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REVIEW

On the psychology of poverty

Johannes Haushofer^{1,2,3,4*} and Ernst Fehr^{3*}

Poverty remains one of the most pressing problems facing the world; the mechanisms through which poverty arises and perpetuates itself, however, are not well understood. Here, we examine the evidence for the hypothesis that poverty may have particular psychological consequences that can lead to economic behaviors that make it difficult to escape poverty. The evidence indicates that poverty causes stress and negative affective states which in turn may lead to short-sighted and risk-averse decision-making, possibly by limiting attention and favoring habitual behaviors at the expense of goal-directed ones. Together, these relationships may constitute a feedback loop that contributes to the perpetuation of poverty. We conclude by pointing toward specific gaps in our knowledge and outlining poverty alleviation programs that this mechanism suggests.

More than 1.5 billion people in the world live on less than \$1 a day (purchasing power parity in December 2013 dollars) (1). This lack of financial means has far-reaching consequences: In Africa, the average person dies 21 years earlier than in Europe, one-third of the population is illiterate (1), and one in three children is stunted in growth (2). Economic poverty means living in squalor, dying early, and raising children who face similar prospects.

But does poverty affect people's affective states and their economic choice patterns, i.e., the way they feel and act? Here, we discuss recent findings that suggest that poverty causes negative affect and stress—defined as an organism's reaction to environmental demands exceeding its regulatory capacity—and that this effect may change people's behaviorally revealed preferences. Poverty may, in particular, lower the willingness to take risks and to forgo current income in favor of higher future incomes. This may manifest itself in a low willingness to adopt new technologies and in low investments in long-term outcomes such as education and health, all of which may decrease future incomes. Thus, poverty may favor behaviors that make it more difficult to escape poverty.

Two caveats are in order at the outset. First, poverty is characterized not only by insufficient income but also by dysfunctional institutions, exposure to violence and crime, poor access to health care, and a host of other obstacles and inconveniences. This diversity complicates a single and simple account of the relationship between poverty and psychology. However, a first,

useful step can be made by focusing on material poverty as a central feature and powerful predictor of the ancillary features of poverty described above. Second, in asking whether poverty reinforces itself through psychological channels, we are not suggesting that the poor bear blame for their poverty. Rather, an environment of poverty into which one happens to have been born can trigger processes that reinforce poverty. On this view, any one of us might be poor if it were not for certain environmental coincidences.

The Effect of Poverty on Risk-Taking and Time-Discounting

People living in poverty, especially in developing countries, have repeatedly been found to be more risk averse and more likely to discount future payoffs than wealthier individuals. For example, discount rates of poor U.S. households are substantially higher than those of rich households (3); likewise, studies of Ethiopian farm households (4) and a South Indian sample (5) find that lower wealth predicts substantially higher (behaviorally measured) discount rates. Wealthier households or those with higher annual incomes also display lower levels of risk aversion in representative samples (6, 7).

In addition to these correlations between wealth/income and preference measures, there is also evidence suggesting that poverty has a causal effect on risk-taking and time-discounting. In (7), the potential reverse causality problem—that low risk aversion may on average lead to higher incomes or wealth—is tackled by using windfall gains as an instrumental variable (IV). The IV estimates show a substantial negative effect of income/wealth on risk aversion. The assumption needed for this approach to work is that windfall gains are positively correlated with household income/wealth—which they are—and that they only affect risk aversion through the income/wealth channel—which is plausible. In another study (8), experimentally measured discount rates of Vietnamese respondents were negatively

related to income; that is, poorer households were more likely to choose smaller and earlier monetary rewards over larger, delayed ones. Here, the potential reverse causality problem—that high incomes may cause low discount rates—was solved by using rainfall as an instrumental variable for income. Rainfall is significantly correlated with income, and on the assumption that it affects the discounting of future payoffs only through income it is a valid instrument. The IV estimates confirm the negative relationship between the discount rate and income, suggesting that poverty may causally affect time-discounting. In addition, the results show marginally more risk aversion in poorer participants.

Negative income shocks are a pervasive feature of the lives of the poor, and they are particularly vulnerable to these shocks because of limited access to credit markets (9, 10). It is therefore interesting to study the effect of negative income shocks on economic choice. In (11), subjects were randomly assigned to income shocks in a laboratory experiment after they had first earned some income in an effort task. The authors compared the discounting of future payoffs of subjects who experienced a negative shock with those of a control group that had not experienced an income shock; importantly, a suitable choice of initial endowments ensured that the two groups had the same absolute income when they performed the discounting task. In addition, the potential reverse causality between income levels and time-discounting could be perfectly controlled in the laboratory setting through exogenous manipulation of income levels. Controlling for absolute income, subjects who received a negative income shock exhibited more present-biased economic behavior than those whom the shock did not affect. No opposite effect was found for positive income shocks. Thus, negative income shocks—a pervasive feature of poverty—appear to increase time-discounting.

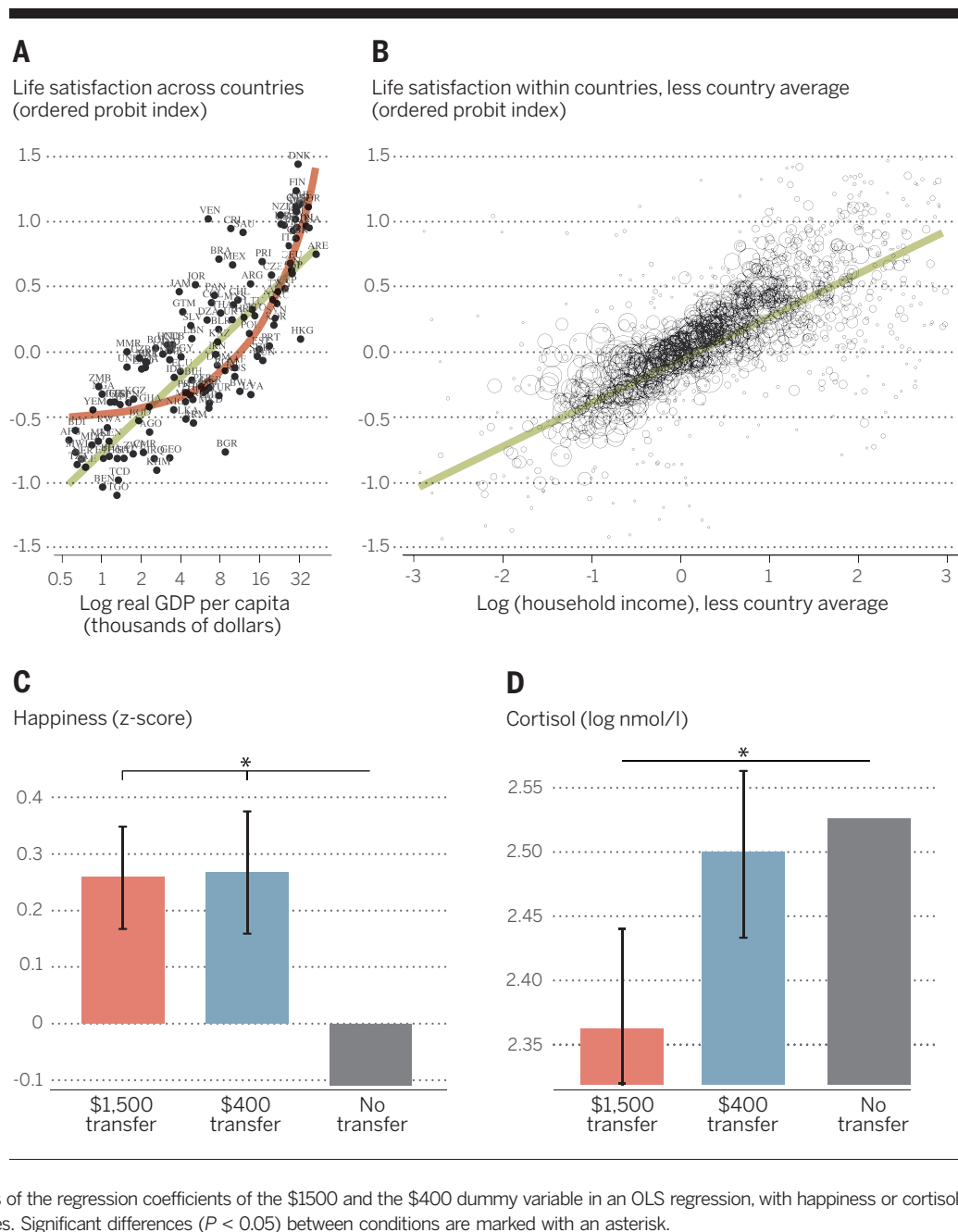
In a similar study, subjects were randomly assigned to a smaller (“poor condition”) or a larger (“rich condition”) budget (12) and were then asked to make a series of “purchasing” decisions. Naturally, those with a smaller budget faced more difficult trade-offs because they could afford fewer of the desirable goods. Because decision-making under difficult trade-offs is likely to consume scarce cognitive resources, subjects with a small budget were hypothesized to be impaired in subsequent tasks that require willpower and executive control (13). The study indeed found that previous decision-making in the poor condition—but not the rich condition—impaired behavioral control, as measured by the duration of time subjects were able to squeeze a handgrip and their performance in a Stroop task. Thus, poverty appears to affect decision-making by rendering people susceptible to the willpower and self-control depleting effects of decision-making. Because willpower and self-control are hypothesized to be important components of the ability to defer gratification,

¹Abdul Latif Jameel Poverty Action Lab, Massachusetts Institute of Technology, 30 Wadsworth Street, Cambridge, MA 02142, USA. ²Program in Economics, History, and Politics, Harvard University, Cambridge, MA 02138, USA.

³Department of Economics, University of Zürich, Blümlisalpstrasse 10, Zürich 8006, Switzerland. ⁴Department of Psychology and Woodrow Wilson School of Public and International Affairs, Princeton University, Princeton, NJ 08544, USA.

*Corresponding author. E-mail: joha@mit.edu (J.H.); ernst.fehr@econ.uzh.ch (E.F.)

Fig. 1. The relationship between poverty, affect, and stress. The top panels show the relationship between income and life satisfaction, adapted from (21), using data from the Gallup World Poll, (A) across and (B) within countries. We plot standardized responses of 102,583 respondents from 131 countries to the question “Please imagine a ladder with steps numbered from zero at the bottom to ten at the top. Suppose we say that the top of the ladder represents the best possible life for you and the bottom of the ladder represents the worst possible life for you. On which step of the ladder would you say you personally feel you stand at this time?” In (A), we plot country mean responses against country gross domestic product (GDP) per capita (purchasing power parity in constant 2000 international dollars). The dashed line is fitted from an ordinary least squares (OLS) regression; the dotted line is fitted from a lowess estimation. In (B), each circle represents one income bracket in one country, with its diameter proportional to the population of that income category in that country, and the horizontal axis represents the log of household income after subtracting the country average. (C) Z-scored happiness responses of $N = 1440$ poor households in Kenya to the happiness question from the World Values Survey (“How happy are you with your life as a whole these days?” on a scale from 1 to 10). Data are from (32). Households received unconditional transfers of either \$1500 (red) or \$400 (blue) or no transfer (gray), and happiness responses were measured about 1 year after the start of the program. (D) Levels of the stress hormone cortisol of the same households in Kenya. The error bars in (C) and (D) represent the standard errors of the regression coefficients of the \$1500 and the \$400 dummy variable in an OLS regression, with happiness or cortisol levels, respectively, as dependent variables. Significant differences ($P < 0.05$) between conditions are marked with an asterisk.



such effects may also affect time-discounting behavior.

Why Does Poverty Affect Risk-Taking and Time-Discounting?

The economic and social conditions under which poor people live may affect discount rates and risk-taking behavior, even though the intrinsic time and risk preferences of the poor may be identical to those of wealthier people. For example, poor people often have no access to formal credit markets (9, 10) and are forced to borrow through informal channels from money lenders, friends or merchants. They often face very high interest rates for credit, and frequently the lenders constrain the amount they lend to them

(9, 14), implying that they are much more likely to be liquidity-constrained. Thus, if a poor individual has the choice between a current and a delayed payment in an experiment, he or she may opt for the current payment not because of an intrinsic preference for present payments but because of the credit market imperfections present in informal markets.

In support of this view, a recent study (17) measures time preferences of U.S. households shortly before versus shortly after payday. Those surveyed before payday have 22% less cash, and they spend 20% less than those after payday, suggesting that households are liquidity-constrained with regard to money before payday. The study further shows that households

surveyed before payday are more present-biased, and this effect is specific to monetary tasks and does not extend to nonmonetary real effort tasks. Because liquidity constraints cannot play a role with regard to effort, this result suggests that liquidity constraints before payday are the source of the apparent present bias for monetary outcomes.

The anticipation of future liquidity constraints may also induce an individual to prefer a safe payment over a risky payment (e.g., in an experiment) (15); again, this may occur not because the individual is intrinsically risk averse but because the safe payment helps alleviate liquidity constraints. In addition, poor individuals often face uninsurable, nondiversifiable

“background” risks such as crop failure. They may therefore display less risk-taking behavior with regard to avoidable risks (e.g., in an experiment) even though their risk preferences may not differ from those who are less exposed to background risks (16). Indeed, higher background risks have been shown to be associated with higher levels of risk aversion (7).

Thus, economic theory and empirical evidence suggest that poor households may display a lower willingness to take risks and to forgo current income for larger future incomes, even though their intrinsic time and risk preferences are not necessarily different from those of richer households. However, we will provide evidence suggesting that this is not the whole story. In a first step, we will show that poverty is associated with negative affect and with stress, and in a second step we will discuss evidence suggesting that negative affect and stress change subjects’ risk-taking and time-discounting. In the second part, in particular, we will focus on experiments in which subjects are randomly assigned to treatment conditions and in which the usual economic channels for changes in time and risk-taking behavior—e.g., liquidity constraints or economic background risks—cannot play a role. It is therefore impossible to attribute differences in behavior across treatment to these channels.

The Effect of Poverty on Affect and Stress

Correlations Between Poverty, Affect, and Stress

For several decades, the prevalent view on the relationship between income and psychological well-being was what became known as the Easterlin Paradox (18), according to which income, self-reported happiness, and life satisfaction are correlated within but not across countries and are uncorrelated above income levels required to meet basic needs. In addition, higher incomes were thought to be uncorrelated with increased happiness and satisfaction over time. However, larger and newer data sets now suggest that higher incomes are associated with more happiness and life satisfaction both within and across countries, that no saturation point exists (although there are decreasing happiness returns to income), and that as countries grow richer, they also grow happier (19–21). Fig. 1 shows a correlation between self-reported life satisfaction and income across countries (Fig. 1A) and within countries (Fig. 1B).

In addition to happiness and life satisfaction, poverty is also more broadly related to mental health. According to the 2003 World Health Report, the poorest population quintiles in rich countries exhibit a depression and anxiety disorder prevalence that is 1.5 to 2 times as high as that of the richest quintiles (22). A recent comprehensive review of 115 studies (23) on the relationship between mental health and poverty in low- and middle-income countries finds a negative association between poverty indicators and good mental health outcomes in 79% of studies. Finally, income and socioeconomic status are also

correlated with levels of the stress hormone cortisol. Several studies have shown elevated cortisol levels in persons with lower income and education (24, 25) and lower lifetime economic position as measured by occupational status (26, 27). Similar results have been obtained in infants and children (27–31).

Together, these findings show that poverty correlates with unhappiness, depression, anxiety, and cortisol levels. But is this relationship causal?

Causal Effect of Poverty on Affect and Stress

The effect of reductions in poverty on affect and stress is usually studied in the context of randomized field experiments or natural experiments such as lottery wins. One such study (32) examined the effects of an unconditional cash transfer program in Kenya on psychological well-being. Households were randomly chosen to receive unconditional transfers of either \$0, \$400, or \$1500. Psychological well-being was measured with the happiness and life satisfaction questions from the World Values Survey, and stress and depression were measured using the Center for Epidemiologic Studies Depression Scale, Cohen’s Perceived Stress Scale, and levels of the stress hormone cortisol in saliva. The study finds substantial improvements in all of these variables when households receive positive transfers (Fig. 1C), but the stress hormone cortisol was only reduced in those who received large transfers (Fig. 1D). Similarly, several other studies (33–37) report results from randomized controlled trials that show that cash transfers reduce distress and depression scores (38).

Similarly, using natural experiments such as the introduction of guaranteed incomes, lottery payouts, access to a pension scheme, and payouts to Native Americans from a casino opening, several studies find that the resulting increases in income lead to a reduction in hospitalization for mental health problems (39), lower consumption of anxiolytics (40), and increases in self-reported mental health (41–44). Less direct alleviations of poverty have also shown effects; several randomized controlled trials report increases in psychological well-being when participants receive health insurance (45), improved housing (46), and access to water (47).

Conversely, the effect of increases in poverty on well-being is usually studied using unexpected shocks such as spells of bad weather for farmers. One such study examined whether random negative income shocks to farmers in Kenya, generated by periods of drought, lead to increases in cortisol levels (48). The study finds that farmers have higher levels of cortisol and self-reported stress during drought periods when crops are likely to fail. This relationship does not hold for nonfarmers and is more pronounced among farmers who depend solely on agriculture for their income than among those who also have other sources of earnings. In addition, it is robust to controlling for physical activity, suggesting that changes in labor supply are not the driving factor; the plausibility of this alternative account is further reduced by the fact that the increase in

cortisol levels is mirrored by an increase in self-reported stress. Another study (49) measured cortisol levels in a sample of 354 Swedish blue-collar workers before and after a subset of these workers lost their jobs. Cortisol levels were significantly higher in those workers who lost their jobs. Importantly, the layoffs were due to a plant closure, arguing against the possibility that job loss might be a consequence rather than a cause of high cortisol levels in individual workers. However, the fact that only one plant was studied and attrition among participants over the course of the study was non-negligible weakens the finding. A further study (50) uses declining industries as an exogenous source of variation for job loss and finds an effect of job loss on family mental health using this approach.

These findings thus suggest causal links between poverty, psychological well-being, and stress levels. Altogether, we identified 25 studies that report the effect on psychological well-being of an increase or decrease in poverty, induced either in randomized controlled trials or natural experiments [see the supplementary material (51)]. Of these, 18 studies show a positive effect of poverty alleviation on psychological well-being or stress, 5 studies show effects on some psychological variables related to well-being or stress (e.g., certain mental disorders), but not others, and 2 show no results. The mixed or inconsistent findings in these studies may reflect deficiencies or noise of some of the measures used, heterogeneity in the interventions tested, or heterogeneity in the effect of changes in poverty on particular psychological constructs; future studies need to assess these different explanations.

Thus, the large majority of the findings suggests that increases in poverty often lead to negative affect and stress, and decreases in poverty have the opposite effect. We now ask whether negative affect and stress influence risk-taking and time-discounting and could therefore be among the channels through which poverty affects economic behavior.

The Effect of Negative Affect and Stress on Risk-Taking and Time-Discounting

The existence of severe credit constraints and uninsurable background risks implies that the poor are particularly vulnerable to income and health shocks; that is, they are less able to exert control over their life circumstances. As discussed above, this leads to stress and negative affective states such as unhappiness and anxiety, and it raises the question whether such states exert an independent effect on decision-making.

Effects on Risk-Taking

In a recent paper (52), subjects were randomly assigned to the threat of receiving unpredictable, randomly administered high or low electrical shocks to their hands during a risk-taking task. The administration of unpredictable shocks is a reliable method for inducing a state of fear and stress (53). Subjects in the high-threat condition showed significantly higher risk aversion than those in

the low-threat condition (Fig. 2A). In another study (54), subjects' fear was exogenously induced by making them watch a horror video that shows a young man being inhumanly tortured; this fear induction also led to significantly higher risk aversion compared with subjects who saw a control video. Fear induction also led to more risk-averse choices in several other studies (55, 56), and it has also been shown that risk-averse choice can be reduced through cognitive reappraisals that undo the fear effect of a fear-inducing video (57).

Thus, it is possible not only to increase risk aversion through fear induction but also to reduce risk aversion by reducing fear.

Although the majority of the studies show an unambiguous positive effect of fear and anxiety on risk aversion (51), we found one study that does not show such an effect (58). However, this study fails to document the specificity of the fear induction and confronts subjects with 100 different choice problems after the fear induction. If induced emotions are not continuous-

ly sustained through an appropriate induction procedure—for example, through the threat of aversive shocks—their emotional effect is likely to be short-lived. It may thus be the case that the fear induction was no longer effective for a sizeable part of the 100 choice problems.

Increased risk aversion can also be induced by administering hydrocortisone, which raises cortisol levels in the brain and thus mimics some of the neurobiological effects of stress. In a placebo-controlled experiment (59), half of the volunteers received hydrocortisone over a period of 8 days, enabling the study of the acute (on day 1) and the chronic effects (on subsequent days) of the substance. Interestingly, the acute effects of hydrocortisone did not cause changes in risk-taking, whereas the chronic administration led to strong increases in risk aversion: Subjects in the placebo and the acute cortisone condition chose the risky alternative in a risk-taking task in roughly 50% of the cases, but subjects in the chronic hydrocortisone condition chose it only in slightly more than 20% of the cases (Fig. 2B). Other studies (60–63) have used well-known behavioral stress inductions—the cold pressor task or the Trier Social Stress Test (TSST)—to show that stress typically induces more risk aversion, although this holds only for the domain of gains and not for losses in (61) and only for women in (63). However, the stress induction did not work for men in the latter study because their cortisol levels in the stress and the control conditions were identical. Thus, taken together, both the evidence from experiments on fear and on stress induction indicates that fear and stress cause higher levels of risk aversion.

Effects on Time-Discounting

A number of recent studies show that negative affect and stress lead to increases in time-discounting (51, 64–66). One study (64) induced sadness by showing participants film clips that were independently verified to induce the desired emotional state. They subsequently offered subjects choices between smaller amounts of money available immediately or larger amounts available after a delay. This task measures temporal discounting, i.e., the degree to which delayed rewards are devalued. Subjects who had viewed the sadness-inducing film clip were less likely to choose larger, delayed payments than those in the control condition; that is, they discounted future payments more strongly, indicating that sadness reduces patience (Fig. 2C). Conversely, another recent study (65) induced positive affect through film clips and found that it increased patience in a similar task.

As in the domain of risk-taking, pharmacological elevation of the stress hormone cortisol through hydrocortisone administration has also been found to increase time-discounting. A recent study administered 10 mg of hydrocortisone or placebo orally to healthy subjects (66). After administration, subjects performed a temporal discounting task similar to that described above. Subjects who had been given hydrocortisone

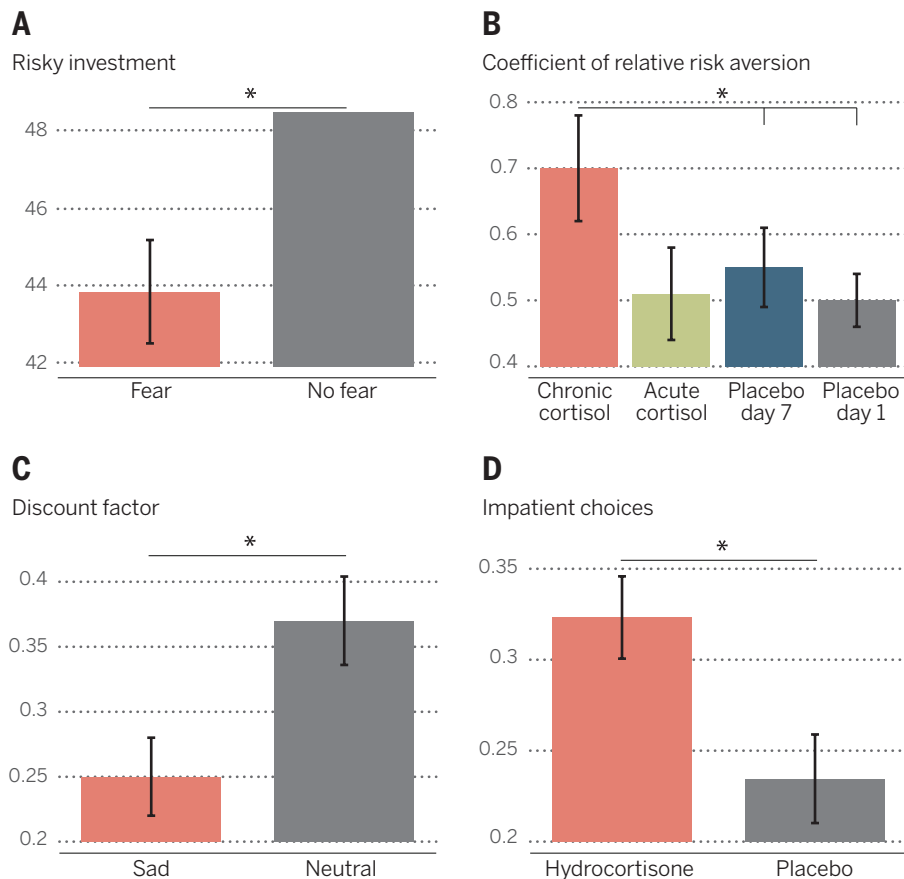


Fig. 2. Effect of negative affect and stress on risk and time preferences. (A) Amount invested in the risky asset (out of a total of CHF 24) when subjects ($N = 41$) faced the threat of receiving a painful electrical shock (fear condition, red bar) and when they received only a mild shock that was not painful (no fear condition, gray bar). Data are taken from (52). Subjects who faced the threat of a painful shock were less likely to make risky investments ($P < 0.05$). The error bar indicates the standard error of the regression coefficient for the fear dummy in an OLS regression with risky investment as the dependent variable. (B) Coefficient of relative risk aversion (mean \pm SEM) of $N = 36$ subjects that were exposed to either repeated pharmacological elevation of cortisol levels through administration of hydrocortisone over 1 week (red), acute administration (1 day, green), or placebo (day 7, blue; day 1, gray). Data are taken from (59). Chronic administration led to an increase in the coefficient of relative risk aversion (CRRRA) relative to placebo on both day 1 ($P < 0.05$) and day 7 ($P < 0.05$). (C) Discount factors (mean \pm SEM) of $N = 189$ subjects who were exposed to either a sad or a neutral prime. Data are from (64). Subjects in the sad condition exhibited lower discount factors ($P < 0.05$), implying greater discounting of the future (because a low discount factor indicates a low valuation of future payoffs relative to present payoffs). (D) Share of impatient choices (mean \pm SEM) of $N = 53$ subjects who received either hydrocortisone or placebo. Data are from (66). Subjects in the hydrocortisone condition were more impatient ($P < 0.05$) in a discounting task; i.e., they showed greater discounting of future payoffs. Significant differences ($P < 0.05$) between conditions are marked with an asterisk.

showed an increase in temporal discounting compared with placebo 15 min after administration; that is, they valued the present more highly relative to the future (Fig. 2D). Thus, both negative affect and elevated cortisol levels increase time-discounting, whereas positive affect has the opposite effect (64–67). Future studies will have to elucidate whether chronic stress in conditions of poverty has similar behavioral effects as acute stress induced under laboratory conditions.

Exactly how might negative affect and stress lead to increased discounting? One possibility lies in the fact that stress has recently been shown to induce a shift from goal-directed to habitual behavior (68). If the habitual behavior is to consume immediately, this mechanism would predict that stress should increase temporal discounting by favoring habitual responses. A related possibility is that stress and negative affect may bias attention toward salient cues. If immediate consumption is more salient than delayed consumption, this mechanism would also predict that stress and negative affect should increase time-discounting. In line with this view, Shah *et al.* (69) showed that decision-making under scarcity—whether this scarcity is temporal, financial, or of another type—shows signs of the irrationality frequently observed in decision-makers in settings of poverty and that this effect is due to attentional capture by salient cues. More recently, Mani *et al.* (70) found that poor individuals (in contrast to the rich) performed worse on tasks measuring intelligence and cognitive control after they had been asked to think about their finances; similarly, farmers performed worse on these tasks before the harvest, when they were relatively poor, than after the harvest. In both cases, material scarcity seems to change people's allocation of attention in ways that are detrimental for their performance. It is possible that similar attentional mechanisms are behind the effect of poverty on risk-taking and time-discounting, in that they induce a focus on immediate and safe payoffs; data on this question are not yet available, however.

Emerging Issues

We have outlined a feedback loop in which poverty reinforces itself through exerting an influence on psychological outcomes, which may then lead to economic behaviors that are potentially disadvantageous. This feedback loop may prolong the climb out of poverty for poor individuals, or even make the escape from poverty impossible if the relationships described above are strong enough.

A number of questions and concerns arise from the previous discussion. First, in our view, the weakest link in the relationship between poverty, psychological outcomes, and economic choice is the effect of stress and negative affect on economic choice. Despite intriguing initial results, it remains incompletely understood exactly which psychological aspects of stress, and which types of negative affect, influence economic behaviors. In addition, the evidence on this link

is currently restricted to laboratory studies, and the literature does little to distinguish between the effects of acute and chronic stress on economic choice. Because poverty is usually a chronic condition, future studies should examine the effect of changes in chronic stress on economic choices in the laboratory as well as in field settings. Second, there is still little evidence on the causal effects of different poverty alleviation interventions on life satisfaction and well-being. We do not know whether some interventions work better, per dollar spent, than others. For example, are cash transfers more effective than the provision of health insurance or crop failure insurance? Third, the temporal dimension remains almost entirely unexplored. Little is known about whether poverty alleviation leads to a permanent or only a temporary increase in psychological well-being. To address this problem, repeated surveying after interventions is necessary.

A further open question is whether the relationships outlined above could constitute a poverty trap. For this to be the case, a strong nonlinearity in the relationship between poverty and psychological outcomes, or psychological outcomes and economic choice, would be required (71). No evidence is present for the former; existing studies on the relationship between income and psychological outcomes show no strong signs of being nonlinear. In contrast, the famous Yerkes-Dodson law states that stress and performance may exhibit a nonlinear relationship resembling an inverted U (72): According to this law, moderate increases in arousal lead to improvements in performance, whereas extreme levels of arousal lead to performance decrements (73, 74). However, little evidence exists on whether this holds for economic behavior; this is a fruitful area for future research.

Finally, what types of welfare programs or interventions would break the relationships discussed above? If the proposed feedback loop holds true, three possibilities seem promising for breaking the cycle and improving welfare: The first is to target poverty directly, the second is to target its psychological consequences, and the third is to target the economic behaviors that result from them. These possibilities are not mutually exclusive, of course, but should be studied in isolation as well as in combination to understand their effect.

With regard to the first possibility—targeting poverty directly—a number of studies have tested the effect of direct poverty alleviation programs on psychological outcomes and economic behavior. Most of these studies examine cash transfer programs, which have produced broadly encouraging results on general welfare in recent years (32, 37, 41, 75–79). Regarding the third possibility—targeting economic behaviors directly—a number of programs provide small nudges to economic behaviors with large positive welfare consequences—for instance, commitment savings accounts (80, 81), reminders to save (82), or the provision of a lockable metal box with a deposit slit at the

top (like a piggy bank) (83) all led to considerable increases in savings.

In our view, the second possibility, i.e., targeting the psychological consequences of poverty, holds much promise for future work. Although an early randomized controlled trial showed that group interpersonal psychotherapy helped people complete daily economic tasks in Uganda (84), research on the economic effects of such interventions is otherwise still in its infancy. Most important, this study targeted depressed individuals, whereas the evidence discussed in this article shows that the debilitating effects of stress and negative affect on economic behavior may occur even in individuals who do not suffer from full-fledged clinical depression. This insight suggests that psychotherapy-like interventions may have economic benefits even in nonclinical populations (85).

More broadly, we propose that an increased understanding of the relationship between poverty, its psychological consequences, and their potentially disadvantageous effects on economic choice will lead to poverty alleviation programs that achieve two goals. First, they will take both the psychological costs of poverty and, conversely, the psychological benefits of poverty alleviation into account. Second, they will consider psychological variables as novel intervention targets for poverty alleviation. It is our hope that this will lead to a more refined understanding of poverty and thus contribute to the solution of this lingering global problem.

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67. In our systematic review, we also identified two studies that found no effect of affect or stress on time preferences. One study (87) exposed subjects to an easy or difficult test, thus inducing feelings of relative success or failure, and then measured time-discounting. No effect of test difficulty on time-discounting was found. However, in this study, the time-preference task was administered at the end of a battery of behavioral tests; it is possible that the negative affect induction had already worn off by then. Alternatively, it is possible that the induction of mood through this manipulation is less powerful than movie clips or that subtly different types of affect may differentially affect time preference. Another study used the TSST to induce stress, then measured temporal discounting and found no effect (88). A potential explanation for this finding is that the TSST induces acute stress (i.e., concurrent glucocorticoid and noradrenergic activity), whereas hydrocortisone administration lacks some of the components of acute stress (e.g., noradrenergic coactivation). The lack of an effect of the TSST on discounting could thus suggest that acute stress does not affect discounting, whereas chronic stress may. This account is superficially consistent with a recent finding (89) showing that the combined administration of hydrocortisone and yohimbine, an α 2-adrenoceptor antagonist, has different behavioral consequences than hydrocortisone in isolation.
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SUPPLEMENTARY MATERIALS

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 Supplementary Text
 Literature Reviews
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