Based on positive psychology, Count Your Blessings (CYB) interventions, which ask participants to write or think about things they are grateful for, have been shown to increase life satisfaction, positive affect, and subjective happiness and decrease depression, negative affect, and negative health symptoms (Emmons and McCullough, 2003; Froh et al., 2008; Chancellor et al., 2015; Seligman et al., 2005; Sheldon and Lyubomirsky, 2006; Geraghty et al., 2010b,a; Martínez-Martí et al., 2010; Odou and Vella-Brodick, 2013; Chan, 2013; Wood et al., 2010), although some studies have produced contradictory results or have been difficult to replicate (Bolier et al., 2013).<sup>5</sup> The majority of studies with positive and significant results asked participants to count their blessings daily for at least 13 days. This is the approach we adopt here.

A self-affirmation is an act that demonstrates one's adequacy in the face of threats to one's self-integrity (Harris and Epton, 2009). In self-affirmation interventions, people typically write about core personal values, where personal values are the internalized standards used to evaluate the self. Self-affirmation (SA) interventions have been shown to increase the grade-point average (GPA) of minority students, the acceptance of unwelcome risk feedback or information, and cognitive control and fluid intelligence (Cohen et al., 2009; Howell and Shepperd, 2012; Harris and

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<sup>5</sup>The psychological mechanisms responsible for the beneficial effects of gratitude can be explained by the Broaden-and-Build Theory (Fredrickson, 2001), which claims that positive emotions broaden the repertoires of thought-action momentarily and build enduring personal resources.

Epton, 2009; Hall et al., 2013; Sherman et al., 2013). Successful interventions either asked participants to write about traits they value about themselves, or a personal event important to them.

The third element of our intervention was an aspirations priming (AP) exercise. Aspirations do not directly relate to psychological well-being, but rather indirectly through the concept of self-efficacy (Bandura, 1989; Locke and Latham, 2002), i.e. “the belief in one’s capabilities to organize and execute the courses of action required to produce given attainments” (Bandura, 1977)<sup>6</sup>. Recent studies suggest that aspirations can be “raised” using simple methods such as showing “aspirational” videos or cartoons, particularly in developing-country settings (Bernard et al., 2014; Macours and Vakis, 2014). These studies further show effects on behavior. We included the aspirations priming because it was closely linked to hope and positive psychology (see Lybbert and Wydick (2018)).

Using the subject pool of the Busara Center for Behavioral Economics, we recruited 220 participants from Kibera, an informal settlement in Nairobi, Kenya to participate in the study.<sup>7</sup> We selected exclusively primary school graduates (completed Standard 8) to ensure that participants were literate, and a screening literacy test was conducted to ensure the participants could read and write. Participants were told that they were invited to participate in a study evaluating the effects of psychological exercises on well-being. The psychological intervention consisted of three exercises, which were combined into a single intervention to create the treatment condition. The three elements of the treatment are described below:

1. **Count Your Blessings (CYB):** This protocol was administered daily for 16 days. All participants were given a packet to be filled out each day. Treatment participants were asked to complete the CYB task daily, instructing them to write down the five things in their life that they were most grateful or thankful for over the past day. The control condition was a pure control and did not ask participants to write anything. Both control and treatment participants completed an identical series of ten questions (the “daily survey”), comprising basic physical health including sleep quality and exercise, ratings of mood, appraisals of the day, expectations for tomorrow, perception of social support received, and a well-being rating derived from 30 affect terms of commonly occurring affective states (Emmons and McCullough, 2003).
2. **Self-affirmation (SA):** This protocol was conducted once only, at endline. All participants completed two writing exercises. Participants in the treatment condition were first instructed to spend 3 to 5 minutes writing in depth about a personal experience during which they felt very successful or proud. Following this, the same participants were then instructed to spend 3 to 5 minutes writing in depth about a selected value that was important to them, describing why it was so important. Options included athletic ability, music, religious values,

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<sup>6</sup>Self-efficacy refers to a person’s belief about *her own* ability to achieve certain outcomes (e.g. the probability of success conditional on taking an effortful action). A related concept is the locus of control, which refers to the extent to which individuals believe they can control events affecting them (ie, the component of the probability of success that can be affected by an action).

<sup>7</sup>We recruited 220 participants, however, one individual declined.

and sense of humor. Participants in the control condition were first instructed to write about their daily routine on a typical day, and then instructed to write about what they had eaten or drunk in the last 48 hours. The protocol was derived from McQueen and Klein (2006) and Cohen et al. (2009).

3. **Aspirations:** This protocol was conducted once only, at endline. All participants read short stories based on real individuals from Kibera and similar informal settlements (the stories were read aloud by a Busara survey administrator, and participants were asked to follow along). In the treatment condition, the stories were about successful individuals, while in the control condition, the story was about someone's daily routine. After the readings, participants in both conditions were asked to think about the future: the treatment group was asked to think about the year ahead, while the control group was asked to think about tomorrow. The participants then had 5 minutes to write down anything that came to mind about the future. The protocol was adapted from that used in Bernard et al. (2014).

During the baseline survey, participants received a packet with a pen and notepad containing the daily surveys followed by (for the treatment group) a writing section for the CYB exercises. Assessors read the instructions out loud and asked participants to take out the packet and complete the CYB writing task. Assessors checked that all five sections of the forms were filled out, and that items listed were legible. Participants were then told that they would receive an SMS reminder to fill out the form every day,<sup>8</sup> and that a follow-up visit would be scheduled two days following the baseline. Participants were also told that sheets would be collected at endline, and they were incentivized to complete the study with a payment of KES 500 ( USD 5). During the field follow-up visit, assessors visited the participants in person to check that the daily sheets and writing tasks were being completed correctly. Visits lasted 20 minutes. After approximately 14 days following the field visits, the assessors called participants to confirm the appointment for endline, at which point the daily sheets would be collected.

Nearly all of the respondents who completed endline had completed and returned at least 14 of 16 daily sheets. In Section 5.2, we analyze the written entries to show that respondents followed the CYB protocol and completed the exercises.

At endline, the self-affirmation and aspirations treatments were completed using pen and paper, prior to the endline survey. The survey team handed out booklets containing instructions for the self-affirmation exercises along with writing space, and the printed stories for the aspirations protocol again followed by writing space (the exact protocols are provided in the appendix). The survey team read the self-affirmation exercises and aspirations stories out loud, asking the participants to follow along and then provided 5 minutes for reflective writing. The self-affirmation and aspirations protocols took approximately 25 minutes to complete, and writing sheets were collected before beginning the computer-administered endline questionnaire.

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<sup>8</sup>The SMS read: "This is a reminder to fill out your daily survey. Please fill it out before you go to bed this evening."

### 3 Evaluation Design

#### 3.1 Sampling, Identification Strategy, and Data Collection

To establish a causal relationship between treatment and outcomes, this study uses a randomized design. A total of 220 participants were recruited from the subject pool of the Busara Center for Behavioral Economics in Nairobi, Kenya, with 120 participants randomly assigned to the treatment condition and the other 100 participants to the control condition.<sup>9</sup> The subject pool consists of residents of Kibera, a large slum outside Nairobi. We specifically chose to run our intervention in this setting because we wanted to test if a low-intensity psychological intervention could benefit low-income and non-Western populations. Because slum residents are often detached from extended family, and are under considerable stress from poverty, pollution, and overcrowding, residents of slums are especially at risk for developing psychological disorders (Subbaraman et al., 2014). This is also important because urbanization in developing countries has led to the rapid growth of slums.

Data were collected in the lab at baseline and at endline after the end of the intervention. In addition, some data related to the CYB portion of the intervention were collected daily via surveys that respondents filled out at home and returned at endline. Finally, we use administrative data on participation in other studies at Busara between 2012–2017.

#### 3.2 Power Calculations

The sample size of 120 participants in the treatment and 100 in the control group allowed us to detect an effect size of 0.38 SD with 80% power. Both our target sample size, and our eventual sample size after attrition, is larger than the average sample size in the psychology literature for Count Your Blessings or Self-Affirmation interventions (where the average starting sample size is about 150, see Appendix Section B). Based on meta-analyses of the positive psychology interventions (such as CYB), effect sizes for subjective well-being ranged from Cohen's  $d$  of 0.34 in Bolier et al. (2013) to 0.61 in Sin and Lyubomirsky (2009). Of the 39 studies in Bolier et al. (2013), 26 were self-help studies, and 17 involved similar gratitude or positive writing exercises similar to our intervention. Primary outcomes in the self-affirmation literature have been performance in school (Cohen et al., 2009; Sherman et al., 2013) and cognitive control, with effects sizes on cognitive control being 0.45 SD (Hall et al., 2014).<sup>10</sup>

Additionally, we report minimum detectable effect sizes (MDEs) for each outcome, which reflect power using in the observed sample at endline. Because we measure key outcomes before and after the intervention, we are able to offset some of the loss of power due to attrition. For

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<sup>9</sup>The different numbers between treatment and control groups arose from the fact that the project had to finish before the 2014 Christmas break in Kenya, at which point 100 control and 120 treatment participants could complete the study. The original target enrollment had been 120 per group.

<sup>10</sup>Secondary outcomes for interventions targeted at specific populations have included satisfaction in school, self-reported health behaviors, and self-reported physical activity.

example, using the observed sample at endline, the MDE for subjective well-being is 0.3 SD. We discuss the MDEs for other outcomes, particularly with respect to previous studies, in section 5.5.

### 3.3 Outcomes

A detailed list of all outcomes and measures used, as well as when they were measured (either in the lab at endline or from the daily sheets) is provided in the Appendix. Conceptually, we grouped our measures into three broad domains: (1) psychological well-being, (2) beliefs and aspirations, and (3) intentions and decision-making.

We measure a diverse set of outcomes related to psychological well-being, including subjective happiness, life satisfaction, depression symptoms, positive/negative affect, and gratitude. We also collected data on outcomes closely related to psychological well-being that are also present in many of the studies upon which our intervention is based. These secondary measures of psychological well-being include items such as sleep quality, exercise, locus of control, and expectations for tomorrow.

To explore the mechanisms by which the intervention might impact behavior, we measured individuals' beliefs and aspirations. For beliefs, we asked about the ability and trustworthiness of own and other ethnic groups. These variables were designed to capture probabilistic beliefs about things that are not under the control of the individual. For aspirations, we measured the difference between desired and actual income, assets, social status, and education (following Bernard and Taffesse (2012)).

To see if the intervention could impact behavior, we asked individuals about their intentions: for example, intentions to reduce consumption of temptation goods such as sweets and sugary drinks, intentions to spend money wisely, and intentions to foster a good relationship with the spouse. We also asked their willingness to take an HIV test. Willingness to take an HIV test is included as an outcome measure because despite the health benefits of HIV screening, the potentially threatening nature of results and fear of stigma has led to underutilization of testing in Kenya (Ng'ang'a et al., 2014). Previous research has suggested that interventions such as the one we test here can reduce risk avoidance behavior (Howell and Shepperd, 2012; Hall et al., 2014).

We also assessed whether the intervention could impact decision-making through two incentivized tasks: one measuring cognitive control (the Stroop task) and one measuring temporal discounting (using a Multiple Price List).<sup>11</sup> We measure these outcomes for several reasons. First, high temporal discounting and low cognitive control have been systematically correlated with poverty (Carvalho et al., 2016; Mullainathan and Shafir, 2013), and it is hypothesized that poor psychological well-being may moderate the negative effects of poverty on cognitive control (Shah et al., 2012; Mullainathan and Shafir, 2013) and temporal discounting (Haushofer and

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<sup>11</sup>The MPL was elicited with choices between today and three different future horizons from – 2, 4, and 8 weeks—and one choice with a front-end delay (a choice between payment in 2 weeks versus 4 weeks). We calculated the implied exponential discount factor (assuming linear utility, or risk-neutrality) using all 4 time preference choices. We present results using the average discount factor across these 4 choices in the main analysis, but also show effects for the individual horizons in Appendix Table A20.



Fehr, 2014). Second, studies have shown that individuals with poor psychological health or even negative mood are more impatient (for example, Ifcher and Zarghamee (2011) show that experimentally induced changes in mild positive affect impact present-bias and temporal discounting) and have lower cognitive control (McDermott and Ebmeier, 2009). A large literature on positive affect has consistently shown that experimentally induced positive affect impacts on a broad range of decision-making like problem-solving, flexible thinking, and creativity (see Isen (2008); Lerner et al. (2015) for reviews). Furthermore, theoretical work in psychology has postulated that the emotional state of gratitude reduces impatience, given its role in maintaining social relationships through encouragement of costly reciprocal responses (Dickens and DeSteno, 2016). In laboratory experiments, induction of gratitude has been shown to attenuate temporal discounting (Desteno et al., 2014).

Given the hypothesis that poor mental health leads to sub-optimal economic decision-making in a way that reinforces the cycle of poverty, ideally, we would measure labor supply, work effort, or earnings. Within the time-frame of the followup, just two weeks after baseline, these would not likely to be affected. To address this issue, we include one additional *post hoc* outcome: attendance (a partial measure of labor supply) as experimental subjects at Busara, measured for a total of 3 years post treatment (from 2015 through 2017). Although this is not a complete measure of labor supply, it has several advantages: first, it is administrative data without measurement error; second, we observe this outcome even if the individual did not complete the endline survey, thus it is not subject to attrition concerns; and third, it allows us to explore longer-term impacts in the case that the benefits of the intervention took time to translate to behavioral change.

For the empirical analysis, we generate summary indices (following Anderson (2008)) of the for the following groups of outcomes: psychological well-being, sleep quality, beliefs, aspirations, and intentions. We analyze the real-incentive tasks separately, without grouping within an index. Appendix Table A1 shows the summary statistics for the five indices (indices were normalized to be mean 0 and standard deviation 1 in the control group), and their components.

## 4 Econometric Specifications

### 4.1 Basic Specification

The study design and all analysis methods were pre-registered before data analysis began.<sup>12</sup> Our basic treatment effects specification estimates the following equation:

$$y_{i,t=15} = \beta_0 + \beta_1 T_i + \varepsilon_{i,t=15} \quad (1)$$

where  $y_{i,t=15}$  is the outcome of interest for individual  $i$  measured at the endline survey, 15 days after the intervention began,  $t = 15$ .  $T_i$  is a dummy variable equal to 1 if the participant was randomly assigned to the treatment condition and 0 if assigned to the control.  $\varepsilon_{i,t=15}$  is the unob-

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<sup>12</sup><https://www.socialscisceregistry.org/trials/627>

served error component, which is assumed to be serially uncorrelated. Where possible, we control for baseline levels of the outcome variables,  $y_{i,t=0}$  to improve statistical power (McKenzie, 2012), thus estimating  $y_{i,t=15} = \beta_0 + \beta_1 T_i + \delta y_{i,t=0} + \varepsilon_{i,t=15}$ .

## 4.2 Accounting for Multiple Inference

To account for multiple inference, we follow three approaches. First, we define summary indices for psychological well-being and decision-making and ask whether these indices are affected by treatment. The summary indices are generated by standardizing all outcomes within a group and then taking a weighted average of all outcomes with weights generated by the inverse of the covariance matrix. As such, it is a GLS-weighted index, and thus places more weight on uncorrelated information. It is analogous to running a Seemingly Unrelated Regression on all outcomes (standardized) jointly within a group, and restricting the coefficient on treat to be equal across outcomes. Without any additional assumptions on the measures this is the most efficient test of whether there is a treatment effect across a group of outcomes. Second, for individual outcome variables within the indices as well as across indices, we adjust for multiple inference using a family-wise  $p$ -value adjustment following Anderson's (2008) variant of Efron & Tibshirani's (1994) non-parametric permutation test. Finally, we also run seemingly unrelated regression (SUR) for across all groups of outcomes to test for the joint significance of all the indices.

## 5 Results

### 5.1 Balance

Table 1 presents the baseline characteristics for the control group (column 1), and the coefficient and standard error on treatment in a regression of the characteristic on the treatment dummy (column 2). Only the score on Ravens Matrices (a measure of cognitive function) was statistically different between the two groups, with the treated group having 0.36 fewer correct answers. Overall, the randomization was successful and the sample was well balanced, with a joint test  $p$ -value of 0.87 across all available baseline characteristics (Table A2).<sup>13</sup>

Balance is also achieved in the analytical sample (excluding individuals lost to followup), presented in columns 4-6. We note that, as attrition was not statistically differential (which we show below), and since our sample was well-balanced at baseline, we would expect that the analytical sample would also remain balanced, which is what we find (the joint test has a  $p$ -value of 0.65). We do note that while the sample is not balanced along one dimension, cognitive function, our re-

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<sup>13</sup>In Table A2, we also include a number of baseline measures that were filled out in the practice daily forms during the baseline survey when participants were asking to complete the CYB writing task (starting with PANAS Positive Total and below). Completing the daily questions was not required in the baseline practice, though approximately 100 of these forms were still filled out and returned at endline. This explains why there are fewer observations for these measures at baseline. The index we compute uses all available data (it does not drop observations with missing data, treating missing outcomes similarly to an unbalanced panel regression with missing years) but places more weight on outcomes that have more complete data.

sults are qualitatively unchanged if we include this variable in the baseline controls (see Appendix Tables A13-A15).

### 5.1.1 Attrition

Of the 219 respondents that participated in the baseline survey, 168 participated in the endline survey, an attrition rate of 23%. Attrition was 9 percentage points ( $p=0.11$ ) higher among the control group. Due to the timing of our study being conducted near the Christmas holidays, we observed higher attrition rates than anticipated as participants left the city to visit family during the holiday season. 8 participants also returned their packets (after the holiday break) but did not complete endline (including these participants in the non-attritors, attrition was 7pp ( $p=0.22$ ) higher among controls). Tests of whether attrition was differential by treatment status or if attritors were different based on baseline characteristics, or if characteristics of attritors varied by treatment status all revealed no statistical patterns (at  $\alpha = 0.05$ ), which we discuss in more detail below.

To assess whether attrition confounds our results, we proceed as follows. First, we define  $attrit_i = 1$  if individual  $i$  was surveyed at baseline but not at endline, and zero otherwise. We then assess the severity of attrition using two approaches. First, we assess whether attritors are different in terms of a vector of baseline characteristics  $y_{i,t=0}$  by estimating  $y_{i,t=0} = \beta_0 + \beta_1 attrit_i + \varepsilon_{i,t=0}$ . Next, we measure whether the baseline characteristics of attritors in the treatment group are significantly different from those in the control group. The sample for regression is restricted to attritors:  $(y_{i,t=0} | attrit_i = 1) = \beta_0 + \beta_1 T_i + \varepsilon_{i,t=0}$ . A comparison of baseline characteristics, shown in Table A3, reveals that attritors were generally similar to non-attritors. Attritors were slightly younger, had fewer children, and had a lower gratitude scale. Table 2 shows that among the attritors, treatment assignment was uncorrelated with baseline characteristics, with the exception of gratitude which was marginally significantly lower for attritors assigned to treatment. We fail to reject the null that attritors from treatment and control groups are similar across the full set of characteristics ( $p$ -value of the joint test is 0.63). However, the fact that attritors from the treatment arm had lower gratitude by 0.34 SD is concerning as this could bias our findings to appear as if the intervention improved gratitude when in fact it did not. To address potential bias due to attrition, we estimate treatment effects with Inverse Probability Weights (IPW) where the weights are calculated as the probability of observing the respondent at endline as a function of all available baseline characteristics (except those measured via the daily surveys, e.g. PANAS), estimated separately for individuals in treatment versus controls groups (Hirano et al., 2003). We also discuss results based on attrition bounds (following Lee (2009)).

## 5.2 Manipulation check

We first report whether the intervention was successful in manipulating the psychological constructs it was intended to. The main component of the intervention was the Count Your Blessings exercise, which has an established manipulation check in the psychology literature measured by

the gratitude scale.<sup>14</sup> While reported gratitude may reflect experimenter demand effects, the goal of the manipulation check is primarily to compare our results to those reported in the previous literature. We find a significant increase in gratitude, by about 0.37 of a standard deviation ( $p < 0.001$ ), indicating that the intervention worked as intended and the psychological manipulation was successful. Controlling for baseline gratitude, the estimate drops to 0.31 SD ( $p = 0.01$ ), which is notable since attrition was slightly differential by baseline gratitude. Adjusting for attrition with IPW, the estimated effect is nearly identical (Table 7). The effect is robust to alternative specifications, for example, controlling for baseline cognitive function (which was not balanced at baseline), the estimate is 0.43 SD ( $p < 0.001$ ). Furthermore, the magnitude of the effect is very similar to that reported in the psychology literature, the average increase being 0.4 SD across the five studies that reported the effect on the gratitude score (see Table 5 of Wood et al. (2010) and the Appendix Section B).

Additionally, since we collected the daily sheets from the participants (for daily measures of sleep and PANAS), we also were able to observe if individuals actually did the “five good things” daily writing exercise (ie, the CYB component of the intervention condition). Consistent with our finding of improvements in gratitude, we found that participants did in fact complete most of the daily CYB exercises. Note that this (objective) check that the task was actually being completed was, to our knowledge, not done in any of the studies from the psychology literature. The data revealed that nearly all of the respondents actually wrote five things every day, and fewer than 7% of the treatment group completed less than half of the exercises (defined as writing less than 2.5 items on average across the 16 days). More than 85% wrote at least four items on average. The written responses varied in length and were generally completed correctly in that items were indeed things for which one could be grateful (e.g. spouse, food, religion, sunshine). The average written response was 207 characters with spaces, or about 30 words, with an interquartile range of 89 to 261.

### 5.3 Main treatment effects

We next turn to the main treatment effects on five index measures – psychological well-being, sleep quality, beliefs, aspirations, and intentions – which are presented in Table 3. Column 2 reports the coefficient on the treatment dummy for the five outcome indices with the family-wise adjusted  $p$ -values in brackets. The intervention had positive, but statistically insignificant, effects on overall psychological well-being, with improvements of 0.16 standard deviations. However, we found no improvement in sleep quality, a secondary measure of psychological well-being. For outcomes related to aspirations, beliefs, and intentions, the intervention appears to have had a perverse effect, with statistically insignificant reductions of 0.13, 0.07, and 0.16 standard deviations, respectively. Thus, no single domain revealed a significant impact of the intervention even without multiple hypothesis adjustment. Not surprisingly, the joint test that the treatment had a

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<sup>14</sup>The self-affirmation interventions, however, do not appear to have a similar manipulation check. Meanwhile, the manipulation check for aspirations is the aspirations index which is not statistically different from zero. Additionally, the WVS Locus of Control is also related to the aspirations condition, for which we find positive but insignificant effects (0.11 sd; in Table 4).

positive effect across all domains fails to reject the null.

Next we turn to the effects of the intervention on the individual variables within the indices to better understand which aspects of well-being and beliefs may have been more responsive to the intervention. Table 4 reports the coefficients on the treatment indicator for the components of the psychological well-being and sleep quality indices. Column 2 provides point estimates from a regression without controlling for baseline levels of the outcome variable. Column 4 provides the point estimates when baseline values of the outcome variable are included as controls. While a number of measures of psychological well-being and sleep quality are statistically significant at naïve  $p$ -values, only the GQ-6 Gratitude Scale remains significant after adjustment. However, apart from gratitude, the intervention had limited effects on individual components of psychological well-being and sleep quality. It appears that the positive coefficient found in the psychological well-being index, which includes gratitude, is mostly driven by the effects on gratitude. Note that controlling for baseline cognitive function, we find that the coefficient on gratitude increases slightly (to 0.43 standard deviations) while we continue to see no evidence of benefits to other domains of psychological well-being (Appendix Table A14).

We may fail to detect true treatment effects if, by chance, our randomization did not sufficiently balance treatment and control groups. Indeed, our baseline balance table indicates that individuals in the treatment condition had significantly lower cognitive function. However, controlling for baseline characteristics that were imbalanced at baseline (education and cognitive function), our overall results remain similar though the coefficient on the psychological well-being index increases to 0.22 SD, and the negative coefficients on the rest of the outcomes are less negative (see Appendix Table A13). Further including baseline measures of psychological well-being could also improve precision of these estimates; however, doing so actually reduces the coefficient on the psychological well-being index to 0.08 SD (see Appendix Table A16, Column 2). We also note that our psychological well-being index includes the gratitude score. As pointed out above, since gratitude was the direct outcome targeted by the exercises, it also makes sense to look at the psychological well-being index on all psychological well-being measures that are not directly related to the construct being manipulated. Excluding the gratitude score from the index, we see that the effect is smaller (0.10 SD without controls and 0.04 SD with controls).<sup>15</sup>

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<sup>15</sup>We also check that the way we construct our summary index of psychological well-being is not driving our null findings. The GLS-weighted index weights uncorrelated information more, and may be inappropriate in situations where the multiple measures are actually capturing one latent trait or construct with error. An alternative approach would be to perform factor analysis to create a factor score using all of the measures of psychological well-being. This approach would effectively place more weight on correlated information captured across the different measures of psychological well-being, essentially removing the measurement error from each measure. However, using the factor score measure of psychological well-being (while excluding the gratitude score), the point estimates are even closer to zero: without baseline controls the intervention increased psychological well-being by 0.07 SD, but with baseline controls that estimate is -0.02 SD (columns 7 and 8 of Appendix Table A16). Based on our estimates using factor scores, we can rule out effect sizes on psychological well-being of 0.2 SD.

### 5.3.1 Comparison to existing meta-analysis

A recent meta-analysis of positive psychology interventions offers an opportunity to compare the effect size and precision achieved here to those obtained in previous work. Bolier et al. (2013) compute standardized effect sizes for impacts on “subjective wellbeing”, which includes measures such as the Satisfaction with Life Scales (SWLS) and positive affect, depending on what is measured in the individual studies. They report a meta-analytic effect of positive psychology interventions on subjective wellbeing of 0.34 SD. In comparison, we find an effect of our interventions on the SWLS of 0.01 SD. Figure 1 illustrates this result by plotting the treatment effects on subjective wellbeing, with 95 percent confidence intervals, in our study and in the 28 studies in Bolier et al. (2013) which measure this outcome. Our treatment effect is the third-smallest. Importantly, our study has higher precision than all individual studies in Bolier et al. (2013). Thus, we identify a null effect on subjective wellbeing with higher precision than existing studies. Indeed, the attrition-adjusted MDE in our study for the SWLS measure of subjective well-being is 0.30 SD, and when calculating treatment effects using bounds, the upper limit of the 95% CI for SWLS is 0.32 SD (Table A4). Thus, for subjective well-being, the attrition-adjusted confidence interval rejects the meta-analytic effect size reported in the literature.

### 5.3.2 Beliefs and aspirations

Table 5 reports the coefficients from estimation of model 1 (without controls for baseline levels of the outcome) for the components of the beliefs and aspirations indices. There is little evidence of any effect of the intervention on components of beliefs or aspirations, with only one variable – agreement with the statement that those from their own ethnic group are competent – that is statistically significant even with naïve  $p$ -values, but the effect is negative. These results indicate overall small perverse effects of the intervention on beliefs and aspirations, though these are not statistically different from zero.

### 5.3.3 Decision-making behavior: intentions, cognitive control, time discounting, and labor supply

Finally, we turn to test if the intervention affected intentions or the incentivized tasks measuring cognitive control and temporal discounting. Additionally, we include estimates for our *post hoc* measure of labor supply, the attendance at Busara sessions, measured up to 3 years after the intervention concluded. Table 6 reports these results. The effects on intentions are negative, though not statistically significant. Similarly, cognitive control, measured by the correct responses in the Stroop task, decreased by 0.37 standard deviations in the treatment group. Reaction time increased, and the number of attempted responses decreased, though these are not statistically different from zero. These results seem to indicate that the intervention reduced cognitive control, however, these patterns are largely driven by baseline imbalance in cognitive function. Controlling for this, the coefficients are much closer to zero (for example, the coefficient on Stroop correct

responses is now  $-0.16$  SD, see Appendix Table A15). The exponential discount factor was also unaffected by treatment.<sup>16</sup>

Finally, we do not find any evidence that the intervention impacted attendance at Busara, with estimates being significant and negative over the 3 year period following the intervention, and insignificant but of a similar magnitude (relative to the control mean) when we only consider the year following the intervention (2015). We can rule out any positive impacts greater than  $0.08$  SD in 2015 (or  $0.02$  SD over the full 3-year horizon). We interpret these results as impacts on (partial) labor supply, under the assumption that the intervention did not differentially impact preferences over participating as a subject at Busara.

#### 5.4 Trends and heterogeneity

With daily data on psychological well-being from the daily sheets that respondents filled out, we have more data, and thus power, to observe treatment effects and their trends. However, no significant trends or treatment effects on psychological well-being were detected using these additional data (see Appendix Section A1 for details).

It is also possible that different groups of people were affected differently by the psychological intervention, and we explore this possibility by looking at the heterogeneous treatment effects by the pre-specified characteristics at baseline. However, we do not find any consistent patterns of heterogeneity that reveal significant benefits of the intervention on any subgroup, with the caveat that given our sample size we are not well-powered to detect even moderately heterogeneous impacts. We also present results of quantile treatment effects (QTEs) for our five main indices. Overall, the analysis of the quantile treatment effects, mirroring the patterns in the heterogeneous treatment effects, shows that there are no statistically significant positive effects of the intervention somewhere along the distribution that the average treatment effects were masking (see Appendix Section A2 for details of the heterogeneity analysis and QTE estimation).

These results from daily reports and our analysis of heterogeneity further support our null findings in the main treatment effects.

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<sup>16</sup>Appendix Tables A19 and A20 provide additional analyses using the incentivized decision-making outcomes by including baseline characteristics. Appendix Table A20 also shows the results of the four discount factors measured using the four different time horizons. We do this to check that our measures (both the incentivized measures and the psychological variables) are actually capturing meaningful variation. First, we can confirm that these incentivized measures do indeed covary with baseline characteristics: higher cognitive control is predicted by more education, being male, and being younger. However, the psychological well-being measures at baseline do not appear to predict cognitive control. Higher education and cognitive function are positively associated with less temporal discounting and higher cognitive control. Interestingly, contemporaneous measures (endline measures) of gratitude are significantly positively associated with cognitive control and patience (the temporal discount factor). Additionally, higher values of CESD at endline were associated with more temporal discounting at all 4 time horizons measured, but not with cognitive control. The PANAS scores (more positive affect and less negative affect) at endline were also statistically associated with higher cognitive control. Meanwhile, life satisfaction (SWLS) at endline was not associated with either temporal discounting or cognitive control.

## 5.5 Discussion

Our results indicate the intervention did not effect any of our pre-specified outcomes: apart from the intended effects on gratitude, we found no effects on psychological well-being or actual decision-making. We discuss several potential explanations of why we find no effect below.

First, we test if positive findings for psychological well-being or decision-making are being masked by differential attrition. As noted in Section 5.1.1, attritors from the treatment arm had lower gratitude by 0.34 SD than attritors from the control arm. Attritors from the treatment arm had 0.45 SD lower psychological well-being scores at baseline, though the difference is not statistically significant. However, several pieces of evidence suggest this is not a likely explanation for our overall null findings. First, these patterns of attrition bias our results towards finding positive impacts on psychological outcomes. Second, Table 7 shows that IPW estimates are nearly identical to unadjusted treatment effects (however, nonparametric approaches, such as bounding following Lee (2009) reported in Table A4, yield generally fairly wide bounds). Finally, and most importantly, the intervention did not result in any meaningful increase in labor supply (measured by Busara attendance), and our estimates can generally rule out any positive effects over the 3 years following the intervention. Since the labor supply measure was available for both attritors and non-attritors, we are confident that our null results on economic decision-making are not driven by attrition.

Second, we consider whether our study did not have sufficient power to detect effects. To test for this possibility, we calculated the minimum detectable effect (MDE) sizes (with 80 percent power at the 5 percent significance level).<sup>17</sup> The MDEs presented here differ from the power calculated prior to running the experiment, as they account for the smaller endline sample and attrition corrections, as well as potential efficiency gains from having baseline measures for some outcomes. We present MDEs which are adjusted for attrition using IPW.

The attrition-adjusted MDEs for each of the five index measures were 0.42 (psychological well-being), 0.56 (sleep and beliefs), 0.34 (aspirations) and 0.53 (intentions) of a standard deviation.<sup>18</sup> A 0.53 SD increase in intentions corresponds to an increase in likelihood of improving intentions along the 7-point Likert scale by an average of 1.6 points across the four categories considered. For aspirations, a 0.34 SD increase corresponds to aspiring to have an income that is \$12,300 higher, or 0.44 more years of schooling.<sup>19</sup> The attrition-adjusted MDEs for the incentivized outcomes of cognitive control and temporal discounting were 0.45 SD for the Stroop (number correct) and 0.08 for the exponential discount factor.<sup>20</sup> To benchmark the cognitive control MDE, we note that

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<sup>17</sup>This exercise amounts to multiplying the standard error on the treatment coefficient by a constant; details can be found in Haushofer and Shapiro (2016).

<sup>18</sup>IPW-adjusted MDEs are about 20% larger than unadjusted MDEs. Without attrition-adjustment, the MDEs for each of the five index measures were 0.36 (psychological well-being), 0.41 (sleep), 0.47 (beliefs), 0.26 (aspirations), and 0.51 (intentions).

<sup>19</sup>For aspirations, there are fewer studies to benchmark our results, but Bernard et al. (2014)'s aspiration intervention (which included aspirational videos, and thus was more salient than our intervention) increased aspirations by about 0.2 standard deviations.

<sup>20</sup>The MDE for labor supply over the 3-year period was 0.34 SD.



“scarcity priming” (experimentally induced thought about difficult financial scenarios) reduced cognitive control among the poor sample by 0.9 SD (Mani et al., 2013b), while the self-affirmation exercise with individuals sampled from an inner-city soup kitchen lead to a 0.45 SD improvement in cognitive control (Hall et al., 2014). As a benchmark for the time preference MDE, Ifcher and Zarghamee (2011) find that a mild positive affect priming (using videos) induced an increase in the exponential discount factor of 0.08, while the gratitude induction by Desteno et al. (2014) increased the exponential discount factor by 0.13.

We rely on the previous literature in psychology to determine what effect sizes are reasonable to expect for the psychological outcomes. Based on a meta-analysis of 39 randomized interventions of which 28 measure subjective wellbeing, Bolier et al. (2013) report a meta-analytic effect size for subjective well-being of 0.34 SD, the primary outcome that has been studied with positive psychology interventions. A common measure of subjective well-being in these studies was the Satisfaction with Life Survey (SWLS), which we also measure. We plot our estimated treatment effect on SLWS along with the 95% confidence interval alongside all the studies that also reported treatment effects on subjective well-being in Figure 1. Our treatment effect is smaller than all but three of these other studies, and the highest precision. The 95 percent confidence interval of our treatment effect (calculated using bounds) excludes the meta-analytic effect size reported by Bolier et al. (2013).

Another possible reason for our null findings might be that gratitude and other elements of positive psychology do not contribute to psychological well-being in Kenya. However, the positive psychology literature does show effects across diverse settings including China, Japan, Australia, and Spain. There has also been considerable diversity with respect to the subject pool: studies include university students, elementary school students, teachers, elderly populations, and patients with a broad range of medical disorders. For example, two recent studies conducted in Hong Kong (that were not included in the meta-analysis discussed above) used positive psychology interventions using gratitude writing with health care workers (Cheng et al., 2015) and female prisoners (Mak and Chan, 2018). Both found improvements in subjective well-being of 0.9 SD. Another study using Chinese male prisoners from Beijing found that gratitude writing improved subjective well-being by 0.7 SD (Deng et al., 2018).

## 6 Conclusion

This study tested the effects of a light-touch psychological intervention on psychological well-being and economic decision-making among residents of slums in Nairobi, Kenya, using a randomized controlled trial. We combined three protocols that have previously been shown in the psychology literature to be effective in improving psychological and behavioral outcomes into a single compound intervention: gratitude writing, self-affirmation, and aspirations priming. The motivation to combine the protocols into a single one was to create the strongest possible intervention, while simultaneously remaining low-cost and light-touch.

We find little evidence that the intervention improved psychological well-being or economic decision-making outcomes. One possible reason is that we were underpowered to detect small effects; however, we can rule out effect sizes on subjective well-being that have been reported in meta-analyses of these types of interventions. Another possible reason is that these interventions do not translate well to the Kenyan setting. However, we confirmed that participants completed the exercises correctly, and the intervention improved self-reported gratitude, with magnitudes comparable to those reported in the literature. Another possibility is that the intervention was “too light touch”. However, the goal of our intervention was to specifically test a light-touch and low-cost intervention, since there is already considerable evidence on the effectiveness of higher-cost psychological interventions such as those involving targeted videos or Cognitive Behavioral Therapy. Our results suggest that simple, light-touch psychological exercises based on positive psychology might have limited effects on psychological well-being and economic decision-making.

## References

- Anderson, M. L. (2008). Multiple Inference and Gender Differences in the Effects of Early Intervention: A Reevaluation of the Abecedarian, Perry Preschool, and Early Training Projects. *Journal of the American Statistical Association*, 103(484):1481–1495.
- Baird, S., de Hoop, J., Ozler, B., Hoop, J. D., and Özler, B. (2013). Income Shocks and Adolescent Mental Health. *Journal of Human Resources*, 48(2):370–403.
- Bandura, A. (1977). Toward a unifying theory of behavioral change. *Psychological Review*, 84(2):191–215.
- Bandura, A. (1989). Human agency in social cognitive theory. *American Psychologist*, 44(9):1175.
- Banerjee, A., Duflo, E., Goldberg, N., Karlan, D., Osei, R., Pariente, W., Shapiro, J., Thuysbaert, B., and Udry, C. (2015). A multifaceted program causes lasting progress for the very poor: Evidence from six countries. *Science*, 348(6236):1260799–1260799.
- Baranov, V., Bhalotra, S., Biroli, P., and Maselko, J. (2017). Maternal Depression, Women’s Empowerment, and Parental Investment: Evidence from a Large Randomized Control Trial. *IZA Discussion Paper*, (11187).
- Bernard, T., Dercon, S., and Taffesse, A. S. (2011). Beyond fatalism-an empirical exploration of self-efficacy and aspirations failure in Ethiopia.
- Bernard, T., Ifpri, L., Dercon, S., Orkin, K., and Taffesse, A. (2014). The Future in Mind : Aspirations and Forward-Looking Behaviour in Rural Ethiopia. 44(April).
- Bernard, T. and Taffesse, A. S. (2012). Measuring aspirations: discussion and example from Ethiopia. *International Food Policy Research Institute Discussion Paper*, 1190.
- Blattman, C., Jamison, J. C., and Sheridan, M. (2017). Reducing Crime and Violence: Experimental Evidence from Cognitive Behavioral Therapy in Liberia. *American Economic Review*, 107(4):1165–1206.
- Bolier, L., Haverman, M., Westerhof, G. J., Riper, H., Smit, F., and Bohlmeijer, E. (2013). Positive psychology interventions: a meta-analysis of randomized controlled studies. *BMC Public Health*, 13(1):119.
- Bolton, P., Bass, J., Neugebauer, R., Verdeli, H., Clougherty, K. F., Wickramaratne, P., Speelman, L., Ndogoni, L., and Weissman, M. (2003). Group Interpersonal Psychotherapy for Depression in Rural Uganda. *JAMA*, 289(23):3117.
- Carvalho, L. S., Meier, S., and Wang, S. W. (2016). Poverty and Economic Decision-Making: Evidence from Changes in Financial Resources at Payday. *American Economic Review*, 106(2):260–284.
- Chakhssi, F., Kraiss, J. T., Sommers-Spijkerman, M., and Bohlmeijer, E. T. (2018). The effect of positive psychology interventions on well-being and distress in clinical samples with psychiatric or somatic disorders: a systematic review and meta-analysis. *BMC Psychiatry*, 18(1):211.
- Chan, D. W. (2013). Counting blessings versus misfortunes: positive interventions and subjective well-being of Chinese school teachers in Hong Kong. *Educational Psychology*, 33(4):504–519.
- Chancellor, J., Layous, K., and Lyubomirsky, S. (2015). Recalling Positive Events at Work Makes Employees Feel Happier, Move More, but Interact Less: A 6-Week Randomized Controlled Intervention at a Japanese Workplace. *Journal of Happiness Studies*, 16(4):871–887.
- Cheng, S.-T., Tsui, P. K., and Lam, J. H. M. (2015). Improving mental health in health care practitioners: Randomized controlled trial of a gratitude intervention. *Journal of Consulting and Clinical Psychology*, 83(1):177–186.
- Cohen, G. L., Garcia, J., Purdie-Vaughns, V., Apfel, N., and Brzustoski, P. (2009). Recursive Processes in Self-Affirmation: Intervening to Close the Minority Achievement Gap. *Science*, 324(5925):400–403.

- Cohen, G. L. and Sherman, D. K. (2014). The Psychology of Change: Self-Affirmation and Social Psychological Intervention. *Annual Review of Psychology*, 65(1):333–371.
- Collins, P. Y., Patel, V., Joestl, S. S., March, D., Insel, T. R., Daar, A. S., Bordin, I. A., Costello, E. J., Durkin, M., Fairburn, C., Glass, R. I., Hall, W., Huang, Y., Hyman, S. E., Jamison, K., Kaaya, S., Kapur, S., Kleinman, A., Ogunniyi, A., Otero-Ojeda, A., Poo, M.-M., Ravindranath, V., Sahakian, B. J., Saxena, S., Singer, P. A., Stein, D. J., Anderson, W., Dhansay, M. A., Ewart, W., Phillips, A., Shurin, S., and Walport, M. (2011). Grand challenges in global mental health. *Nature*, 475(7354):27–30.
- Currie, J. (2009). Healthy, wealthy, and wise: Is there a causal relationship between child health and human capital development? *Journal of Economic Literature*, 47(1):87–122.
- Currie, J. and Madrian, B. C. (1999). Chapter 50 Health, health insurance and the labor market. In *Handbook of Labor Economics*, volume 3, pages 3309–3416. Elsevier.
- Currie, J. and Stabile, M. (2006). Child mental health and human capital accumulation: The case of ADHD. *Journal of Health Economics*, 25(6):1094–1118.
- Deng, Y., Xiang, R., Zhu, Y., Li, Y., Yu, S., and Liu, X. (2018). Counting blessings and sharing gratitude in a Chinese prisoner sample: Effects of gratitude-based interventions on subjective well-being and aggression. *Journal of Positive Psychology*, 9760:1–9.
- Desteno, D., Li, Y., Dickens, L., and Lerner, J. S. (2014). Gratitude: A tool for reducing Economic impatience. *Psychological Science*, 25(6):1262–1267.
- Dickens, L. and DeSteno, D. (2016). The Grateful Are Patient: Heightened Daily Gratitude Is Associated With Attenuated Temporal Discounting. *Emotion*, 16(4):421–425.
- Efron, B. and Tibshirani, R. J. (1994). *An Introduction to the Bootstrap*. CRC Press.
- Emmons, R. A. and McCullough, M. E. (2003). Counting blessings versus burdens: An experimental investigation of gratitude and subjective well-being in daily life. *Journal of Personality and Social Psychology*, 84(2):377–389.
- Frijters, P., Johnston, D. W., and Shields, M. A. (2014). The Effect Of Mental Health On Employment: Evidence From Australian Panel Data. *Health Economics*, 23(9):1058–1071.
- Froh, J. J., Sefick, W. J., and Emmons, R. A. (2008). Counting blessings in early adolescents: An experimental study of gratitude and subjective well-being. *Journal of School Psychology*, 46(2):213–233.
- Genicot, G. and Ray, D. (2017). Aspirations and Inequality. *Econometrica*, 85(2):489–519.
- Geraghty, A. W. A., Wood, A. M., and Hyland, M. E. (2010a). Attrition from self-directed interventions: Investigating the relationship between psychological predictors, intervention content and dropout from a body dissatisfaction intervention. *Social Science and Medicine*, 71(1):30–37.
- Geraghty, A. W. A., Wood, A. M., and Hyland, M. E. (2010b). Dissociating the facets of hope: Agency and pathways predict dropout from unguided self-help therapy in opposite directions. *Journal of Research in Personality*, 44(1):155–158.
- Ghosal, S., Jana, S., Mani, A., Mitra, S., and Roy, S. (2013). Sex Workers, Stigma and Self-Belief: Evidence from a Psychological Training Programme.
- Hall, C. C., Zhao, J., and Shafir, E. (2013). Self-Affirmation Among the Poor Cognitive and Behavioral Implications. *Psychological science*.
- Hall, C. C., Zhao, J., and Shafir, E. (2014). Self-Affirmation Among the Poor: Cognitive and Behavioral Implications. *Psychological science*, 25(2):619–25.
- Harris, P. R. and Epton, T. (2009). The impact of self-affirmation on health cognition, health behaviour and other health-related responses: a narrative review. *Social and Personality Psychology Compass*, 3(6):962–978.
- Haushofer, J. and Fehr, E. (2014). The Psychology and Neurobiology of Poverty. *Science*, 344(6186):1–40.

- Haushofer, J. and 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.
- Heckman, J. J., Stixrud, J., and Urzua, S. (2006). The Effects of Cognitive and Noncognitive Abilities on Labor Market Outcomes and Social Behavior. Technical report, National Bureau of Economic Research.
- Heller, S. B., Shah, A. K., Guryan, J., Ludwig, J., Mullainathan, S., and Pollack, H. A. (2016). Thinking, Fast and Slow? Some Field Experiments to Reduce Crime and Dropout in Chicago. *The Quarterly Journal of Economics*, 132(1):1–54.
- Hirano, K., Imbens, G. W., and Geert, R. (2003). Efficient Estimation of Average Treatment Effects Using the Estimated Propensity Score. *Econometrica*, 71(4):1161–1189.
- Howell, J. L. and Shepperd, J. A. (2012). Reducing information avoidance through affirmation. *Psychological science*, 23(2):141–145.
- Ifcher, J. and Zarghamee, H. (2011). Happiness and Time Preference: The Effect of Positive Affect in a Random-Assignment Exper. *The American Economic Review*, 101(7):3109–3129.
- Isen, A. M. (2008). Some ways in which positive affect influences decision making and problem solving. *Handbook of emotions*, pages 548–573.
- Kessler, R. C., Aguilar-Gaxiola, S., Alonso, J., Chatterji, S., Lee, S., Ormel, J., Ustün, T. B., and Wang, P. S. (2009). The global burden of mental disorders: an update from the WHO World Mental Health (WMH) surveys. *Epidemiologia e psichiatria sociale*, 18(1):23–33.
- Kessler, R. C. and Frank, R. G. (1997). The impact of psychiatric disorders on work loss days. *Psychological medicine*.
- Kilburn, K., Thirumurthy, H., Halpern, C. T., Pettifor, A., and Handa, S. (2015). Effects of a large-scale unconditional cash transfer program on mental health outcomes of young people in kenya.
- Krishnan, P. and Krutikova, S. (2013). Non-cognitive skill formation in poor neighbourhoods of urban India. *Labour Economics*, 24(0):68–85.
- Lee, D. S. (2009). Training, wages, and sample selection: Estimating sharp bounds on treatment effects. *The Review of Economic Studies*, 76(3):1071–1102.
- Lee Duckworth, A., Steen, T. A., and Seligman, M. E. (2005). Positive Psychology in Clinical Practice. *Annual Review of Clinical Psychology*, 1(1):629–651.
- Lerner, J. S., Li, Y., Valdesolo, P., and Kassam, K. S. (2015). Emotion and Decision Making. *Annual Review of Psychology*, 66(1):799–823.
- Locke, E. A. and Latham, G. P. (2002). Building a practically useful theory of goal setting and task motivation: A 35-year odyssey. *American psychologist*, 57(9):705.
- Lybbert, T. J. and Wydick, B. (2016). Hope as Aspirations, Agency, and Pathways: Poverty Dynamics and Microfinance in Oaxaca, Mexico. *NBER Working Paper Series*, page 33.
- Lybbert, T. J. and Wydick, B. (2018). Poverty, Aspirations, and the Economics of Hope. *Economic Development and Cultural Change*, (January).
- Macours, K. and Vakis, R. (2014). Changing Households' Investments and Aspirations through Social Interactions: Evidence from a Randomized Transfer Program. *Economic Journal*, 124(576):607–633.
- Mak, V. W. and Chan, C. K. (2018). Effects of cognitive-behavioural therapy (CBT) and positive psychological intervention (PPI) on female offenders with psychological distress in Hong Kong. *Criminal Behaviour and Mental Health*, 28(2):158–173.
- Mani, A., Mullainathan, S., Shafir, E., and Zhao, J. (2013a). Poverty impedes cognitive function. *Science*, 341(6149):976–80.
- Mani, A., Mullainathan, S., Shafir, E., and Zhao, J. (2013b). Poverty Impedes Cognitive Function. *Science*, 341(6149):976–980.

- Martínez-Martí, M. L., Avia, M. D., and Hernández-Lloreda, M. J. (2010). The effects of counting blessings on subjective well-being: a gratitude intervention in a Spanish sample. *The Spanish journal of psychology*, 13(2):886–896.
- McDermott, L. M. and Ebmeier, K. P. (2009). A meta-analysis of depression severity and cognitive function. *Journal of Affective Disorders*, 119(1-3):1–8.
- McKenzie, D. (2012). Beyond baseline and follow-up: The case for more T in experiments. *Journal of Development Economics*, 99(2):210–221.
- McQueen, A. and Klein, W. M. P. (2006). Experimental manipulations of self-affirmation: A systematic review. *Self and Identity*, 5(4):289–354.
- Meyers, M. C., van Woerkom, M., and Bakker, A. B. (2013). The added value of the positive: A literature review of positive psychology interventions in organizations. *European Journal of Work and Organizational Psychology*, 22(5):618–632.
- Mullainathan, S. and Shafir, E. (2013). *Scarcity: Why Having Too Little Means So Much*. Macmillan.
- Ng'ang'a, A., Waruiru, W., Ngare, C., Sempijija, V., Gachuki, T., Njoroge, I., Oluoch, P., Kimanga, D. O., Maina, W. K., Mpazanje, R., and Kim, A. A. (2014). The Status of HIV Testing and Counseling in Kenya. *JAIDS Journal of Acquired Immune Deficiency Syndromes*, 66(4):S27–S36.
- Odou, N. and Vella-Brodrick, D. A. (2013). The Efficacy of Positive Psychology Interventions to Increase Well-Being and the Role of Mental Imagery Ability. *Social Indicators Research*, 110(1):111–129.
- Rahman, A., Malik, A., Sikander, S., Roberts, C., and Creed, F. (2008). Cognitive behaviour therapy-based intervention by community health workers for mothers with depression and their infants in rural Pakistan: a cluster-randomised controlled trial. *The Lancet*, 372(9642):902–909.
- Ray, D. (2006). Aspirations, poverty, and economic change. *Understanding poverty*, (March):409–421.
- Riley, E. (2017). Increasing students' aspirations: the impact of Queen of Katwe on students' educational attainment Emma. *CSAE Working Paper*, WPS/2017-1:1–51.
- Seligman, M., Steen, T., Park Nansook, and Peterson, C. (2005). Positive Psychology Progress: Empirical Validation of Interventions. *American Psychologist*, 60(5):410–421.
- Shah, A. K., Mullainathan, S., and Shafir, E. (2012). Some Consequences of Having Too Little. *Science*, 338(6107):682–685.
- Shankland, R. and Rosset, E. (2017). Review of Brief School-Based Positive Psychological Interventions: a Taster for Teachers and Educators. *Educational Psychology Review*, 29(2):363–392.
- Sheldon, K. M. and Lyubomirsky, S. (2006). How to increase and sustain positive emotion: The effects of expressing gratitude and visualizing best possible selves. *The Journal of Positive Psychology*, 1(2):73–82.
- Sherman, D. K., Hartson, K. A., Binning, K. R., Purdie-Vaughns, V., Garcia, J., Taborsky-Barba, S., Tomassetti, S., Nussbaum, A. D., and Cohen, G. L. (2013). Deflecting the trajectory and changing the narrative: How self-affirmation affects academic performance and motivation under identity threat. *Journal of Personality and Social Psychology*, 104(4):591.
- Sin, N. and Lyubomirsky, S. (2009). Enhancing Well-Being and Alleviating Depressive Symptoms with Positive Psychology Interventions: A Practice-Friendly Meta-Analysis. *Journal of Clinical Psychology*, 65(5):467–487.
- Subbaraman, R., Nolan, L. B., Shitole, T., Sawant, K., Shitole, S., Sood, K., Nanarkar, M., Ghannam, J., Bloom, D. E., and Patil-Deshmukh, A. (2014). The psychological toll of slum living—an assessment of mental health, disability, and slum-related adversities in Mumbai, India. *The Lancet Global Health*, 2:S26.

- Wood, A. M., Froh, J. J., and Geraghty, A. W. A. (2010). Gratitude and well-being: A review and theoretical integration. *Clinical Psychology Review*, 30(7):890–905.
- World Health Organization (2013). Investing in mental health: evidence for action.
- World Mental Health Survey Consortium (2004). Prevalence, severity, and unmet need for treatment of mental disorders in the World Health Organization World Mental Health Surveys. *JAMA : the journal of the American Medical Association*, 291(21):2581–90.

Table 1: Baseline Balance

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	Surveyed at Baseline			Surveyed at Endline		
	(1) Control Mean (SD)	(2) Treatment	(3) N	(4) Control Mean (SD)	(5) Treatment	(6) N
Attrition	0.28 (0.45)	-0.09 (0.08)	219	0.00 (0.00)	0.00 (0.00)	168
Female Subject	0.63 (0.49)	-0.00 (0.05)	218	0.58 (0.50)	0.04 (0.06)	167
Age	32.17 (9.10)	0.46 (1.48)	218	32.59 (9.66)	0.99 (1.66)	167
Years of Education	10.89 (2.03)	-0.11 (0.27)	218	11.04 (1.98)	-0.37* (0.18)	167
Unemployed	0.24 (0.43)	0.03 (0.06)	218	0.23 (0.42)	0.04 (0.06)	167
Married	0.48 (0.50)	-0.10* (0.05)	218	0.46 (0.50)	-0.10 (0.07)	167
Number of Children	1.68 (1.61)	0.15 (0.22)	218	1.77 (1.70)	0.18 (0.24)	167
Cognitive Function (Ravens)	-0.00 (1.00)	-0.36** (0.13)	219	0.10 (0.98)	-0.48*** (0.12)	168
WVS Happiness	0.00 (1.00)	-0.23 (0.15)	219	-0.04 (0.93)	-0.19 (0.14)	168
WVS Life-Satisfaction	0.00 (1.00)	-0.13 (0.13)	219	-0.04 (1.00)	-0.14 (0.16)	168
SWLS Life-Satisfaction Scale Total	-0.00 (1.00)	0.25 (0.20)	219	-0.09 (0.94)	0.35* (0.18)	168
GQ-6 Gratitude Scale Total	0.00 (1.00)	0.04 (0.08)	219	0.02 (0.97)	0.12 (0.12)	168
WVS Locus of Control	-0.00 (1.00)	-0.00 (0.15)	219	-0.04 (0.98)	-0.02 (0.12)	168
LOTR Life-Orientation Total	0.00 (1.00)	-0.12 (0.17)	219	0.03 (1.01)	-0.10 (0.18)	168
CESD Total	-0.00 (1.00)	0.16 (0.18)	219	-0.00 (1.00)	0.08 (0.17)	168
Psych Wellbeing Index	0.00 (1.00)	-0.03 (0.21)	219	-0.07 (0.94)	0.09 (0.21)	168
First time as Busara subject	0.36 (0.48)	-0.11* (0.06)	219	0.34 (0.48)	-0.06 (0.07)	168
Number of Busara sessions (prior to this experiment)	2.64 (2.37)	0.44 (0.32)	218	2.75 (2.34)	0.33 (0.37)	167

Notes: Difference in key demographics and baseline outcome variables between treated and non-treated individuals, estimated with an OLS regression of variable of interest on the treatment dummy. Demographics and outcome variables are listed on the left. Binary outcomes are left unadjusted, whereas all non-binary outcomes and indices are always normalized to be mean 0, standard deviation of 1, in the control group. Columns (1) through (3) report the results for all individuals present at baseline. Columns (4) through (6) report the results only for individuals present at endline. Column (1) and (4) report the mean of the control group at baseline. Columns (2) and (5) report the mean of the treatment group at baseline. Columns (3) and (6) reports the sample size at baseline and endline respectively. For outcomes measures reported by respondents on each day for 16 days, "baseline" refers to the result reported on day 1 and "endline" refers to the result reported on day 16. \* denotes significance at 10 pct., \*\* at 5 pct., and \*\*\* at 1 pct. level.



Table 2: Baseline difference between treated and non-treated attritors

	(1) Control Mean (SD)	(2) Treatment	(3) N
Female Subject	0.75 (0.44)	-0.10 (0.12)	51
Age	31.11 (7.56)	-2.45 (2.23)	51
Years of Education	-0.35 (0.95)	0.27 (0.35)	51
Unemployed	0.29 (0.46)	0.02 (0.09)	51
Married	0.54 (0.51)	-0.06 (0.10)	51
Number of Children	1.43 (1.35)	-0.17 (0.36)	51
Cognitive Function (Ravens)	-0.25 (1.03)	-0.02 (0.23)	51
WVS Happiness	0.09 (1.17)	-0.32 (0.28)	51
WVS Life-Satisfaction	0.09 (1.02)	-0.03 (0.18)	51
SWLS Life-Satisfaction Scale Total	0.23 (1.13)	-0.02 (0.37)	51
GQ-6 Gratitude Scale Total	-0.05 (1.08)	-0.34* (0.18)	51
WVS Locus of Control	0.11 (1.07)	0.14 (0.36)	51
LOTR Life-Orientation Total	-0.07 (0.99)	-0.26 (0.38)	51
CESD Total	0.01 (1.01)	0.50 (0.32)	51
Psych Wellbeing Index	0.19 (1.14)	-0.45 (0.35)	51
First time as Busara subject	0.43 (0.50)	-0.25* (0.13)	51
Number of Busara sessions (prior to this experiment)	2.36 (2.44)	0.73 (0.62)	51

*Notes:* Difference in key demographics and baseline outcome variables between treated and non-treated attritors, estimated with an OLS regression of variable of interest on the treatment dummy for attriting households only. Demographic and outcome variables are listed on the left. Binary outcomes are left unadjusted, whereas all non-binary outcomes and indices are always normalized to be mean 0, standard deviation of 1, in the control group. Column (1) reports the mean of the control group conditional on attrition for a given outcome variable at baseline. Column (2) reports the baseline difference between treatment and control groups within villages conditional on attrition. Column (3) reports sample size. \* denotes significance at 10 pct., \*\* at 5 pct., and \*\*\* at 1 pct. level.

Table 3: Treatment Effects - Summary Indices

	(1) Control Mean (SD)	(2) Treatment	(3) N
Psych Wellbeing Index	0.00 (1.00)	0.16 (0.13) [0.63]	168
Sleep Quality Index	0.00 (1.00)	-0.06 (0.15) [0.87]	166
Aspirations Index	0.00 (1.00)	-0.13 (0.09) [0.57]	168
Beliefs Index	0.00 (1.00)	-0.07 (0.17) [0.87]	168
Intentions Index	0.00 (1.00)	-0.16 (0.18) [0.76]	168
Joint test ( <i>p</i> -value)		0.09*	
Constrained SUR Coefficient		-0.06	
Constrained SUR ( <i>p</i> -value)		0.43	

*Notes:* OLS regressions of outcome variables on treatment status. Outcome variables are listed on the left. By construction, summary indices are mean 0, SD 1 in the control group. Column (1) reports the variable mean for the control group. Column (2) reports the coefficient from an OLS regression of the outcome variable on treatment status. Column (3) reports the sample size. Standard errors are reported in parentheses and are clustered at the endline session level. FWER-adjusted *p*-values are reported in brackets. \* denotes significance at 10 pct., \*\* at 5 pct., and \*\*\* at 1 pct. level.

Table 4: Treatment Effects - Psychological well-being and Sleep Quality

	(1) Control Mean (SD)	(2) Treatment (SE)	(3) FWER <i>p</i> -value	(4) Treatment (SE)	(5) FWER <i>p</i> -value	(6) N
<i>Panel A: Psychological wellbeing</i>						
GQ-6 Gratitude Scale Total	0.00 (1.00)	0.31*** (0.10)	0.14	0.37*** (0.08)	0.00***	168
WVS Happiness	0.00 (1.00)	-0.04 (0.17)	1.00	-0.07 (0.16)	1.00	168
WVS Life-Satisfaction	0.00 (1.00)	-0.00 (0.14)	1.00	-0.06 (0.14)	1.00	168
SWLS Life-Satisfaction Scale Total	0.00 (1.00)	0.01 (0.11)	1.00	0.26** (0.10)	0.38	168
PANAS Negative Total	0.00 (1.00)	-0.16** (0.07)	0.59	-0.06 (0.11)	0.99	166
PANAS Positive Total	0.00 (1.00)	0.06 (0.13)	1.00	0.03 (0.16)	1.00	166
CESD Total	0.00 (1.00)	-0.01 (0.11)	1.00	0.03 (0.15)	1.00	168
<i>Panel B: Sleep quality</i>						
Hours of Sleep	0.00 (1.00)	0.09 (0.16)	1.00	0.11 (0.16)	0.98	159
Woke-up Refreshed	0.00 (1.00)	-0.12 (0.19)	1.00	-0.12 (0.15)	0.98	166
Difficulty Sleeping	0.24 (0.43)	0.07* (0.04)	0.77	0.07 (0.04)	0.82	166
<i>Panel C: Locus of control</i>						
WVS Locus of Control	0.00 (1.00)	0.12 (0.14)	0.99	0.11 (0.18)	0.98	168
LOTR Life-Orientation Total	0.00 (1.00)	-0.19 (0.12)	0.88	-0.23 (0.15)	0.86	168
<i>Panel D: Other wellbeing outcomes</i>						
Appraisal of Day	0.00 (1.00)	0.21 (0.15)	0.89	0.16 (0.13)	0.90	166
Expectations for Tomorrow	0.00 (1.00)	-0.00 (0.15)	1.00	-0.07 (0.15)	1.00	166
Helped Someone Today	0.29 (0.46)	0.14* (0.07)	0.75	0.15* (0.07)	0.69	166
Connection with Others	0.00 (1.00)	0.21* (0.12)	0.77	0.20 (0.13)	0.88	166
<i>Panel D: Physical activity</i>						
Exercised Today	0.42 (0.50)	0.13** (0.05)	0.47	0.15** (0.06)	0.36	166
Difficulty with Physical Activity	0.28 (0.45)	0.07 (0.05)	0.89	0.04 (0.06)	0.98	166
Controls for Baseline		Yes		No		

*Notes:* OLS regressions of outcome variables on treatment status. Outcome variables are listed on the left. Binary outcomes are left unadjusted, whereas all non-binary outcomes and indices are always normalized to be mean 0, standard deviation of 1, in the control group. Column (1) reports the variable mean for the control group. Column (2) reports the coefficient from an OLS regression of the outcome variable on treatment status controlling for baseline levels. Column (3) reports the coefficient from an OLS regression of the outcome variable on treatment status without controlling for baseline levels. Column (4) reports the sample size. Standard errors are reported in parentheses and are clustered at the session level. \* denotes significance at 10 pct., \*\* at 5 pct., and \*\*\* at 1 pct. level.

Table 5: Treatment Effects - Aspirations and Beliefs

	(1) Control Mean (SD)	(2) Treatment	(3) N
<i>Panel A: Aspirations</i>			
Income Aspirations	0.00 (1.00)	-0.10 (0.08)	168
Assets Aspirations	0.00 (1.00)	-0.07 (0.13)	168
Status Aspirations	0.00 (1.00)	-0.16 (0.19)	168
Education Aspirations	0.00 (1.00)	0.02 (0.21)	168
<i>Panel B: Beliefs about ability and trustworthiness of others</i>			
Own Ethnic Group Competent	0.00 (1.00)	-0.35** (0.14)	168
Own Ethnic Group Trustworthy	0.00 (1.00)	0.08 (0.16)	168
Other Ethnic Group Competent	0.00 (1.00)	-0.17 (0.12)	168
Other Ethnic Group Trustworthy	0.00 (1.00)	0.22 (0.18)	168

*Notes:* OLS regressions of outcome variables on treatment status. Outcome variables are listed on the left. Binary outcomes are left unadjusted, whereas all non-binary outcomes and indices are always normalized to be mean 0, standard deviation of 1, in the control group. Column (1) reports the variable mean for the control group. Column (2) reports the coefficient from an OLS regression of the outcome variable on treatment status. Column (3) reports the sample size. Standard errors are reported in parentheses and are clustered at the endline session level. \* denotes significance at 10 pct., \*\* at 5 pct., and \*\*\* at 1 pct. level.

Table 6: Treatment Effects on Behavior - Intentions, Cognitive Control, Temporal Discounting and Labor Supply

	(1) Control Mean (SD)	(2) Treatment	(3) N
<i>Panel A: Intentions (non-incentivized)</i>			
Willingness to Take HIV-test	0.00 (1.00)	0.00 (0.16)	168
Sweets Intent	0.00 (1.00)	-0.12 (0.14)	168
Money Intent	0.00 (1.00)	-0.29* (0.15)	168
Spouse Intent	0.00 (1.00)	-0.01 (0.13)	122
<i>Panel B: Incentivized behavior</i>			
Stroop Correct Responses	0.00 (1.00)	-0.37** (0.15)	168
Stroop Reaction Time	0.00 (1.00)	0.16 (0.16)	168
Stroop Attempted Responses	0.00 (1.00)	-0.24 (0.14)	168
Exponential discount factor	0.71 (0.20)	0.01 (0.03)	168
<i>Panel C: Labor supply</i>			
Attendance at Busara 2015-2017 (# sessions) (without controls)	4.73 (4.73)	-0.84 (0.50)	218
Attendance at Busara 2015-2017 (# sessions) (controlling for pre-attendance)	4.73 (4.73)	-1.11** (0.46)	218
Attendance at Busara 2015 (# sessions) (controlling for pre-attendance)	1.61 (1.82)	-0.36 (0.22)	218

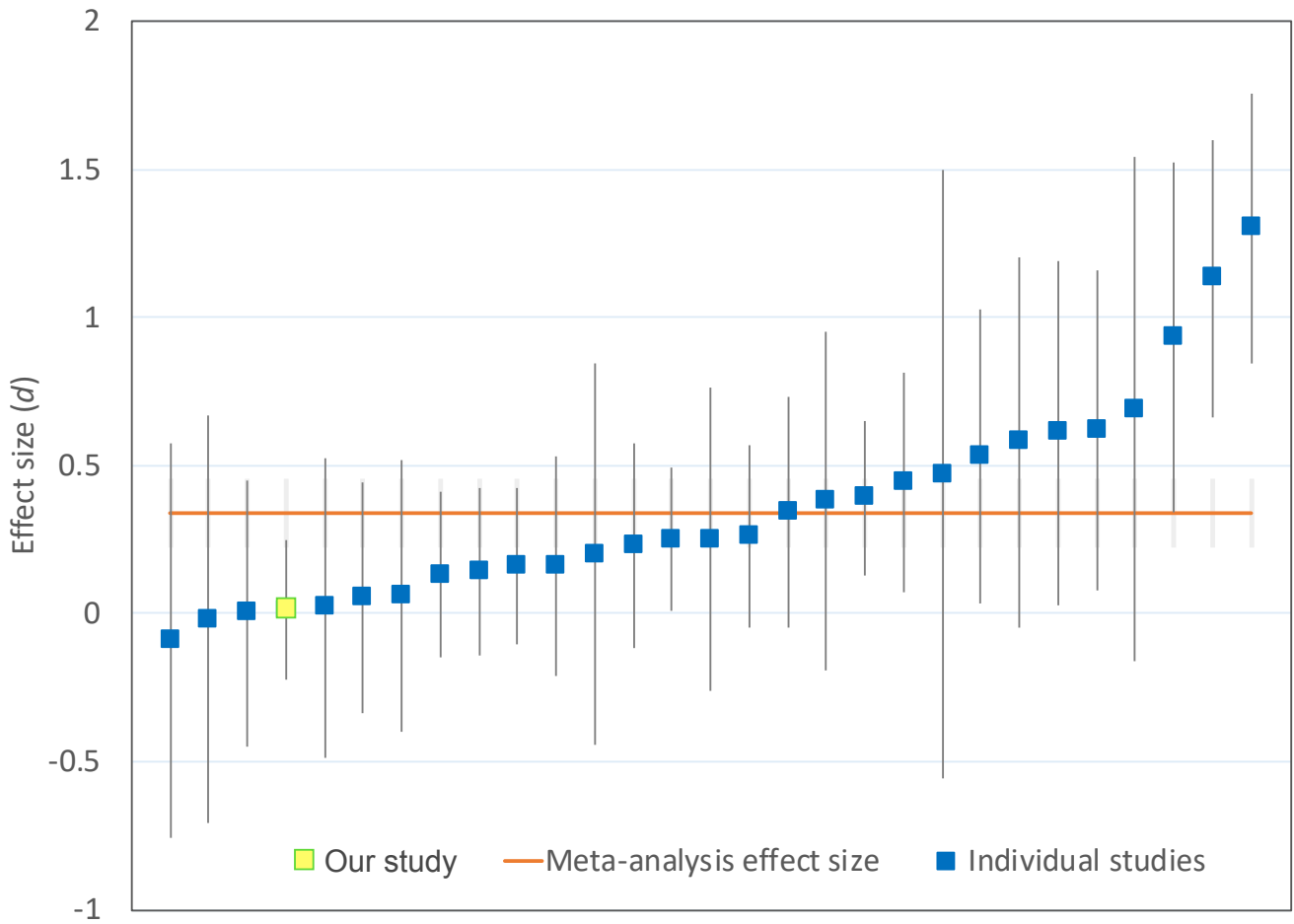
*Notes:* OLS regressions of outcome variables on treatment status. Outcome variables are listed on the left. Non-binary outcomes are normalized to be mean 0, standard deviation of 1, in the control group, with the exception of the exponential discount factor and attendance (measuring as number of sessions). Column (1) reports the variable mean for the control group. Column (2) reports the coefficient from an OLS regression of the outcome variable on treatment status. Column (3) reports the sample size. Panel C reports the impact on labor supply as measured by attendance at Busara between 2015-2017, controlling for pre-treatment attendance (2012-2014). Standard errors are reported in parentheses and are clustered at the endline session level. \* denotes significance at 10 pct., \*\* at 5 pct., and \*\*\* at 1 pct. level.

Table 7: Attrition-adjusted treatment effects

	Attrition-adjusted Treatment Effects		
	(1) Control mean (SD)	(2) Treatment effects (unadjusted)	(3) Attrition correction: IPW
GQ-6 Gratitude Scale Total	-0.00 (1.00)	0.31*** (0.10)	0.31** (0.10)
Psych wellbeing (excluding gratitude)	-0.00 (1.00)	0.08 (0.16)	0.09 (0.16)
Psych Wellbeing Index	-0.00 (1.00)	0.14 (0.15)	0.15 (0.15)
Sleep Quality Index	-0.00 (1.00)	0.00 (0.16)	-0.13 (0.20)
Aspirations Index	0.00 (1.00)	-0.13 (0.09)	-0.11 (0.12)
Beliefs Index	-0.00 (1.00)	-0.07 (0.17)	-0.10 (0.20)
Intentions Index	0.00 (1.00)	-0.16 (0.18)	-0.16 (0.19)
SWLS Life-Satisfaction Scale Total	-0.00 (1.00)	0.01 (0.11)	0.04 (0.10)
PANAS Positive Total	0.00 (1.00)	0.03 (0.16)	-0.05 (0.17)
CESD Total	0.00 (1.00)	-0.01 (0.11)	-0.03 (0.11)
Exponential discount factor	0.71 (0.20)	0.01 (0.04)	0.03 (0.03)
Stroop Correct Responses	0.00 (1.00)	-0.37** (0.15)	-0.25 (0.16)

*Notes:* OLS regressions of outcome variables on treatment status. Outcome variables are listed on the left. Non-binary outcomes are normalized to be mean 0, standard deviation of 1, in the control group, with the exception of the exponential discount factor. Column (1) reports the variable mean for the control group. Column (2) reports the coefficient from an OLS regression of the outcome variable on treatment status, controlling for the baseline measure of the outcome when available, but without adjusting for attrition. Column (3) reports the same coefficient estimated using Inverse Probability Weighting (IPW) to adjust for attrition. Standard errors are reported in parentheses and are clustered at the endline session level. \* denotes significance at 10 pct., \*\* at 5 pct., and \*\*\* at 1 pct. level.

Figure 1: Treatment effects of positive psychology interventions on subjective well-being (SWB)



Notes: Effect sizes (in standard deviations) and confidence intervals (95%) for positive psychology interventions as reported in Bolier et al (2013).

# Online Appendix

“Can Positive Psychology Improve Psychological Well-being and Economic Decision-Making? Experimental Evidence from Kenya” by Baranov, Haushofer, and Jang

## Outcome Variables

Below we list the outcome variables and indices which we will consider by group. Outcomes marked by an asterisk (\*) were measured daily. We aimed to employ measures that are the most widely used in the literature for comparability. The sources for measures and scales are listed below:

- WVS=World Values Survey  
(<http://www.worldvaluessurvey.org/wvs.jsp>).
- SWLS=Satisfaction With Life Scale  
(<https://internal.psychology.illinois.edu/~ediener/SWLS.html>).
- CESD=Center for Epidemiologic Studies Depression Scale  
(<http://cesd-r.com/>).
- PANAS = Postive and Negative Affect Schedule  
([https://en.wikipedia.org/wiki/Positive\\_and\\_Negative\\_Affect\\_Schedule](https://en.wikipedia.org/wiki/Positive_and_Negative_Affect_Schedule)).
- LOTR=Revised Life Orientation Test  
([http://fetzer.org/sites/default/files/images/stories/pdf/selfmeasures/Self\\_Measures\\_for\\_Love\\_and\\_Compassion](http://fetzer.org/sites/default/files/images/stories/pdf/selfmeasures/Self_Measures_for_Love_and_Compassion)).
- GQ6=6-item Gratitude Questionnaire  
(<http://www.psy.miami.edu/faculty/mmccullough/gratitude/GQ-6-scoring-interp.pdf>).

### 1. Psychological well-being

- (a) Happiness - WVS2
- (b) Life satisfaction - SWLS + WVS3
- (c) Depression - CESD
- (d) Rating of well-being from affective states - PANAS\*
- (e) Gratitude - GQ6
- (f) Locus of control - LOTR + WVS1
- (g) Sleep quality:
  - i. Hours of sleep\*
  - ii. Respondent had difficulty sleeping\*
  - iii. How refreshed respondent felt after sleep\*
- (h) Appraisal of day\*



- (i) Expectations for tomorrow\*
- (j) Respondent helped someone with a problem or offered emotional support\*
- (k) Appraisal of connection with others\*
- (l) Index: Weighted standardized average of variables (a)-(e)

## 2. Exercise

- (a) Respondent exercised\*
- (b) Respondent had difficulties with physical activity\*
- (c) Index: Weighted standardized average of variables (a)-(b)

## 3. Intentions

- (a) Intent to eat sweets and sodas over next month
- (b) Intent to spend money wisely over next month
- (c) Intent to have good relationship with spouse over next month
  
- (d) Willingness to take an HIV test (with results given in a few days)
- (e) Index: Weighted standardized average of variables (a)-(d)

## 4. Beliefs

- (a) Belief of competency of people in own ethnic group
- (b) Belief of competency of people in other ethnic groups
- (c) Belief of trustworthiness of people in own ethnic group
- (d) Belief of trustworthiness of people in other ethnic groups
- (e) Index: Weighted standardized average of variables (a)-(d)

## 5. Aspirations index (following ?)

- (a) Annual income
- (b) Assets
- (c) Status
- (d) Education
- (e) Priorities
- (f) Index: Individual-assigned weighted standardized average of variables (a)-(d) using weights given by (e)

## 6. Cognitive control (Stroop - heart/flower)

## 7. Discount rate (MPL)

## A Robustness

### A.1 Temporal Dynamics of the Treatment Effect

With daily data on psychological well-being from the daily sheets that respondents filled out, we have more data, and thus power, to observe treatment effects. Further, we are able to explore the temporal dynamics of the treatment effect. That is, we can observe how quickly or slowly the intervention impacts psychological well-being over the two weeks. In the daily data, we have outcome measures  $y_{it}$  for individual  $i$  for  $t = 0, \dots, 15$ , where  $t = 1$  is the measure after the first day of the intervention, and  $t = 15$  is the measure at endline. The daily measures we collected were on general affect (PANAS positive and negative scores), appraisal of the day, expectations for tomorrow, whether the subject helped someone that day, connected with other, exercised, or had physical difficulties. Additionally, a number of measures of sleep quality were also collected. We estimate the following specification:

$$y_{it} = \beta_0 + \sum_{k=1}^{15} \beta_1^k (T_i \times [t = k]) + \delta y_{i,t=0} + \varepsilon_{it} \quad (2)$$

where  $[t = k]$  is a dummy indicator for the  $k^{\text{th}}$  day of the intervention. The standard errors are corrected for auto-correlation by clustering at the individual level. As before  $y_{i,t=0}$  is the measure of the outcome variable at baseline, prior to the start of the intervention, and is included as a control to improve precision.

Table A.6 reports the temporal dynamics based on the specification in Equation 2. A number of interesting patterns emerge from these data. First, there appears to be a significant and sustained effect of the intervention on exercise. A plausible explanation for this finding is that the treatment increased self-efficacy, which has been shown to improve exercise behavior (?). However, we believe that these effects are actually driven by the interpretation of the exercise to mean filling out the daily sheets and doing the gratitude exercise (and in Swahili, *mazoezi*, can mean physical exercise or homework/writing exercises). Furthermore, the instructions read to participants explicitly referred to the CYB writing task as “exercises”. Indeed, in all time periods, the exercise variable is never correlated with the “Active today” variable from the PANAS. The last column in Table A.6, shows the “overall” or average effect of treatment across days and confirms that subjects in the treatment group were 10 percentage points more likely to be “exercising” during the intervention. However, no other treatment effects on psychological well-being were detected.

### A.2 Heterogeneity

#### A.2.1 Heterogeneous treatment effects by baseline characteristics

It is likely that different groups of people were affected differently by the psychological intervention, and we explore this possibility by looking at the heterogeneous treatment effects by the pre-specified characteristics at baseline. We estimate the differential effects of the intervention along baseline psychological measures (our psychological well-being index and cognitive function from the Raven’s matrices), demographic characteristics (age, gender, and marital status), and economic characteristics (years of education and employment status). We estimate the following equation, interacting the treatment indicator with the heterogeneous dimension of interest measured at baseline and denoted by  $X_{i,t=0}$  and including the main effects:  $y_{i,t=15} = \beta_0 + \beta_1 T_i + \beta_2 X_{i,t=0} + \beta_3 T_i \times X_{i,t=0} + \delta y_{i,t=0} + \varepsilon_{i,t=15}$ . However, we did not find any consistent patterns of heterogeneity that revealed significant benefits of the intervention on any subgroup.

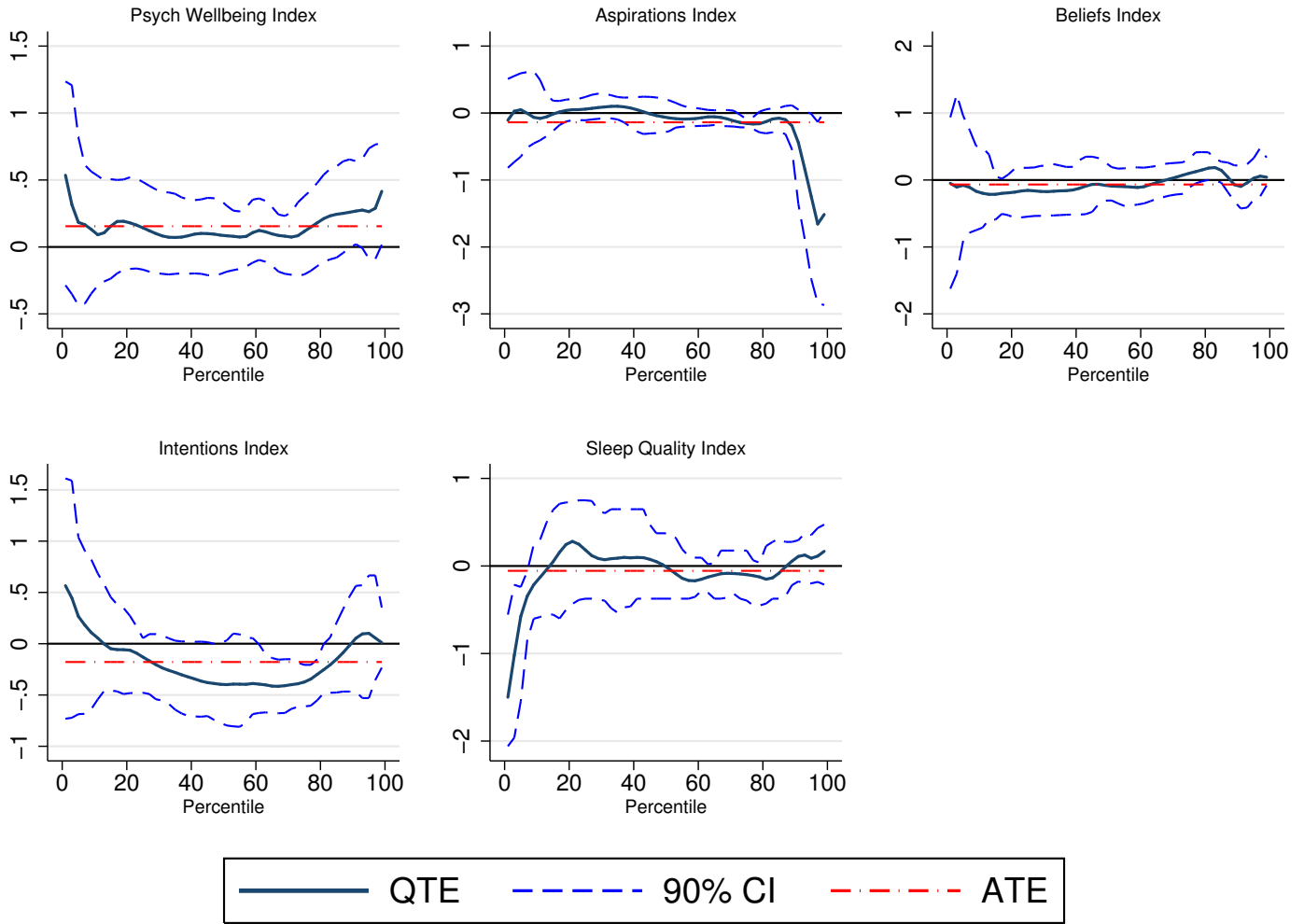
Appendix Tables A.7-A.9 follow the same pattern of reporting: Column 1 shows the coefficient on the treatment dummy, which is interpreted as the effect of treatment for individuals which are not positive in the dimension of interest, Column 2 shows the interaction of the treatment dummy and variable indicating the dimension of heterogeneity (which is dichotomous for all dimensions except for education), and Column 3 shows the main association between the dimension of heterogeneity and the outcomes. Column 4 tests the linear restriction that both the main effect and interaction effect are jointly equal to zero (which, when the heterogeneous characteristics are dichotomous, report the test of the treatment effect for individuals with the characteristic, ie when  $X_{i,t=0} = 1$ ). We briefly discuss the heterogeneous effects by dichotomous measures of psychological well-being and cognitive function (reported in Appendix Table A.7). Firstly, individuals with low baseline psychological well-being did not benefit more from the intervention. It is notable that while high well-being at baseline was positively associated with psychological well-being at endline – those with high baseline well-being were 0.5 SD better in the psychological well-being index at endline – this association is not statistically significant. This lack of autocorrelation is due to the aggregation of outcomes into indices, and because the interacting variable was dichotomized. Individual measures of psychological well-being, however, are all significantly autocorrelated. For heterogeneity by cognitive function, we see that individuals with high cognitive function benefited from treatment, though not significantly so. The only detectable heterogeneous effect is in the beliefs index, which indicates that individuals with high cognitive function had improved beliefs in response to the intervention, while the opposite was true for individuals with low cognitive function. We note that high cognitive function at baseline was strongly positively associated with aspirations, but weakly negatively associated with beliefs and attitudes. We also find no significant heterogeneous effects along the other pre-specified dimensions. Appendix Table A.8 reports heterogeneous effects by demographic characteristics (female, married, and older). We find no strong heterogeneity along these characteristics. We do note that aspirations were 0.5 SD lower among females, psychological well-being was 0.31 SD lower among married individuals 0.52 SD lower among older respondents, and beliefs and intentions were also lower among older respondents (by 0.44 and 0.24 SD respectively). Appendix Table A.9 reports heterogeneous effects by years of education and unemployment. Again, we find no evidence of strong heterogeneity, but note that education was strongly and positively associated with psychological well-being, aspirations, and sleep quality. For example, an additional year of education is associated with higher psychological well-being of 0.18 SD and greater aspirations of 0.26 SD. Curiously, unemployment was not statistically associated with any of the indices (and 24% of the sample reported to be unemployed).

## A.2.2 Quantile Treatment Effects (QTEs)

Since we have a randomized intervention, we are able to test differences along the distribution for our main outcomes (?). We present results of quantile treatment effects (QTEs) for our five main indices in Figure A.1. While we did not explicitly specify quantile regression in the pre-analysis plan, this analysis falls in line with our analysis of the heterogeneous treatment effects. The QTE plots show somewhat different patterns across the five indices, though unsurprisingly the effects were generally not statistically significant anywhere along the distribution. Psychological well-being improved along the entire distribution, with larger improvements at tails. This is reassuring as the intervention was intended to impact primarily psychological well-being. Meanwhile, the effect on aspirations appears to be near zero everywhere along the distribution, except the right-most tail, where we find large negative effects for the 90th percentile. The effect of the intervention on the beliefs index was flat and near zero along the entire distribution. The intentions index follows the same pattern as the psychological well-being index, except the effects are negative in the middle of the distribution and slightly positive at the tails. Finally, the sleep quality index

also hovers around zero for most of the distribution but is strongly negative at the left-most tail. Overall, the analysis of the quantile treatment effects shows that there are no statistically significant positive effects of the intervention somewhere along the distribution that the average treatment effects were masking.

Figure A.1: Quartile Treatment Effects



Notes: Quantile regression plots of primary index variables. Dark blue lines represent point estimates for each percentile, and the dashed blue lines represent the 90% confidence interval. Dashed red line is the average treatment effect.

Table A.1: Summary Statistics

	Mean	SD	Median	Minimum	Maximum	Baseline Observations	Endline Observations
Psych Wellbeing Index <sup>a</sup>	0.10	0.96	0.21	-4.12	2.25	219	176
WVS Happiness	1.83	0.67	2.00	1.00	4.00	219	168
WVS Life-Satisfaction	6.79	1.93	7.00	1.00	10.00	219	168
SWLS Life-Satisfaction Scale Total	20.97	6.50	21.00	6.00	35.00	219	168
PANAS Negative Total	29.49	11.38	27.50	14.00	69.00	103	174
PANAS Positive Total	70.71	13.42	71.00	36.00	94.00	99	174
GQ-6 Gratitude Scale Total	34.55	5.14	35.00	16.00	42.00	219	168
CES-D Total Score	17.38	10.33	15.00	0.00	56.00	219	168
Aspirations Index <sup>b</sup>	-0.08	0.84	-0.10	-1.96	3.97	0	168
Income Aspirations (USD 100)	206.45	517.81	48.08	0.00	3605.77	0	168
Assets Aspirations (USD 100)	6851.75	34278.18	72.12	0.00	240384.61	0	168
Status Aspirations (0 to 100)	75.25	23.49	80.00	0.00	100.00	0	168
Education Aspirations (Years)	17.80	2.68	19.00	2.00	19.00	0	168
Beliefs Index <sup>a</sup>	-0.04	1.02	0.03	-3.50	1.92	0	168
Own Ethnic Group Competent	5.56	1.38	6.00	1.00	7.00	0	168
Own Ethnic Group Trustworthy	4.69	1.57	5.00	1.00	7.00	0	168
Other Ethnic Group Competent	5.25	1.43	6.00	1.00	7.00	0	168
Other Ethnic Group Trustworthy	4.33	1.53	4.00	1.00	7.00	0	168
Intentions Index <sup>a</sup>	-0.09	0.93	0.01	-3.73	1.32	0	168
HIV-test Intent	4.49	0.89	5.00	1.00	5.00	0	168
Sweets Intent	4.28	2.01	4.00	1.00	7.00	0	168
Money Intent	6.47	1.15	7.00	1.00	7.00	0	168
Spouse Intent	6.09	1.49	7.00	1.00	7.00	0	122
Sleep Quality Index <sup>a</sup>	-0.00	1.04	0.22	-3.71	1.89	107	174
Hours of Sleep	7.44	2.06	7.00	1.00	15.00	66	167
Difficulty Sleeping	0.26	0.44	0.00	0.00	1.00	106	174
Woke-up Refreshed	3.89	1.12	4.00	1.00	7.00	106	174

Notes: (a) Index calculated following Anderson (2008) as a GLS-weighted average of variables listed below the index, with all measures flipped such that higher values indicate more favorable outcomes. (b) Index calculated following Bernard et al (2014) from components listed below the index (the overall index is a weighted average of the standardized components, where the weights are assigned by the individual to that dimension).

Table A.2: Baseline Balance

	Surveyed at Baseline			Surveyed at Endline		
	(1) Control Mean (SD)	(2) Treatment	(3) N	(4) Control Mean (SD)	(5) Treatment	(6) N
Attrition	0.28 (0.45)	-0.09 (0.08)	219	0.00 (0.00)	0.00 (0.00)	168
Female Subject	0.63 (0.49)	-0.00 (0.05)	218	0.58 (0.50)	0.04 (0.06)	167
Age	32.17 (9.10)	0.46 (1.48)	218	32.59 (9.66)	0.99 (1.66)	167
Years of Education	10.89 (2.03)	-0.11 (0.27)	218	11.04 (1.98)	-0.37* (0.18)	167
Unemployed	0.24 (0.43)	0.03 (0.06)	218	0.23 (0.42)	0.04 (0.06)	167
Married	0.48 (0.50)	-0.10* (0.05)	218	0.46 (0.50)	-0.10 (0.07)	167
Number of Children	1.68 (1.61)	0.15 (0.22)	218	1.77 (1.70)	0.18 (0.24)	167
Cognitive Function (Ravens)	-0.00 (1.00)	-0.36** (0.13)	219	0.10 (0.98)	-0.48*** (0.12)	168
WVS Happiness	0.00 (1.00)	-0.23 (0.15)	219	-0.04 (0.93)	-0.19 (0.14)	168
WVS Life-Satisfaction	0.00 (1.00)	-0.13 (0.13)	219	-0.04 (1.00)	-0.14 (0.16)	168
SWLS Life-Satisfaction Scale Total	-0.00 (1.00)	0.25 (0.20)	219	-0.09 (0.94)	0.35* (0.18)	168
GQ-6 Gratitude Scale Total	0.00 (1.00)	0.04 (0.08)	219	0.02 (0.97)	0.12 (0.12)	168
WVS Locus of Control	-0.00 (1.00)	-0.00 (0.15)	219	-0.04 (0.98)	-0.02 (0.12)	168
LOTR Life-Orientation Total	0.00 (1.00)	-0.12 (0.17)	219	0.03 (1.01)	-0.10 (0.18)	168
CESD Total	-0.00 (1.00)	0.16 (0.18)	219	-0.00 (1.00)	0.08 (0.17)	168
PANAS Positive Total	-0.00 (1.00)	0.32 (0.18)	99	0.03 (0.99)	0.29 (0.17)	94
PANAS Negative Total	-0.00 (1.00)	-0.04 (0.22)	103	-0.06 (0.97)	0.03 (0.22)	98
Psych Wellbeing Index	0.00 (1.00)	-0.03 (0.21)	219	-0.07 (0.94)	0.09 (0.21)	168
Appraisal of Day	0.00 (1.00)	-0.17 (0.23)	105	0.05 (0.96)	-0.17 (0.23)	100
Expectation for Tomorrow	0.00 (1.00)	-0.15 (0.19)	105	0.02 (1.00)	-0.19 (0.20)	100
Helped Someone Today	0.55 (0.50)	0.05 (0.08)	105	0.55 (0.50)	0.04 (0.09)	100
Connection with Others	-0.00 (1.00)	-0.15 (0.25)	105	-0.02 (1.02)	-0.13 (0.26)	100
Difficulty with Physical Activity	0.37 (0.49)	-0.12 (0.07)	106	0.34 (0.48)	-0.09 (0.07)	101
Sleep Quality Index	-0.00 (1.00)	0.39 (0.22)	107	0.04 (0.96)	0.39* (0.21)	102
Exercised Today	0.37 (0.49)	0.11 (0.11)	106	0.38 (0.49)	0.11 (0.11)	101
Joint test ( <i>p</i> -value)		0.87			0.65	

Notes: Difference in key demographics and baseline outcome variables between treated and non-treated individuals, estimated with an OLS regression of variable of interest on the treatment dummy. Demographics and outcome variables are listed on the left. Binary outcomes are left unadjusted, whereas all non-binary measures are always normalized to be mean 0, standard deviation of 1, in the control group. Columns (1) through (3) report the results for all individuals present at baseline. Columns (4) through (6) report the results only for individuals present at endline. Column (1) and (4) report the mean of the control group at baseline. Columns (2) and (5) report the mean of the treatment group at baseline. Columns (3) and (6) report the sample size at baseline and endline, respectively. For outcomes measures reported by respondents on each day for 16 days, "baseline" refers to the result reported on day 1 and "endline" refers to the result reported on day 16. \* denotes significance at 10 pct., \*\* at 5 pct., and \*\*\* at 1 pct. level.

Table A.3: Baseline difference between attritors and non-attritors

	(1) Non-attrition Mean (SD)	(2) Attrition	(3) N
Female Subject	0.60 (0.49)	0.11 (0.08)	218
Age	33.16 (9.76)	-3.16* (1.63)	218
Years of Education	0.07 (0.99)	-0.30 (0.20)	218
Unemployed	0.25 (0.43)	0.05 (0.04)	218
Married	0.41 (0.49)	0.10 (0.07)	218
Number of Children	1.88 (1.79)	-0.53** (0.21)	218
Cognitive Function (Ravens)	-0.18 (0.97)	-0.09 (0.15)	219
WVS Happiness	-0.15 (0.98)	0.10 (0.15)	219
WVS Life-Satisfaction	-0.12 (0.98)	0.20 (0.13)	219
SWLS Life-Satisfaction Scale Total	0.11 (0.91)	0.12 (0.17)	219
GQ-6 Gratitude Scale Total	0.09 (1.09)	-0.29* (0.15)	219
WVS Locus of Control	-0.06 (1.02)	0.23 (0.19)	219
LOTR Life-Orientation Total	-0.03 (1.12)	-0.16 (0.20)	219
CESD Total	0.04 (1.11)	0.19 (0.18)	219
PANAS Positive Total	0.18 (0.85)	-0.46 (0.39)	99
PANAS Negative Total	-0.04 (1.01)	0.46 (0.47)	103
Psych Wellbeing Index	-0.02 (1.01)	0.00 (0.18)	219
Appraisal of Day	-0.04 (1.12)	-1.04 (0.67)	105
Expectation for Tomorrow	-0.08 (1.05)	0.06 (0.33)	105
Helped Someone Today	0.57 (0.50)	0.03 (0.20)	105
Connection with Others	-0.09 (1.14)	0.32 (0.18)	105
Difficulty with Physical Activity	0.30 (0.46)	0.30 (0.25)	106
Sleep Quality Index	0.23 (1.04)	-0.84 (0.59)	107
Exercised Today	0.44 (0.50)	-0.24 (0.16)	106
First time as Busara subject	0.30 (0.46)	0.01 (0.07)	219
Number of Busara sessions (prior to this experiment)	2.93 (2.40)	-0.25 (0.07)	218

Notes: Difference in key demographics and baseline outcome variables, estimated with an OLS regression of variable on interest on the attrition dummy. Outcome variables are listed on the left. Column (1) reports the mean of the non-attrition group for a given outcome variable at baseline. Column (2) reports the coefficient on the attrition dummy in an OLS regression of the outcome variable on this dummy, thus testing the baseline difference between attrition and non-attrition groups. Column (3) reports sample size. \* denotes significance at 10 pct., \*\* at 5 pct., and \*\*\* at 1 pct. level.



Table A.4: Attrition corrections: IPW and Attrition Bounds

	Attrition-adjusted Treatment Effects			
	(1) Control mean (SD)	(2) Treatment effects (unadjusted)	(3) Attrition correction: IPW	(4) Attrition correction: Lee bounds 95% CI
GQ-6 Gratitude Scale Total	-0.00 (1.00)	0.31*** (0.10)	0.31** (0.10)	[-0.21 0.73]
Psych wellbeing (excluding gratitude)	-0.00 (1.00)	0.08 (0.16)	0.09 (0.16)	[-0.36 0.50]
Psych Wellbeing Index	-0.00 (1.00)	0.14 (0.15)	0.15 (0.15)	[-0.32 0.55]
Sleep Quality Index	-0.00 (1.00)	0.00 (0.16)	-0.13 (0.20)	[-0.62 0.45]
Aspirations Index	0.00 (1.00)	-0.13 (0.09)	-0.11 (0.12)	[-0.39 0.35]
Beliefs Index	-0.00 (1.00)	-0.07 (0.17)	-0.10 (0.20)	[-0.61 0.43]
Intentions Index	0.00 (1.00)	-0.16 (0.18)	-0.16 (0.19)	[-0.59 0.39]
SWLS Life-Satisfaction Scale Total	-0.00 (1.00)	0.01 (0.11)	0.04 (0.10)	[-0.43 0.32]
PANAS Positive Total	0.00 (1.00)	0.03 (0.16)	-0.05 (0.17)	[-0.51 0.48]
CESD Total	0.00 (1.00)	-0.01 (0.11)	-0.03 (0.11)	[-0.51 0.32]
Exponential discount factor	0.71 (0.20)	0.01 (0.04)	0.03 (0.03)	[-0.08 0.13]
Hyperbolic discount factor	0.91 (0.22)	-0.06 (0.05)	-0.06 (0.05)	[-0.13 0.13]
Present-biased	0.21 (0.41)	0.07 (0.07)	0.07 (0.06)	[-0.22 0.21]
Stroop Correct Responses	0.00 (1.00)	-0.37** (0.15)	-0.25 (0.16)	[-0.70 0.34]
Stroop Attempted Responses	0.00 (1.00)	-0.24 (0.14)	-0.11 (0.17)	[-0.56 0.40]
Stroop Reaction Time	-0.00 (1.00)	0.16 (0.16)	0.08 (0.14)	[-0.43 0.47]

*Notes:* OLS regressions of outcome variables on treatment status. Outcome variables are listed on the left. Column (1) reports the variable mean for the control group. Column (2) reports the coefficient from an OLS regression of the outcome variable on treatment status, controlling for the baseline measure of the outcome when available, but without adjusting for attrition. Column (3) reports the same coefficient estimated using Inverse Probability Weighting (IPW) to adjust for attrition. Column (4) provides the 95% confidence interval for the treatment effect calculated from Lee bounds, conditional on baseline covariates. Standard errors are reported in parentheses and are clustered at the endline session level. \* denotes significance at 10 pct., \*\* at 5 pct., and \*\*\* at 1 pct. level.

Table A.5: Participation by Day

	(1) Control Mean (SD)	(2) Treatment	(3) N
Baseline	99	120	219
Daily Sheet 1	54	54	108
Daily Sheet 2	75	97	172
Daily Sheet 3	76	96	172
Daily Sheet 4	76	96	172
Daily Sheet 5	76	96	172
Daily Sheet 6	76	98	174
Daily Sheet 7	76	97	173
Daily Sheet 8	76	95	171
Daily Sheet 9	76	95	171
Daily Sheet 10	76	98	174
Daily Sheet 11	76	97	173
Daily Sheet 12	76	97	173
Daily Sheet 13	76	95	171
Daily Sheet 14	76	96	172
Daily Sheet 15	71	94	165
Daily Sheet 16	76	98	174
Endline	71	97	168

*Notes:* Difference in participation for baseline session, daily participation for days 1 - 16 and endline participation. Column (1) the number of participants in the control condition. Column (2) reports the the number of participants in the treatment condition. Column (3) reports the total. \* denotes significance at 10 pct., \*\* at 5 pct., and \*\*\* at 1 pct. level.

Table A.6: Daily Trends

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	Day of Treatment															Overall Effect
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
<b>Psychological Wellbeing</b>																
PANAS Negative Total	-0.1 (0.1)	-0.1 (0.1)	-0.2** (0.1)	-0.1 (0.1)	0.1 (0.1)	0.2 (0.1)	-0.1 (0.1)	-0.1 (0.1)	-0.1 (0.1)	-0.0 (0.1)	-0.1 (0.1)	-0.1 (0.1)	-0.1 (0.1)	-0.2 (0.1)	-0.2 (0.1)	-0.1 (0.1)
PANAS Positive Total	0.2** (0.1)	0.1 (0.1)	0.1 (0.1)	-0.1 (0.1)	-0.2 (0.1)	-0.3* (0.1)	-0.1 (0.1)	-0.1 (0.1)	-0.2 (0.1)	-0.0 (0.1)	-0.1 (0.1)	-0.1 (0.1)	-0.0 (0.1)	-0.2 (0.1)	-0.0 (0.1)	-0.1 (0.1)
Appraisal of Day	0.3** (0.1)	0.1 (0.1)	-0.0 (0.1)	-0.2 (0.2)	0.1 (0.1)	-0.1 (0.1)	0.3*** (0.1)	0.2** (0.1)	0.1 (0.1)	-0.0 (0.1)	-0.1 (0.1)	-0.1 (0.1)	0.1 (0.1)	0.1 (0.1)	0.2** (0.1)	0.1 (0.1)
Expectation for Tomorrow	-0.0 (0.1)	-0.1 (0.1)	-0.2 (0.1)	-0.1 (0.2)	-0.1 (0.1)	-0.0 (0.1)	0.0 (0.1)	0.0 (0.1)	-0.1 (0.2)	-0.2 (0.2)	-0.2 (0.1)	0.0 (0.1)	-0.2 (0.2)	-0.0 (0.1)	0.0 (0.1)	-0.1 (0.1)
Helped Someone Today	0.1 (0.1)	0.1** (0.1)	0.1 (0.1)	0.1 (0.1)	0.1 (0.1)	0.0 (0.1)	0.1* (0.1)	0.0 (0.1)	0.0 (0.1)	0.1* (0.1)	0.1 (0.1)	0.0 (0.1)	0.1 (0.1)	0.1 (0.1)	-0.1 (0.1)	0.1 (0.0)
Connection with Others	0.1 (0.1)	0.2 (0.1)	0.0 (0.1)	0.0 (0.1)	-0.2 (0.1)	-0.2 (0.2)	0.2 (0.1)	0.2* (0.1)	0.0 (0.1)	-0.3* (0.2)	-0.1 (0.1)	-0.1 (0.1)	-0.2 (0.2)	0.0 (0.1)	0.2** (0.1)	-0.0 (0.1)
<b>Exercise</b>																
Exercised Today	0.0 (0.1)	0.1** (0.1)	0.0 (0.1)	0.2*** (0.1)	0.1 (0.1)	0.1* (0.1)	0.2*** (0.1)	0.1 (0.1)	0.1** (0.1)	0.1** (0.1)	0.1* (0.1)	0.1* (0.1)	0.2*** (0.1)	0.2*** (0.1)	0.1** (0.1)	0.1*** (0.0)
Difficulty with Physical Activity	0.0 (0.1)	-0.1* (0.1)	-0.0 (0.1)	0.0 (0.1)	0.0 (0.1)	-0.0 (0.1)	0.0 (0.1)	0.1 (0.1)	0.0 (0.1)	0.0 (0.1)	0.0 (0.1)	0.1* (0.1)	-0.0 (0.1)	-0.0 (0.1)	-0.0 (0.1)	0.0 (0.0)
<b>Sleep</b>																
Sleep Index	0.0 (0.1)	0.1 (0.1)	0.0 (0.1)	-0.1 (0.1)	-0.1 (0.1)	-0.3** (0.1)	0.0 (0.1)	-0.3** (0.1)	0.0 (0.1)	-0.2 (0.1)	-0.1 (0.1)	0.1 (0.1)	-0.0 (0.1)	0.2 (0.1)	-0.0 (0.1)	-0.0 (0.1)
Hours of Sleep	-0.3 (0.3)	0.1 (0.3)	-0.3 (0.3)	-0.2 (0.3)	0.4 (0.3)	-0.3 (0.3)	0.2 (0.3)	-0.3 (0.3)	-0.2 (0.4)	-0.3 (0.3)	-0.1 (0.3)	0.1 (0.3)	-0.1 (0.3)	0.1 (0.4)	0.1 (0.3)	-0.1 (0.3)
Difficulty Sleeping	0.1 (0.1)	0.0 (0.1)	0.1 (0.1)	0.1* (0.1)	0.0 (0.1)	0.1 (0.1)	-0.1 (0.1)	0.1 (0.1)	0.0 (0.1)	0.0 (0.1)	-0.0 (0.1)	0.0 (0.1)	0.0 (0.1)	-0.1 (0.1)	-0.0 (0.1)	0.0 (0.0)
Woke-up Refreshed	-0.3* (0.2)	-0.2 (0.2)	-0.2 (0.2)	-0.1 (0.2)	-0.2 (0.2)	-0.0 (0.1)	-0.0 (0.2)	-0.0 (0.1)	0.0 (0.1)	-0.1 (0.2)	0.0 (0.1)	0.1 (0.1)	0.3* (0.1)	0.1 (0.1)	0.2 (0.1)	-0.0 (0.1)

Notes: Panel regressions of outcome variables measured on each of the 15 days on treatment status. Outcome variables are listed on the left. The regression includes daily fixed effects. Columns (1) through (15) reports the effect size for treatment on each of the days of the study for variables collected on a daily basis. Column (16) reports the overall effect averaged across all days. Standard errors are clustered at the individual level to control for autocorrelation. \* denotes significance at 10 pct., \*\* at 5 pct., and \*\*\* at 1 pct. level.

Table A.7: Heterogenous Effects by Baseline Psychological Characteristics

	(1)	(2)	(3)	(4)	(5)
	Treat	Treat X Interactant	Interactant	F-test (1)+(2)=0 (p-value)	N
High Psychological Wellbeing					
Psych Wellbeing Index	0.14 (0.21)	-0.05 (0.35)	0.50 (0.28)	0.74	168
Aspirations Index	-0.09 (0.14)	-0.12 (0.17)	0.21 (0.12)	0.15	168
Beliefs Index	-0.03 (0.26)	-0.14 (0.36)	0.37 (0.26)	0.42	168
Intentions Index	-0.20 (0.19)	0.09 (0.28)	-0.08 (0.19)	0.69	168
Sleep Quality Index	0.02 (0.26)	-0.26 (0.28)	0.53** (0.19)	0.04**	166
High Cognitive Function					
Psych Wellbeing Index	-0.04 (0.17)	0.42 (0.26)	-0.19 (0.22)	0.07*	168
Aspirations Index	-0.01 (0.13)	-0.15 (0.14)	0.35*** (0.08)	0.25	168
Beliefs Index	-0.33* (0.17)	0.54*** (0.13)	-0.25* (0.12)	0.33	168
Intentions Index	-0.34 (0.19)	0.34 (0.23)	-0.23 (0.13)	1.00	168
Sleep Quality Index	-0.17 (0.20)	0.20 (0.27)	-0.12 (0.14)	0.87	166

*Notes:* OLS regressions of outcome variables on treatment status and treatment status interacted with a dimension of heterogeneity. Outcome variables are listed on the left. Column (1) reports the overall treatment effect. Column (2) reports the heterogenous effect for individuals in the category of interest. Column (3) reports the difference in outcome for individuals in the category of interest in relation to those who are not. Column (4) reports the p-value of an F-test with the null hypothesis that the sum of the coefficients reported in (1) and (2) is zero. Column (5) reports the sample size. Standard errors are reported in parentheses and are clustered at the endline session level. \* denotes significance at 10 pct., \*\* at 5 pct., and \*\*\* at 1 pct. level.

Table A.8: Heterogenous Effects by Personal Characteristics

	(1) Treat	(2) Treat X Interactant	(3) Interactant	(4) F-test (1)+(2)=0 (p-value)	(5) N
<b>Female Subject</b>					
Psych Wellbeing Index	0.28 (0.27)	-0.21 (0.36)	0.11 (0.32)	0.70	167
Aspirations Index	-0.22 (0.14)	0.17 (0.18)	-0.50** (0.16)	0.67	167
Beliefs Index	0.13 (0.15)	-0.33 (0.25)	-0.01 (0.20)	0.42	167
Intentions Index	-0.15 (0.22)	-0.02 (0.17)	0.04 (0.16)	0.35	167
Sleep Quality Index	0.16 (0.17)	-0.36* (0.17)	-0.02 (0.10)	0.23	165
<b>Married</b>					
Psych Wellbeing Index	0.14 (0.13)	-0.05 (0.19)	-0.31*** (0.07)	0.64	167
Aspirations Index	-0.30** (0.13)	0.42 (0.31)	-0.10 (0.25)	0.62	167
Beliefs Index	-0.25 (0.17)	0.37 (0.39)	-0.33 (0.30)	0.69	167
Intentions Index	-0.24 (0.27)	0.16 (0.35)	-0.13 (0.30)	0.73	167
Sleep Quality Index	0.09 (0.16)	-0.38 (0.21)	0.08 (0.07)	0.18	165
<b>Above Median Age</b>					
Psych Wellbeing Index	-0.00 (0.16)	0.30 (0.28)	-0.52*** (0.13)	0.21	168
Aspirations Index	-0.16 (0.11)	0.06 (0.25)	-0.04 (0.21)	0.57	168
Beliefs Index	-0.34* (0.17)	0.52* (0.25)	-0.44* (0.21)	0.46	168
Intentions Index	-0.24 (0.24)	0.16 (0.18)	-0.24** (0.10)	0.54	168
Sleep Quality Index	0.06 (0.17)	-0.25 (0.31)	-0.14 (0.18)	0.45	166

*Notes:* OLS regressions of outcome variables on treatment status and treatment status interacted with a dimension of heterogeneity. Outcome variables are listed on the left. Column (1) reports the overall treatment effect. Column (2) reports the heterogenous effect for individuals in the category of interest. Column (3) reports the difference in outcome for individuals in given category of interest in relation to those who are not. Column (4) reports the p-value of an F-test with the null hypothesis that the sum of the coefficients reported in (1) and (2) is zero. Column (5) reports the sample size. Standard errors are reported in parentheses and are clustered at the endline session level. \* denotes significance at 10 pct., \*\* at 5 pct., and \*\*\* at 1 pct. level.

Table A.9: Heterogenous Effects by Economic Characteristics

	(1) Treat	(2) Treat X Interactant	(3) Interactant	(4) F-test (1)+(2)=0 (p-value)	(5) N
<b>Years of Education</b>					
Psych Wellbeing Index	0.19 (0.14)	-0.23* (0.12)	0.18** (0.06)	0.83	167
Aspirations Index	-0.09 (0.12)	-0.14 (0.13)	0.26** (0.11)	0.01**	167
Beliefs Index	-0.08 (0.19)	-0.03 (0.18)	-0.01 (0.13)	0.54	167
Intentions Index	-0.17 (0.17)	0.05 (0.14)	-0.04 (0.12)	0.67	167
Sleep Quality Index	-0.04 (0.15)	-0.03 (0.08)	0.12*** (0.02)	0.68	165
<b>Unemployed</b>					
Psych Wellbeing Index	0.13 (0.18)	0.10 (0.34)	0.08 (0.16)	0.39	167
Aspirations Index	-0.13 (0.14)	-0.02 (0.22)	-0.02 (0.18)	0.19	167
Beliefs Index	-0.13 (0.17)	0.19 (0.32)	0.23 (0.22)	0.88	167
Intentions Index	-0.22 (0.20)	0.20 (0.27)	0.15 (0.22)	0.92	167
Sleep Quality Index	-0.12 (0.21)	0.23 (0.50)	-0.21 (0.35)	0.77	165

*Notes:* OLS regressions of outcome variables on treatment status and treatment status interacted with a dimension of heterogeneity. Outcome variables are listed on the left. Column (1) reports the overall treatment effect. Column (2) reports the heterogenous effect for individuals in the category of interest. Column (3) reports the difference in outcome for individuals in given category of interest in relation to those who are not. Column (4) reports the p-value of an F-test with the null hypothesis that the sum of the coefficients reported in (1) and (2) is zero. Column (5) reports the sample size. Standard errors are reported in parentheses and are clustered at the endline session level. \* denotes significance at 10 pct., \*\* at 5 pct., and \*\*\* at 1 pct. level.

Table A.10: Treatment Effect on Latent Factors

	(1) Control Mean (SD)	(2) Treatment	(3) N
Psych Wellbeing Index (Factor Analysis)	-0.05 (0.77)	0.09 (0.08) [0.60]	166
Sleep Quality Index (Factor Analysis)	0.02 (0.61)	-0.07 (0.07) [0.60]	159
Beliefs Index (Factor Analysis)	0.06 (0.60)	-0.10 (0.09) [0.60]	168
Joint test ( <i>p</i> -value)		0.47	
Constrained SUR Coefficient		-0.06	
Constrained SUR ( <i>p</i> -value)		0.38	

*Notes:* OLS regressions of outcome variables on treatment status. Outcome variables are listed on the left. Column (1) reports the variable mean for the control group. Column (2) reports the coefficient from an OLS regression of the outcome variable on treatment status. Column (3) reports the sample size. Standard errors are reported in parentheses and are clustered at the baseline session level. \* denotes significance at 10 pct., \*\* at 5 pct., and \*\*\* at 1 pct. level.

Table A.11: Baseline Psychological well-being Heterogenous Effects - Psychological well-being

	(1) Treat	(2) Treat X Interactant	(3) Interactant	(4) F-test (1)+(2)=0 (p-value)	(5) N
WVS Happiness	-0.26 (0.31)	0.40 (0.38)	-0.28 (0.30)	0.39	168
WVS Life-Satisfaction	0.06 (0.23)	-0.29 (0.34)	0.45 (0.33)	0.29	168
SWLS Life-Satisfaction Scale Total	0.47** (0.21)	-0.52 (0.32)	0.61** (0.26)	0.77	168
PANAS Negative Total	0.01 (0.15)	-0.07 (0.32)	-0.29 (0.29)	0.80	166
PANAS Positive Total	0.13 (0.22)	-0.27 (0.33)	0.42 (0.31)	0.64	166
GQ-6 Gratitude Scale Total	0.20* (0.09)	0.27 (0.17)	0.23 (0.13)	0.00***	168
WVS Locus of Control	-0.10 (0.28)	0.42 (0.35)	-0.08 (0.23)	0.17	168
LOTR Life-Orientation Total	-0.51** (0.19)	0.52** (0.22)	-0.04 (0.13)	0.95	168
CESD Total	0.02 (0.19)	0.11 (0.30)	-0.48** (0.19)	0.62	168
Appraisal of Day	0.47** (0.16)	-0.71*** (0.21)	0.76*** (0.13)	0.10	166
Expectation for Tomorrow	-0.00 (0.31)	-0.22 (0.37)	0.54* (0.25)	0.11	166
Helped Someone Today	0.15 (0.08)	0.03 (0.11)	-0.16** (0.07)	0.07*	166
Connection with Others	0.29 (0.24)	-0.23 (0.34)	0.26 (0.21)	0.71	166
Exercised Today	0.09 (0.09)	0.14 (0.13)	-0.15** (0.06)	0.02**	166
Difficulty with Physical Activity	0.04 (0.10)	0.05 (0.12)	-0.22* (0.10)	0.15	166
Hours of Sleep	0.34 (0.25)	-0.45 (0.27)	0.18 (0.18)	0.48	159
Woke-up Refreshed	-0.02 (0.22)	-0.30 (0.27)	0.63** (0.21)	0.09*	166
Difficulty Sleeping	0.11 (0.08)	-0.05 (0.13)	-0.18* (0.10)	0.40	166

Notes: OLS regressions of outcome variables on treatment status. Outcome variables are listed on the left. Column (1) reports the variable mean for the control group. Column (2) reports the coefficient from an OLS regression of the outcome variable on treatment status. Column (3) reports the sample size. Standard errors are reported in parentheses and are clustered at the endline session level. \* denotes significance at 10 pct., \*\* at 5 pct., and \*\*\* at 1 pct. level.



Table A.12: Daily Trend

	(1) Treat	(2) Treat X Day	(3) F-test (1)+(2)=0 ( <i>p</i> -value)	(4) N
Psychological Wellbeing				
PANAS Negative Total	-0.00 (0.01)	-0.00 (0.01)	0.58	2513
PANAS Positive Total	-0.01 (0.01)	-0.01 (0.01)	0.78	2508
Appraisal of Day	-0.00 (0.01)	-0.00 (0.01)	0.45	2542
Expectation for Tomorrow	0.00 (0.01)	0.00 (0.01)	0.39	2540
Helped Someone Today	0.00 (0.00)	0.00 (0.00)	0.24	2541
Connection with Others	-0.00 (0.01)	-0.00 (0.01)	0.78	2540
Exercise				
Exercised Today	0.08 (0.05)	0.00 (0.00)	0.08*	2572
Difficulty with Physical Activity	-0.04 (0.05)	0.01* (0.00)	0.50	2561
Sleep				
Sleep Index	-0.07 (0.11)	0.00 (0.01)	0.55	2577
Hours of Sleep	-0.12 (0.30)	0.01 (0.02)	0.70	1893
Difficulty Sleeping	0.05 (0.05)	-0.00 (0.00)	0.36	2575
Woke-up Refreshed	-0.05 (0.13)	0.00 (0.01)	0.72	2573

*Notes:* OLS regression of daily outcomes on an interaction between treatment status and the day of study. Outcome variables are listed on the left. The regression includes daily fixed effects. Columns (1) reports the coefficient and standard error of the interaction between treatment status and day of study. Column (2) reports observation. Standard errors are clustered at the individual level to control for autocorrelation. \* denotes significance at 10 pct., \*\* at 5 pct., and \*\*\* at 1 pct. level.

Table A.13: Sensitivity to baseline controls

	(1) No controls $\beta$ / (s.e.)	(2) With controls $\beta$ / (s.e.)	(3) FWER $p$ -value	(4) N
Psych Wellbeing Index	0.16 (0.13)	0.22 (0.12)	0.45	167
Sleep Quality Index	-0.06 (0.15)	-0.05 (0.17)	0.96	165
Aspirations Index	-0.13 (0.09)	-0.05 (0.11)	0.96	167
Beliefs Index	-0.07 (0.17)	-0.05 (0.16)	0.96	167
Intentions Index	-0.16 (0.18)	-0.14 (0.18)	0.91	167

*Notes:* OLS regressions of outcome variables on treatment status. Outcome variables are listed on the left. Column (1) reports the coefficient from an OLS regression of the outcome variable on treatment status without baseline controls. Column (2) includes baseline controls for education and cognitive function (Ravens). Standard errors are reported in parentheses and are clustered at the endline session level. FWER-adjusted  $p$ -values are reported in Column (3). \* denotes significance at 10 pct., \*\* at 5 pct., and \*\*\* at 1 pct. level.

Table A.14: Psychological well-being: sensitivity to baseline controls

	(1) No controls $\beta$ / (s.e.)	(2) With controls $\beta$ / (s.e.)	(3) FWER <i>p</i> -value	(4) N
WVS Happiness	-0.07 (0.16)	-0.04 (0.15)	1.00	167
WVS Life-Satisfaction	-0.06 (0.14)	-0.08 (0.15)	1.00	167
SWLS Life-Satisfaction Scale Total	0.26** (0.10)	0.15 (0.11)	0.92	167
PANAS Negative Total	-0.06 (0.11)	-0.19 (0.13)	0.92	165
PANAS Positive Total	0.03 (0.16)	0.06 (0.17)	1.00	165
GQ-6 Gratitude Scale Total	0.37*** (0.08)	0.43*** (0.06)	0.00***	167
WVS Locus of Control	0.11 (0.18)	0.17 (0.18)	0.99	167
LOTR Life-Orientation Total	-0.23 (0.15)	-0.08 (0.14)	1.00	167
CESD Total	0.03 (0.15)	-0.12 (0.15)	0.99	167
Appraisal of Day	0.16 (0.13)	0.21 (0.15)	0.92	165
Expectation for Tomorrow	-0.07 (0.15)	0.04 (0.16)	1.00	165
Helped Someone Today	0.15* (0.07)	0.11 (0.07)	0.89	165
Connection with Others	0.20 (0.13)	0.21 (0.15)	0.92	165
Difficulty with Physical Activity	0.04 (0.06)	-0.02 (0.06)	1.00	165
Hours of Sleep	0.11 (0.16)	0.07 (0.18)	1.00	158
Woke-up Refreshed	-0.12 (0.15)	-0.09 (0.17)	1.00	165
Difficulty Sleeping	0.07 (0.04)	0.04 (0.04)	0.99	165

*Notes:* OLS regressions of outcome variables on treatment status. Outcome variables are listed on the left. Column (1) reports the coefficient from an OLS regression of the outcome variable on treatment status without baseline controls. Column (2) includes baseline controls for education and cognitive function (Ravens). Standard errors are reported in parentheses and are clustered at the endline session level. FWER-adjusted *p*-values are reported in Column (3). \* denotes significance at 10 pct., \*\* at 5 pct., and \*\*\* at 1 pct. level.

Table A.15: Cognitive controls and time discounting: sensitivity to baseline controls

	(1) No controls $\beta$ / (s.e.)	(2) With controls $\beta$ / (s.e.)	(3) FWER $p$ -value	(4) N
Stroop Correct Responses	-0.37** (0.15)	-0.16 (0.14)	0.62	167
Stroop Reaction Time	0.16 (0.16)	0.04 (0.15)	0.89	167
Stroop Attempted Responses	-0.24 (0.14)	-0.05 (0.13)	0.89	167
Exponential discount factor	0.01 (0.03)	0.03 (0.04)	0.43	167

*Notes:* OLS regressions of outcome variables on treatment status. Outcome variables are listed on the left. Column (1) reports the coefficient from an OLS regression of the outcome variable on treatment status without baseline controls. Column (2) includes baseline controls for education and cognitive function (Ravens). Standard errors are reported in parentheses and are clustered at the endline session level. FWER-adjusted  $p$ -values are reported in Column (3). \* denotes significance at 10 pct., \*\* at 5 pct., and \*\*\* at 1 pct. level.

Table A.16: Components of Psychological well-being at Endline

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	Including Gratitude Score				Excluding Gratitude Score			
	Psych Wellbeing Index (1)	Psych Wellbeing Index (2)	Psych Wellbeing Factor Score (3)	Psych Wellbeing Factor Score (4)	Psych Wellbeing Index (5)	Psych Wellbeing Index (6)	Psych Wellbeing Factor Score (7)	Psych Wellbeing Factor Score (8)
Treatment	0.16 (0.13)	0.084 (0.17)	0.095 (0.079)	0.16* (0.080)	0.096 (0.14)	0.037 (0.18)	0.069 (0.068)	-0.018 (0.099)
GQ-6 Gratitude Scale Total		0.25*** (0.067)		0.22*** (0.042)		0.18** (0.071)		0.080 (0.056)
CESD Total		0.00018 (0.078)		-0.16** (0.055)		-0.016 (0.083)		-0.17* (0.089)
LOTR Life-Orientation Total		-0.0083 (0.050)		0.085* (0.046)		-0.027 (0.049)		-0.0057 (0.027)
SWLS Life-Satisfaction Scale Total		0.26** (0.094)		-0.093 (0.060)		0.26** (0.098)		0.28*** (0.074)
Cognitive Function (Ravens)		0.088 (0.060)		0.078 (0.067)		0.10 (0.069)		-0.035 (0.061)
Female Subject		0.051 (0.15)		-0.077 (0.100)		0.051 (0.16)		-0.15 (0.089)
Age		-0.0057 (0.0082)		-0.0025 (0.0035)		-0.0061 (0.0091)		-0.0095* (0.0049)
r <sup>2</sup>	0.0081	0.19	0.0040	0.38	0.0030	0.14	0.0021	0.24
N	168	168	166	166	168	168	166	166

Notes: OLS regressions of outcome variables (measured at endline), listed on top, on treatment status with and without baseline controls. Controls (listed on left) were all measured at baseline. Columns 1-4 include the GQ-6 Gratitude score in the summary index (as in the main paper), while columns 5-8 exclude it. Standard errors are reported in parentheses and are clustered at the endline session level. \* denotes significance at 10 pct., \*\* at 5 pct., and \*\*\* at 1 pct. level.

Table A.17: Additional baseline controls

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	Psych Wellbeing (1)	Sleep Quality (2)	Aspirations (3)	Beliefs (4)	Intentions (5)	Discount factor (6)	Stroop Correct (7)
Treatment	0.084 (0.17)	-0.072 (0.17)	-0.077 (0.11)	-0.15 (0.14)	-0.14 (0.18)	0.030 (0.038)	-5.88* (2.79)
GQ-6 Gratitude Scale Total	0.25*** (0.067)	0.10 (0.073)	0.20*** (0.061)	0.16** (0.067)	-0.018 (0.032)	0.0073 (0.019)	1.81 (2.44)
CESD Total	0.00018 (0.078)	-0.16 (0.088)	-0.0020 (0.061)	-0.0067 (0.089)	-0.0049 (0.061)	0.022 (0.016)	-3.10 (3.91)
LOTR Life-Orientation Total	-0.0083 (0.050)	-0.020 (0.13)	-0.044 (0.092)	-0.12 (0.088)	0.052 (0.054)	0.0047 (0.022)	-1.03 (2.08)
SWLS Life-Satisfaction Scale Total	0.26** (0.094)	-0.095 (0.10)	-0.096 (0.078)	0.21** (0.084)	0.020 (0.12)	-0.0016 (0.023)	-3.35 (2.73)
Cognitive Function (Ravens)	0.088 (0.060)	-0.091 (0.11)	0.098 (0.066)	0.043 (0.10)	0.032 (0.073)	0.038 (0.030)	6.36** (2.43)
Female Subject	0.051 (0.15)	-0.17 (0.12)	-0.30** (0.11)	-0.20 (0.16)	0.071 (0.096)	0.0075 (0.035)	-13.2** (5.04)
Age	-0.0057 (0.0082)	-0.00087 (0.012)	0.0066 (0.0059)	-0.0020 (0.0086)	-0.0071 (0.0040)	-0.00060 (0.0018)	-1.26*** (0.37)
r <sup>2</sup>	0.19	0.059	0.15	0.076	0.021	0.043	0.32
N	168	166	168	168	168	168	168

Notes: OLS regressions of outcome variables, listed on top, on treatment status with additional baseline controls. All specifications include as independent variables only the listed (on left) variables, measured at baseline. Standard errors are reported in parentheses and are clustered at the endline session level. \* denotes significance at 10 pct., \*\* at 5 pct., and \*\*\* at 1 pct. level.

Table A.18: Components of Psychological well-being at Endline

	GQ-6 (1)	CESD (2)	LOTR (3)	SWLS (4)
Treatment	0.30*** (0.055)	-0.055 (0.12)	-0.12 (0.11)	-0.034 (0.094)
GQ-6 Gratitude Scale Total	0.42*** (0.053)	-0.18*** (0.050)	0.094 (0.056)	0.0076 (0.046)
CESD Total	-0.040 (0.094)	0.29*** (0.089)	-0.16** (0.052)	-0.018 (0.085)
LOTR Life-Orientation Total	0.13 (0.073)	-0.082 (0.069)	0.28*** (0.062)	-0.11** (0.038)
SWLS Life-Satisfaction Scale Total	0.052 (0.078)	0.016 (0.094)	-0.17* (0.075)	0.72*** (0.081)
Cognitive Function (Ravens)	-0.033 (0.13)	-0.13 (0.085)	0.013 (0.053)	-0.098* (0.044)
Female Subject	-0.060 (0.19)	0.17* (0.088)	-0.17 (0.14)	-0.15 (0.11)
Age	-0.0028 (0.0061)	0.0010 (0.0063)	-0.018** (0.0068)	-0.013* (0.0060)
r <sup>2</sup>	0.28	0.33	0.35	0.48
N	168	168	168	168

*Notes:* OLS regressions of outcome variables (measured at endline), listed on top, on treatment status with baseline controls. Controls (listed on left) were all measured at baseline. Standard errors are reported in parentheses and are clustered at the endline session level. \* denotes significance at 10 pct., \*\* at 5 pct., and \*\*\* at 1 pct. level.

Table A.19: Cognitive control: Additional baseline controls

	Stroop Correct Responses		Stroop Attempted Responses		Stroop Reaction Time	
	(1)	(2)	(3)	(4)	(5)	(6)
Treatment	-11.8*	-6.52	-3.27	-1.26	0.12	0.029
	(6.29)	(3.90)	(2.47)	(1.60)	(0.15)	(0.11)
Cognitive Function (Ravens)		4.70		1.84		-0.054
		(2.70)		(1.20)		(0.063)
SWLS Life-Satisfaction Scale Total		-2.45		-0.34		0.066
		(2.68)		(1.34)		(0.077)
GQ-6 Gratitude Scale Total		0.76		-0.18		0.011
		(2.03)		(0.67)		(0.033)
CESD Total		-2.91		-1.48		0.092
		(2.49)		(1.07)		(0.068)
Female Subject		-11.2**		-4.93**		0.14*
		(4.03)		(2.01)		(0.079)
Number of Children		0.40		0.56		-0.012
		(3.07)		(1.24)		(0.065)
Years of Education		6.48**		2.27*		-0.012
		(2.59)		(1.12)		(0.047)
Unemployed		-0.67		-1.76		0.24
		(5.74)		(2.27)		(0.21)
Married		-7.12		-2.84		0.040
		(4.08)		(1.87)		(0.13)
Age		-1.17**		-0.61***		0.029
		(0.46)		(0.20)		(0.018)
Dep. var mean		94.9		55.2		1.07
Dep. var sd		36.9		14.9		0.84
R2	0.025	0.36	0.012	0.35	0.0054	0.17
Observations	168	168	168	168	168	168

Notes: OLS regressions of outcome variables, listed on top, on treatment status with and without baseline controls. Odd columns do not include any controls, while even columns include only baseline controls, with coefficients displayed above. Standard errors are reported in parentheses and are clustered at the endline session level. \* denotes significance at 10 pct., \*\* at 5 pct., and \*\*\* at 1 pct. level.



Table A.20: Time preference: Additional baseline controls

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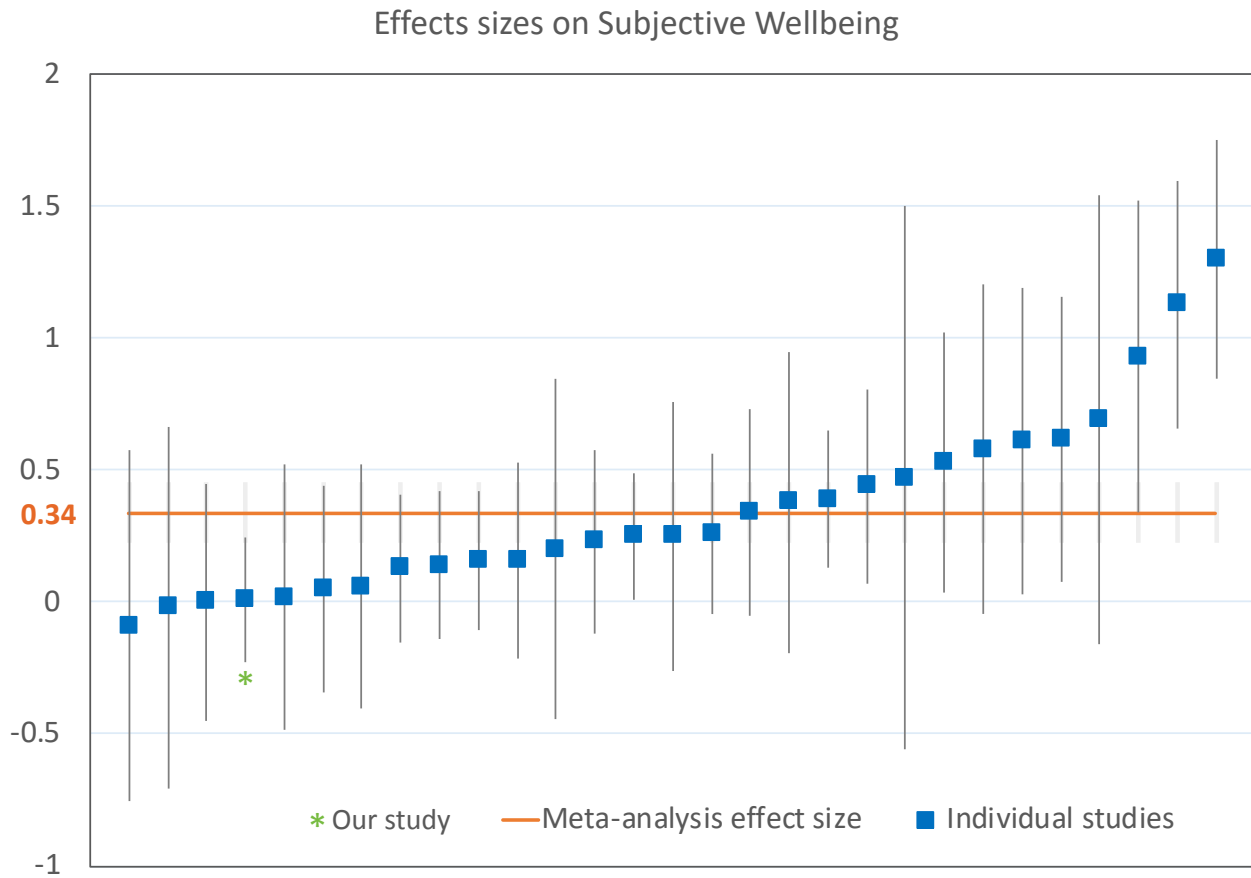
	Discount factor		Discount factor		Discount factor		Discount factor	
	1 day vs. 14 days		1 day vs. 28 days		1 day vs. 84 days		14 days vs. 28 days	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Treatment	-0.0015 (0.068)	0.024 (0.069)	0.0094 (0.037)	0.027 (0.033)	-0.010 (0.017)	-0.012 (0.018)	0.052 (0.036)	0.076* (0.036)
Cognitive Function (Ravens)		0.035 (0.040)		0.035 (0.029)		0.0017 (0.013)		0.075** (0.033)
SWLS Life-Satisfaction Scale Total		-0.0062 (0.028)		0.0017 (0.016)		0.011 (0.0095)		0.012 (0.021)
GQ-6 Gratitude Scale Total		0.011 (0.031)		0.0093 (0.017)		0.0055 (0.0075)		-0.0023 (0.023)
CESD Total		0.040 (0.031)		0.011 (0.016)		0.015* (0.0082)		0.011 (0.023)
Female Subject		0.057 (0.044)		0.015 (0.035)		-0.023 (0.018)		-0.022 (0.043)
Number of Children		0.013 (0.029)		0.015 (0.014)		0.0081 (0.0088)		0.043 (0.028)
Years of Education		0.038* (0.021)		0.032** (0.014)		0.020 (0.012)		0.026 (0.027)
Unemployed		-0.019 (0.039)		0.0066 (0.029)		0.041** (0.017)		-0.018 (0.056)
Married		0.038 (0.067)		-0.0052 (0.037)		0.0037 (0.028)		-0.096 (0.066)
Age		-0.0048 (0.0042)		-0.0016 (0.0029)		-0.00068 (0.0014)		-0.0035 (0.0046)
Dep. var mean		0.67		0.75		0.81		0.64
Dep. var sd		0.30		0.21		0.12		0.31
R2	0.00	0.07	0.00	0.06	0.00	0.06	0.01	0.09
Observations	168	168	168	168	168	168	168	168

Notes: OLS regressions of outcome variables, listed on top, on treatment status with and without baseline controls. Odd columns do not include any controls, while even columns include only baseline controls, with coefficients displayed above. Standard errors are reported in parentheses and are clustered at the endline session level. \* denotes significance at 10 pct., \*\* at 5 pct., and \*\*\* at 1 pct. level.



## B Psychology literature review

Figure B.2: Effect sizes of positive psychology literature on Subjective well-being (SWB)



Notes: Effect sizes (in standard deviations) and confidence intervals (95%) for positive psychology interventions as reported in Bolier et al (2013).

Authors	N	Subject pool	Interventions	Results
<b>COUNT YOUR BLESSINGS (CYB)</b>				
Count Your Blessings (CYB) is a gratitude exercise based on positive psychology. It involves writing (or thinking about) 3-5 good (positive) things that have happened to an individual in the recent past (depending on the frequency of the exercise). Of all positive psychology intervention (PPIs), count your blessings is the most widely utilized and studies. Frequency of the CYB exercise has been varied from weekly (1x per week) up to 5x within a day. Most commonly, the exercise is done either weekly or daily and written down in a journal. Control conditions vary across studies. Common control conditions are: (1) Count your hassles (list hassles or problems), (2) Event recall (list events that occurred), (3) waitlist control/do nothing control (no task). Typical outcomes that have been studied are (1) gratitude (for example, the GQ-6), (2) Satisfaction with Life Scale (SWLS), (3) Positive and negative affect (PANAS), (4) mental well-being, (5) depression (e.g., measured with CES-D). Other, secondary outcomes for interventions targeted at specific populations have included body dissatisfaction, worry, divorce adjustment, satisfaction with school, health behaviors, and physical activity.				
Emmons and McCullough (2003) - Study 1	192	University students (USA)	CYB (10 weeks, weekly)	<b>Gratitude:</b> CYB > control (event recall), $d=0.28$ . <b>Life as whole:</b> CYB > Hassles > Events (5.05 vs. 4.67 vs. 4.66, $p<.05$ ); <b>Physical symptoms:</b> Events > Hassles > CYB (3.75 vs. 3.54 vs. 3.03, $p<.05$ );
Emmons and McCullough (2003) - Study 2	157	University students (USA)	CYB (13 days, daily)	<b>Gratitude:</b> CYB > (d=0.4) Hassles > Downward social comparison. <b>Positive affect:</b> gratitude > hassles (0.24 vs. -0.26, $p<.05$ ); no effect on <b>negative affect</b>
Emmons and McCullough (2003) - Study 3	65	Adults with neuromuscular diseases (USA)	CYB (21 days, daily)	<b>Gratitude:</b> CYB > No treatment control ( $d=0.56$ ) <b>Positive affect:</b> gratitude > control (0.35 vs. -0.25, $p=.026$ ); <b>Negative affect:</b> gratitude < control (-0.26 vs. 0.26, $p=.041$ ); <b>Life as whole:</b> gratitude > control (5.54 vs. 4.80, $p<.01$ , $d=0.92$ ); <b>Health behaviors</b> insignificant; <b>spouses rating of positive affect</b> (gratitude > control, 3.68 vs. 3.31, $p=.06$ ), <b>life satisfaction</b> (gratitude > control, 4.42 vs. 3.63, $p<.02$ )
Seligman, Steen, Park et al. (2005)	129	Online (USA)	CYB (1 week, daily)	<b>Happiness:</b> CYB > placebo at 1 month, 3 month, 6 month follow-ups ( $\lambda$ from .21, .36, and .50, $p<.05$ ); <b>Depression scale (CES-D):</b> placebo > CYB in post-test to six month ( $\lambda$ from .21 to .28, $p<.05$ )
Sheldon and Lyubormirsky (2006)	67	University students (USA)	CYB (4 weeks, protocol not clear —instructed to think about it)	<b>Positive affect:</b> no significant diff btw CYB and control. Few subjects reported actually doing the exercises on their own.
Henrie (2006)	127	Divorced women using online dating site (USA)	CYB (6 weeks, 5x daily)	CYB not effective in improving <b>divorce adjustment</b> or <b>increasing life satisfaction</b> .
Froh, Sefick, and Emmons (2008)	221	Middle school children	CYB (14 days, daily)	<b>Positive affect:</b> not significant; <b>Negative affect:</b> gratitude < hassles (1.65 vs. 1.92, $p<.05$ ); <b>Life satisfaction</b> in upcoming week (3 week follow-up): gratitude > hassles (6.11 vs. 5.53, $p<.05$ ); LS for school experience: gratitude > hassles (5.80 vs. 5.26, $p<.05$ )
Geraghty, Wood, and Hyland (2010a)	479	Online (UK), Body dissatisfaction targeted	CYB (14 days, daily)	CYB reduced <b>body dissatisfaction:</b> CYB > Waitlist control ( $d=0.96$ ).
Geraghty, Wood, and Hyland (2010b)	108	Online (UK), Worry targeted	CYB (14 days, daily)	CYB reduced <b>worry:</b> CYB > Waitlist control ( $d=1.5$ ).
Martinez, Avia, and Hernandez-Lloreda (2010)	105	Spanish sample	CYB (14 days, daily)	<b>Gratitude</b> manipulation check was not significant ( $d=0.38$ ); Significant effect for <b>positive affect</b> on post-test: gratitude > hassles ( $d=0.32$ , $p=.012$ ), but disappears after 15 days; found that positive affect could mediate effect of intervention on gratitude
Chancellor, Layous, and Lyubormirsky (2013)	32	Workplace (Japan)	CYB (weekly for 6 weeks)	Greater <b>subjective happiness</b> across time ( $t=2.40$ , $p=.02$ ), higher <b>behavioral activity</b> (moved around more) ( $t=3.20$ , $p=.002$ )
Odou and Vella-Brodrick (2013)	210	Adults, recruited online (Australia)	CYB (1 week, daily) — recall and imagine	No gratitude manipulation check. <b>Positive affect:</b> CYB > control <b>Negative affect:</b> CYB > control <b>Mental Well-being:</b> CYB > control (statistical tests of simple differences were not reported, only negative affect mentioned to be significant in the text but no effect sizes)
Chan (2013)	78	Chinese school teachers (Hong Kong)	CYB (weekly for 8 weeks)	<b>Gratitude:</b> CYB > coping control (not sig, $d=0.39$ ); <b>Life satisfaction:</b> CYB > coping control (not sig, $d=0.38$ ); <b>Positive affect:</b> CYB > coping control (not sig, $d=0.35$ ); <b>Negative affect:</b> CYB < coping control ( $d=-0.53$ , $p<.05$ );

Authors	N	Subject pool	Interventions	Results
<b>SELF AFFIRMATION</b>				
A self-affirmation is an act that demonstrates one's adequacy. In self-affirmation interventions, people typically write about core personal values, where personal values are the internalized standards used to evaluate the self. People first review a list of values, then choose one or a few values important to them, and then write a short essay about why these values are important to them. The goal of the intervention is to bring a more expansive view of the self and its resources.				
Cohen et al. (2009)	416	7th grade students (USA)	Self-affirmation writing (between 2-5 tasks/year)	Two-year GPA increased for African Americans (t=3.59, p<.001) but not European Americans (t=-1.19, p=.236); low-performing AAs ended year w/ lower sense of personal adequacy in control vs. affirmation (t=3.30, p=.001)
Howell and Shepperd (2012) - Study 1	40	University students (USA)	Self-Affirmation writing (once)	Fewer participants avoided risk feedback (disease) (16% vs 55%, p<.01)
Howell and Shepperd (2012) - Study 2	113	University students (USA)	Self-Affirmation writing (once)	Affirmation eliminated effects of high-obligation risk avoidance (21% vs. 19%, n.s.)
Howell and Shepperd (2012) - Study 3	104	University students (USA)	Self-Affirmation writing (once)	Affirmation eliminated effects of untreatable condition risk avoidance (n.s.)
Sherman et al. (2013)	184	Middle school students	Self-Affirmation writing (4-5 in first year only)	Latinos w/ affirmation had higher year 2 GPA than no-affirmation (t=3.14, p=.002); same in year 3 (t=1.73, p=.087)
Hall, Zhao, Shafir (2014)	80	Low-income individuals in an inner-city soup kitchen (USA)	Self-affirmation talking into tape recorder (3 min)	Raven's matrices: s-a > control (t=3.20, p<.01); cognitive control: s-a > control (t=2.01, p<.05)
<b>POSITIVE PSYCHOLOGY META ANALYSES</b>				
Sin and Lyubomirsky (2009)	51 interventions, 4266 participants		51 Positive Psychology interventions (PPIs)	Significant enhancement of well-being (Cohen's d = .61), significant decrease in depressive symptoms (Cohen's d = .65). Factors that impact effectiveness of PP interventions: depression status, self-selection, age of participants, format and duration of interventions.
Wood, Froh, and Geraghty (2010)	12 studies		Review and theoretical integration of gratitude and well-being	Interventions to clinically increase gratitude are critically reviewed and concluded to be promising, though there are still limitations in the current positive psychology literature.
Bolier, Havermann et al. (2013)	40 articles, 6139 participants		PPIs: Self-help interventions (26/39 studies), group (8/39), individual (5/39)	Moderate effects on <b>subjective well-being</b> (Cohen's d=.34), small effects on <b>psychological well-being</b> (d=.20) and <b>depression</b> (d=.23); at follow up (3-6 months) still significant effects for subjective well-being (d=.22) and psychological well-being (d=.16). Meta-analysis revealed indication for publication bias, and the quality of studies varied considerably. Results of rating of studies according to criteria of Cochrane collaboration: 20 studies of low quality, 18 of medium quality, 1 of high quality. No study reported power analysis.

## Self-Affirmation Exercise

*Instructions to survey administrators. Read out-loud the instructions to the participants as they follow on their own sheets.*

### Treatment

1. We would like to hear from you about your ideas, your beliefs, and your life. Please consider the following items that people value:

- Athletic ability • Being good at art • Creativity • Independence • Living in the moment • Membership in a social group (such as your community, or school club) • Music • Politics • Relationships with friends or family • Religious values • Sense of humor

Please select which of these items is most important to you and circle that. For the item you chose, please write a few paragraphs on the following page to tell us:

- Why is this important to you • Tell us about a time in your life that this was especially important to you • Tell us about some things you have done in your life that demonstrate how this value is important to you • Tell us about how acting in a way that demonstrates why this is important to you makes you feel

Focus on your thoughts and feelings, and don't worry about spelling, grammar, or how well written it is. Remember there are no right or wrong answers.

2. We want to hear about a time where you felt very successful or proud. First please spend a minute thinking of a personal experience where you felt very successful or proud. For example, this could be your achievements in work, family, school, sports, or with friends. Now please spend 3 to 5 minutes describing the event in as much detail as you can. In your story, please answer the following questions:

- (a) 1. What happened? 2. What did you do exactly? 3. What motivated you? 4. What led to your success? 5. How hard did you work for it? 6. How did you feel about yourself when you succeeded?

Please write a few paragraphs on the following page about your story.

### Control

1. We would like to hear from you about your life. Please think for a moment about the following:

- What have I eaten in the last 48 hours (2 days)
- What have I had to drink in the last 48 hours (2 days)

For these topics, please write a few paragraphs on the following page or speak the answers into the recorder (whichever you prefer) to tell us:

- What specifically have you eaten and drunk in the last 48 hours (2 days)

- Where were you and what time was it when you ate or drank each item
- How did that item taste

Focus on the questions, and don't worry about spelling, grammar, or how well written it is. Remember there are no right or wrong answers.

2. We want to hear about your daily routine. First please spend a minute thinking of what you do on a typical day. Now please spend 3 to 5 minutes describing your daily routine in as much detail as you can. In your story, please answer the following questions:

- 1. Where did you spend a typical day?
- 2. What did you do on a typical day?

Please write a few paragraphs on the following page or speak the answers into the recorder (whichever you prefer).

## **Aspirations Condition and Exercise**

*Instructions to survey administrators. Read to everyone: Now, I am going to read to you a few stories. These stories are based on REAL people who live in places like Kibera. We have changed the names and some details to maintain anonymity, but otherwise these stories are true. We have printed them out in front of you. Please read along as we read them out loud.*

### **Treatment**

FIRST STORY: Musa is a businessman who has lived in Kawangware all his life. He is a single father of two and, because he comes from a humble background, had been struggling to make enough money for his family. He was employed in an artifact company as a cleaner for three years earning Ksh 3,000 per month. He continued working hard until he got a promotion as a salesperson earning Ksh 15,000 a month, which motivated him to work even harder. After five years, he got another promotion as a manager where his salary increased to Ksh 20,000. Having saved some good money he decided to quit his job four years later and start his own business. He also got a loan from K-Rep bank and he opened a furniture shop, which picked up very well in his neighborhood. As a result of his diligence, he managed to open a second furniture shop five years later as well as another shop selling kitchen supplies and utensils. He currently owns three shops, which earns him an average of Ksh 80,000 per month. He admits that he had to overcome a lot of challenges to get to where he is now. Alcohol he had to do away with. Despite of his many challenges: low number of customers, big losses, lack of capital, high interest rates from borrowed money, this did not deter him from carrying on. His main source of motivation however was his family. He also had 'reliable' products which were also on demand. It took him eight years to get here and from this, he has so far been able to pay back his loans, buy himself a pick-up truck and educate his children without too much struggle. He also managed to move out of the informal settlement to a neighborhood just close by. He now lives in Adams and he is well respected by his family, friends, and neighbors'. All have been impressed with the hard work, respect and his motivation.

SECOND STORY: Wambui is lady who lives in mathare, she is a widow and a mother of two, and has lived in the informal settlement for over ten years. Before she got married, she pursued a tailoring course

in 2000. In 2009 after her husband's death she decided to join Kenya Women Finance Trust where she took out a loan worth Ksh 40,000. Her husband bought her a sewing machine. With the loan, she bought two more sewing machines and fabric. She formed a partnership with her friend to start a tailoring shop which went on very well, but later decide to venture out on her own. She then opened a tailoring school where she trains other young women from the area and has a few employees to help her run the business. From this business, she earns an average of Ksh 25,000-30,000 per month. She admits she had to overcome a lot of challenges to get to where she is now. Customers failing to pay their debts as well as insufficient income are some of the challenges she has faced whilst running her business, but self-motivation, patience and diligence kept her going. It took her 6 years to be where she is today. Through these accomplishments, she has managed to educate her children and siblings and build her mom a new house. Her family, neighbors, and customers have even started to note her accomplishments and she has begun to earn a lot of respect in the community for her hard work and motivation. She is particularly well regarded because of her work in helping train other young women in tailoring, something that has also make her very happy because in addition to the money helping others is very rewarding.

WRITING SPACE Think about your life one year from now. Please write three things that come to mind when reading these stories.

## Control

This biography is based on a true story about a person living in an informal settlement. Some details may have been changed to preserve anonymity.

Kamau is a 28-year-old man living in Dandora. He has lived there since he was born but moved to a different part of Dandora when he moved out of his parent's house. He now lives in one-room house with his wife Wairimu and their three children. All his children attend a nearby city council primary school. The first-born is in standard four, the second born in standard two and the third is in nursery school. Kamau did not go to school but does not want the same for his children. He is always encouraging them to work hard. Kamau leaves his house every single day at six o'clock in the morning and walks to work, as do most of his neighbors. He works in Industrial Area as a casual laborer. He takes one hour to get to work and one hour every evening to get back home. Kamau is a smoker so on his way to work he usually smokes a few cigarettes especially on cold rainy mornings. When Kamau gets to his work site, he usually drinks a cup of porridge sold by a food vendor at the site; this costs him ten shillings. He then begins his duties. His work entails unloading boxes/sacks of goods from big trucks and ferrying these to different companies located in the area. He has his lunch break between one and two o'clock, during which time he and his some of his work-mates sit down under a tree to relax and chat a bit. On some days, when he has some spare money, he buys a plate of beans and chapatti for twenty shillings from a food kiosk close to the site. At 2.00 p.m., Kamau and his mates get on with their tasks, and keep working until closing time at 5.00 p.m. Kamau has been working as a casual laborer for the last six years. His daily wage is Ksh 250. However, this depends on how much work is available on a given day. On average, he works about 3-4 days a week. In the course of his work Kamau has to be careful not to drop the goods he unloads as his wage is docked if any goods are damaged. Before setting off home at the end of the week, Kamau settles his bill with the food vendor at the site. The remaining amount goes towards his household expenses and school fees for his children. Kamau begins his trek



back home at 5.00 p.m every day. On reaching his neighborhood, he and his mates stop by the shopping center where they gather to discuss politics and football. Kamau is a huge Manchester United fan and follows the English Premier League matches religiously. He also follows local football and his favorite local team is Thika United. Kamau usually heads home at about nine o'clock. He normally passes by his wife Wairimu's shop and helps her close up, after which they go home together. By the time they get home their children are normally sound asleep. Kamau then eats his dinner, after which he takes a warm bath then goes straight to bed. Most weekends, you will find Kamau collecting garbage around the neighborhood. This he does as part of a community group that came together and started clean up exercises in the area. The group charges 20 shillings for every home they collect garbage from. After each clean up session, they all head home to take a bath, with a promise to meet later. When they meet up, they divide the money from the day's collections and thereafter spend the rest of the day chatting over a glass of locally brewed alcohol. On weekend nights Kamau typically gets home by about 10.00 p.m. When Kamau is drunk he generally does not say much. After eating his dinner, he goes straight to bed and falls asleep immediately. On Monday morning his weekly routine commences once more.

WRITING SPACE Think about your life tomorrow. Please write three things that come to mind when reading these stories.