The Impact of Access to Microfinance on Mental Health

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Microfinance has reached over 175 million impoverished families worldwide (Microcredit Summit), offering under-banked populations the opportunity to access financial tools. This access to finance provides clients an opportunity to improve their financial condition; however, the impacts of microfinance often extend beyond a client's wallet. This study analyzes the extent to which access to finance impacts mental health indicators, including life satisfaction, stress, depression, and optimism. Financial access is measured by household use of various financial products, such as loans, savings, and insurance, as well as by the different modes in which these products are offered, e.g., group liability lending versus individual loans. Data was collected in the impoverished Udaipur district of Rajasthan, India between 2002 and 2009. The data consists of both individual and household surveys that were administered in two distinct waves, creating a panel data set. Using fixed-effects OLS regressions, the results show that having an outstanding loan decreases an individual's life satisfaction and increases stress. Outstanding loans are the only measure of financial access to impact mental health. Mental health indicators of depression symptoms and optimism appear unaffected by access to finance. The results indicate a limited impact of access to finance on the emotional health and status of microfinance clients.

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Introduction

Microfinance and expanded access to financial services has been hailed as a potential "magic bullet" for the global fight against poverty. The success or failure of a microfinance program is most often evaluated on the improvement or deterioration of the participant's financial portfolio, including changes in assets, income, or wealth. This method of evaluation ignores the impact of access to finance on aspects of people's lives beyond their financial situation, such as their physical health and emotional well-being. While there is an abundance of research targeting changes in physical health outcomes as a result of increased access to finance (Dunford 2001, Leatherman and Dunford 2010, Proynk et al. 2007), there is a disturbing lack of focus on the mental health and emotional well-being of microfinance participants. This gap in the literature is especially troubling considering the fundamental interconnectedness of physical and mental health. Previous research has established that physical disease may be the result of emotional stress and that sound mental health helps guard against illness. The burden of poverty extends beyond simply the finances of low-income people - low socio-economic status is a risk factor for negative mental health outcomes, including psychological distress, depression, anxiety, and other disorders. Accessing financial services may change these mental health outcomes, either for better or for worse.

On the positive side, taking advantage of financial services has an enormous potential to improve mental health, a benefit that should be considered when evaluating the impact of programs that provide access to financial products. Access to credit enables consumption smoothing and allows households to cope with economic shocks by easing liquidity constraints. Loan recipients may be less stressed and anxious because their ability to manage unexpected economic burdens is improved by consumption smoothing. Another potential mental health

benefit of microfinance programs occurs within the MFIs that operate on a group-based system that creates an exchange of knowledge and support between members, i.e. social capital. Social capital may improve the mental health of participants in group-based financial services by offering a safety-net in case of inability to pay and by providing emotional support in case of failure. In these programs, emotional support comes from both the group members themselves and the knowledge that other people in one's group are experiencing similar things.

Conversely, increased access to finance may negatively impact clients' mental health outcomes, a detriment that should also be considered when evaluating programs. The pressure to repay a loan, from the savings group or a loan officer, coupled with a possible inability to repay, could result in clients being more stressed or depressed than they would have been without a loan. The burden of saving would be felt daily when individuals must reduce current consumption so that money can be set aside for future use, a loss that could certainly add stress to one's life. There is also some debate about whether participation in MFIs is empowering for women or whether it results in an increase in the incidence of domestic abuse (Kim et al. 2007, Schuler et al. 2010).

This paper seeks to identify the impact of accessing financial services on mental health outcomes for the poorest of the poor. The data used in the analysis includes information on individual participation in a variety of financial institutions and products. The measures of financial access include loans from a commercial bank, participation in a savings group or SHG, member status in a ROSCA, and other institutional or savings group deposits. Mental health and emotional well-being are measured by overall satisfaction with life, occurrence of depressive symptoms, and optimism, as well as measures of the extent of worry, anxiety, and tension.

Literature Review

While many studies address the connection between microfinance and health outcomes, most focus on physical health outcomes, such as a reduction in AIDS incidence or the health of children as a result of the mother's relationship with a microfinance institution (Leatherman and Dunford 2010, Proynk et al. 2007). In a research study of Indonesian households DeLoach and Lamanna (2011) find that the presence of microfinance institutions in communities significantly improves the health of children. The authors reach the conclusion that participation in microfinance lending facilitates the sharing of health-related information among parents, advances the position of women within the household by increasing their bargaining power, contributes to the expansion of health-related infrastructure, and smooths household consumption in cases of unexpected economic shocks. These findings reflect the general consensus on the relationship between microfinance and children's health outcomes and microfinance's impact on the accessibility and outcomes of health care (Leatherman et al. 2012). This paper demonstrates the success of participation in MFI programs in improving physical health and motivates the question of whether a similar effect exists for mental health outcomes.

Hussain and Strasse (2010) explore both embodiment and emotionality as factors that affect microcredit client's agency. The authors investigate their research question through a series of informal interviews of households in Bangladesh. Overall, the conversations with microfinance clients lead the authors to conclude that the "repayment pressure of credit brings emotional stress and anxiety in the everyday life of clients involved with the microcredit system". A major limitation of this study is that it relies entirely on anecdotal evidence gathered from informal interviews with clients to draw its conclusions. While economic research often lacks the human component of asking participants how they feel and why it is that they feel that

way, the credibility of this study suffers from a complete lack of empirical evidence. The anecdotal evidence provides insight into the everyday psychological state of low-income individuals with microcredit loans. However, the researchers only interview microfinance clients; individuals without microcredit are not included as a comparison to the emotionality and embodiment of women credit clients. Without a control group to which microfinance clients can be compared, it is difficult to determine whether the increase in stress and anxiety can actually be attributed to microfinance.

Fernald, Hamad, Karlan, Ozer and Zinman (2008) differ in their analysis from previous research by using a randomized control evaluation, wherein participants were randomly selected from a pool of previously rejected loan applicants to combat selection bias and survivorship bias. The analysis uses the Center for Epidemiologic Studies Depression Scale and Cohen's Perceived Stress scale as the primary indicators of mental health. Mental health status is measured two to six months after subjects received a micro-loan. The authors find that credit access is associated with reduced depressive symptoms in men, but not in women. For both genders, the authors observe an increase in perceived stress, with men showing a stronger association. The paper suggests that the increase in the prevalence of stress could be attributed to the fact that even "good" life events, for example marriage or a new career path, may cause an increase in stress and that therefore the observation may not indicate a negative effect of MFI participation. In conclusion, the authors suggest that their findings support the inclusion of mental health as a measure of the success or failure of poverty alleviation approaches such as microfinance and that longitudinal research is needed to further assess impacts.

Angelucci, Karlan, and Zinman (2013) consider measures of well-being alongside access to credit and business outcomes. Their study uses a clustered randomized trial as well as

household surveys to evaluate the validity of concerns that microcredit hurts more than it helps. The authors find that overall, access to microcredit has a positive impact, finding a statistically significant negative impact in only three out of forty-five variables. The paper addresses mental health through measures of happiness, trust in others, satisfaction with one's life, and job stress. Only happiness, defined as the absence of signs of depression, and trust in other people were impacted by access to credit; both were positively affected. The data comes from Compartamos, the largest MFI in Mexico, and relies exclusively on the group-lending model practiced within the bank. Because the study uses information collected from group-lending clients alone, the results have limited application across other formats of micro-lending. The finding that microfinance increases happiness and trust in others is drawn from the small section of panel data, composing only 11% of the entire data set, and lacks a strong sample size. Overall, the paper provides a compelling case for the need for future research to investigate the impact of access to credit on mental health on a larger scale across a long-term time period using panel data.

Ahmed and Chowdhury (2001) examine mental health by exploring the emotional experiences of women in relation to BRAC, a large MFI in poor rural areas in Bangladesh. For the purposes of the study, the authors define emotional stress as a "condition in which an individual experiences anxieties or worries that interferes with daily activities". To assess the level of emotional stress, a survey was conducted among BRAC members and non-BRAC members of similar socioeconomic status which asked the female respondents, "In the last one month, did you suffer from any disturbance in mental peace that interfered with your daily activities?" The women in the sample include a significant number that are involved in credit-based income-generating activities. The paper finds that the impacts of subjective factors on the

emotional and physical well-being of the sample are significant. These factors include the differences between expectation and accomplishment, as well as anxieties and stress resulting from the transition away from the traditional role of women. The surveys revealed that the primary causes of emotional stress were strongly related to poverty, such as a chronic deficit of daily necessities. The conclusions incorporate the primary finding that BRAC membership did not show any evident effect on the prevalence of emotional stress among poor women, although some women reported symptoms of depression. The paper ends by asserting the importance of addressing the mental health needs of poor women, particularly in the evaluation of success or failure of an MFI program and national health care systems.

The results of the Ahmed and Chodwhury (2001) study are limited to microcredit that is used for income-generating activities, rather than loans meant for other common uses including consumption, health shocks, and ceremonies. Without restricting loan sample to only income-generating activities, one would expect the impact of the difference between expectations and accomplishments to be minimal. These findings are further limited by the focus on the early stage of microfinance program implementation when clients first receive a loan. Using BRAC membership as the representation of microfinance is limiting to the generalization of the study's results due to the fact that BRAC uses a group-based lending structure wherein peer group pressure is used in place of collateral for a loan. Group lending is accompanied by a host of dynamics such as support or repayment pressure that may impact the mental health of a loan recipient in addition to the financial consequences of receiving a loan. The results of this analysis are not generalizable to microfinance institutions that do not rely on the group lending structure and instead offer individual loans or other types of microfinance products. My paper addresses

these gaps by collecting data from multiple sources of financial products that includes but is not limited to MFIs and savings groups.

Table 1: Review of Previous Work

Authors	Health Measure	Financial Product	Methods	Results
Angelucci, Karlan, and Zinman	Happiness Life satisfaction	Credit: group lending	Randomized Control Trial	Happiness increase
DeLoach and Lamanna	Child physical health	Credit: group lending	Indonesian Family Life Survey	Child health outcomes improve: weight gain
Fernald et al.	Stress Depression	Credit	Assess 2-6 months post-loan	Stress increase Depression increase (men)
Hussain and Strasse	Embodiment Emotionality	Credit	Interviews	Observe stress
Ahmed and Chowdhury	Emotional stress	Credit	Compare MF clients to non-clients of similar SES	No impact

Previous work studying the connection between access to finance and mental health has been limited by the specific types of microfinance examined in each study, including lending-structure and type of microfinance product. To address this gap, my study includes data on a wide variety of microfinance products, extending beyond a single model of microcredit. Financial access data includes various forms of loans, as well as savings and insurance, broadening the scope of my analysis beyond previous work which has been limited to a single type of microfinance scheme. Unlike prior studies, my data also allows me to distinguish between group models of lending and saving and individual financial activities.

Previous work also fails to control for within-person characteristics and suffers from an inability to follow individuals across time, only observing an individual immediately following receipt of microcredit. My study utilizes panel data to account for unobserved individual characteristics that undoubtedly impact an individual's mental health. Because my data includes two distinct waves of surveying, it is possible to look at an individual both when they have accessed financial services and when they have not, unlike previous studies which restrict their data collection to immediately during or after microfinance participation. Through the use of panel data including extensive financial access and mental health variables, my study contributes a more comprehensive picture of the impact of various forms of microfinance on mental health measures.

Theoretical Framework

Determinants of Mental Health

In 2006, followers of microfinance were shocked and heartbroken when microfinance institutions were connected to a string of suicides in Andhra Pradesh, India. The number of estimated suicides of microfinance clients in Andhra Pradesh ranges from 50 to as many as 200, numbers startling enough to incite state government intervention on behalf of microfinance borrowers. While it is unclear how many of the suicides were the result of debt recovery methods used by MFIs and therefore the fault of those institutions, the incident has made it clear that there is a real, potentially dangerous connection between increasing access to financial services and mental health. The psychological profile of a microfinance client is equally as important as their financial portfolio; when evaluating whether a microfinance program has truly improved someone's life and made them better off, the impacts on an individual's mental health should be considered alongside their financial outcomes.

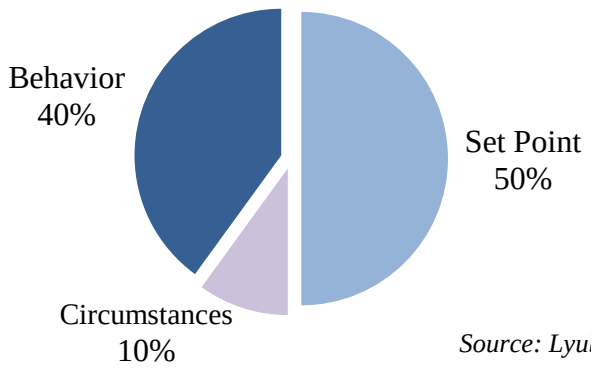
There are innumerable factors that determine a person's self-identified subjective well-being[1] that range from individual characteristics to home and work environments to macro-economic indicators. The set point, or hedonic adaptation, theory of happiness proposed by Brickman and Campbell (1971) suggests that there is a relatively stable level of subjective well-being that each individual returns to, even after significant positive or negative life events. If happiness is truly set at some inflexible point, albeit with a small spectrum of movement allowed, then microfinance intervention in the lives of those living in poverty can neither dramatically help nor hurt the subjects' happiness. However, not all psychologists agree. Others have proposed additional factors that affect happiness outside of life events. Contributing to the establishment of a set point of happiness, Lykken and Tellegen (1996) use evidence from their longitudinal study of twins to find that genetics are a major determinant of subjective well-being, accounting for about 50% of happiness. Beyond genetics, personality also has an enormous influence on how happy a person is. Personal traits associated with a positive affect[2] include components of extraversion such as sociability, warmth, and social participation while ego, guilt, and anxiety are indicators of neuroticism and are associated with negative affect (Costa and McCrae 1980). Costa and McCrae find that although there is a set point of happiness that an individual returns to throughout their lifetime, "throughout these changes, the absolute advantages of being more extraverted or less neurotic will continue". When measuring changes in happiness, not all similarly significant life events have an equal impact. Consistent with the behavioral economic idea of an S-shaped utility function developed by Kahneman and Tversky in 1979 wherein losses loom larger than gains, Baumeister, Bratslavsky, Vohs, and Finkenauer (2001) find that negative events have a stronger mental impact than positive events.

[1]Subjective well-being, happiness, and life satisfaction are terms that are not strictly identical but conflated enough that for the purpose of this analysis, they are used interchangeably.
[2] Emotions, happiness

Lyubomirsky (2007) suggests that 40% of happiness is within one's power to change simply through adapting one's behavior. She offers a model of happiness wherein, like previous researchers have found, 50% is set point and in addition to the set point, only 10% is life circumstances such as wealth, marital status, etc. The remaining 40% of happiness lies not in genes or life situations, but rather in the intentional choices individuals make every day [Figure 1]. Examples of activities deliberately chosen by happier people include spending time with family and friends, helping coworkers and others, and engaging in regular physical exercise.

Figure 1

Determinants of Happiness



Source: Lyubomirsky 2007

This model of happiness implies that microfinance interventions targeting behavioral changes in addition to financial access would be more successful in improving the lives of the poor. Grameen bank, the originator of the microfinance movement, targets behavioral changes in its sixteen mandates, life behaviors clients promise to follow through participation with the bank. Grameen couples loans with a promise from clients to adhere to the behavioral mandates, which include decisions to help each other when someone is in need, participate in social activities together, and not inflict injustice. The Grameen model connects to Lyubomirsky's model of happiness through behavioral choices by showing how microfinance, beyond offering financial

access, provides a unique opportunity to intervene to affect counterproductive behaviors that can lead to cycles of poverty.

Poverty and Mental Health

Any research exploring subjective well-being must consider that the ways in which individuals evaluate life satisfaction varies across cultures and these differences in judgment are tied to the values of those cultures. Oishi et al (1999) find that in poorer nations, financial satisfaction is more strongly associated with life satisfaction than in wealthier nations. Wealthier nations value home-life satisfaction more than financial satisfaction. These differences suggest that in developing countries, the potential of microfinance to impact life satisfaction is higher than in developed countries, where the citizenry derives less life satisfaction from their financial situations. Other cultural values that impact the standards for life satisfaction include collectivist versus individualist nations and safety, love and esteem needs (Oishi 1999)[3].

While the correlation between income and well-being remains remarkably convoluted, poverty has a clear impact on the mental processes of the poor. Mani et al. (2013) find a causal relationship between poverty and a deterioration of mental function as a result of the burden poverty imposes on cognitive capacity. The study finds that within an individual, mental acuteness changes alongside changes in income. The results are drawn from an experiment involving small-scale farmers in India whose cognitive capabilities were measured before the harvest season, a time of economic hardship, and after the harvest season, when farmers enjoy greater levels of prosperity. The authors argue that cognitive constraint occurs as a result of self-

[3] When comparing happiness across countries it is also important to consider that the determinants of happiness may vary due to different levels of primary needs being met. For research in first world countries, the determinants of happiness are evaluated once all primary needs such as food and shelter are satisfied. People living in third world countries often lack these essential human needs and as a result, the determinants of happiness for people living in first-world nations may significantly differ from people who live in poverty.

control and cognitive capacity being a limited and depletable resources. Living in poverty often forces individuals to make frequent, difficult decisions regarding trade-offs because their resources, such as money, food, and time, are relatively limited. As a result of these mentally taxing decisions, cognitive capacity is diminished. Furthermore, as a result of the increased mental burden carried by those in poverty, any subsequent decisions (after the first choice between difficult trade-offs) are more likely to reflect impulsiveness and other problematic behaviors (Vohs 2013). The increased likelihood of people in poverty to perform risky behaviors creates a poverty trap, wherein those poor decisions may further entrench people deeper into poverty. These findings show that people living in poverty would benefit from an intervention aimed at lessening their cognitive burden and enabling simpler, less mentally demanding decisions. The consumption smoothing relief provided by microfinance loans and savings may lessen the cognitive burden of impoverished individuals.

Hypotheses

I hypothesize that participating in financial services improves mental health outcomes primarily due to the ability to cope with economic shocks both as a result of the lessening of liquidity constraints and investment in social capital. Microfinance institutions operate with a double bottom line: the dual objectives of financial returns and the social mission of poverty relief. Through offering credit and savings, microfinance may raise an individual's income and wealth. Such a raise in socio-economic condition could have a spillover effect beyond the betterment of one's financial life - happiness could also be affected by access to finance. A major benefit of access to finance is the consumption smoothing relief credit and savings provide. The flexibility of loans and savings offers an advantage to clients. Consumption smoothing through microcredit and savings could also disrupt the downward economic spiral caused by a shock. For

example, a person who is able to use a microloan to purchase medicine in the midst of a health shock will recover faster and be able to earn income again much sooner than if they were unable to purchase medication. As a result of the consumption smoothing enabled by access to finance, clients could be less stressed than if they had been unable to access finance.

The act of accessing microfinance itself may impact mental health by fostering feelings of agency and inspiring hope. By increasing the range of options available to people in poverty and offering opportunities for people to help themselves, microfinance promotes hope and optimism. Opening new avenues to people in poverty to develop and use their capabilities provides the clients with the possibility that their circumstances may improve in the future. Microfinance offers a chance for clients to lift themselves out of poverty, rather than relying on family or charity, and shows people living in poverty that it is possible to improve their lives themselves.

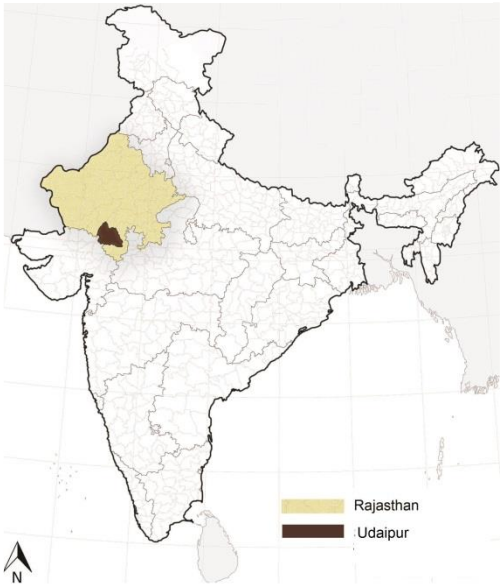
The social aspect of microfinance has a significant potential to impact mental health. Microfinance programs that operate with a group model, whether a group-liability credit scheme or an informal savings group, add another dimension to access to finance by creating a group dynamic. Group-based financial access can help individuals to build social capital through exchanging information and providing emotional support. By branching both the financial and social worlds, microfinance offers the opportunity to build and strengthen social networks and through these social interactions, impact the emotional life of the clients. The social components of microfinance could also negatively impact a client's mental health. Group-liability, in which group members are responsible for monitoring and enforcing repayment amongst themselves, creates an environment in which social acquaintances become uniquely, perhaps detrimentally, involved in each other's financial lives. Repayment pressure from the people who are meant to

function as one's social support network would negatively impact mental health of clients. Additionally, as low-income individuals move toward microfinance, they also move away from traditional sources of financial relief, such as informal loans and financial support from family members. Negative emotional impacts could result from the stress caused by the possible changes in the kinship relationships resulting from replacing familial monetary exchanges with alternative sources of credit such as the structured microfinance market. This study analyzes the relationship between financial services and the emotional profile of microfinance clients.

Data

The data for this paper was accessed from the Abdul Latif Jameel Poverty Action Lab Dataverse. Abhijit Banerjee and Esther Duflo authored the study that designed the methods for collecting the data and compiled it for use in their academic work. The data was originally collected in 2002 to 2005, including an initial baseline and a second baseline study that added additional villages. A follow-up survey for the endline data set was conducted from 2007 to 2009. The study was administered with the help of Seva Mandir, a local non-governmental organization (NGO). The individual survey data consists of the responses of 12,951 unique individuals from 134 villages with 15,293 observations overall. Respondents were surveyed during the initial waves of data collection in 2002 and 2005 and then again in 2007 and 2009. While the authors of the study were not able to collect responses from each individual in both the baseline and the endline years, responses were collected from all households across both

Figure 2



Source: Seva Mandir

waves of data collection. Of the 12,915 unique observations, 1,681 of the individuals were surveyed in wave one and 11,270 were surveyed in the second wave of data collection.

The data was collected from villages throughout Rajasthan, India in the Udaipur district, one of the poorest districts of India. More than 40% of the inhabitants of the Udaipur district live below the poverty line, a figure startlingly above the regional rate of 13%. Households are so impoverished that most do not have many durable goods and only 21% have electricity. The literacy rate of the district is also extremely low; of the people surveyed, only 46% of men and 11% of women reported that they are literate (Banerjee and Duflo 2009). The data used in this study comes from 'the poorest of the poor', a group usually targeted for help by microfinance institutions but whom is increasingly becoming ignored in favor of a richer, and subsequently more profitable, poor as MFIs move toward independence from donations and become more commercialized.

The portion of the data that I use consists of the responses from an adult survey, taken on the individual level within households. The individual survey, also referred to as 'the adult module of the integrated family survey', was given to all members of a household over the age of fourteen. The survey is composed of several segments, including sections on personal details, individual income and expenditures, physical health, mental health, and social integration. The 'individual income and expenditures' section provides the financial measures for this study while the 'mental health' section provides the measures of emotional well-being [Table 2]. To evaluate emotional well-being, the survey includes a broad array of mental health measures[4]. The first question in the survey assesses overall mental well-being, "How satisfied are you with your life

[4] It may be problematic that the health outcomes use self-reported measurements. The individuals rate their own health and mental status rather than having a professional evaluation. It is also possible that the survey respondents do not feel comfortable sharing their emotional troubles with the interviewer and subsequently provide false or misleading information.

right now?" The question is answered on a scale of one to five, based off of the different emotional depictions of smiling or frowning cartoon faces. The next question, "Last year, did you have a period lasting longer than a month when most of the time you felt worried, anxious, or tense?" is an indication of stress and other psychological distress conditions. Questions referring to crying, loss of appetite, apathy, and trouble sleeping are indicators of depression. A final question targeting mental health addresses optimism and hope, both indicators of positive mental health, "Do you expect life to get better for you and your family in the next few years?" The respondent's answers to these and other questions targeting mental health concerns offer a thorough representation of mental health status.

Table 2: Mental Health Measures
F1.0 Which picture best describes how satisfied you are with your life right now if the smiling face is very satisfied and the frowning-crying face is very dissatisfied?
F2.0 From time to time, everyone feels sad or down. I am going to read a list of statements that may express these feelings. I would like to know how often you have felt this way in the past week. Please indicate for each statement whether in the past week you felt this way hardly ever, some of the time, or most of the time. 1. I felt sad… 2. I cried a lot… 3. I did not feel like eating… 4. I did not feel like doing my work… 5. My sleep was restless…
F3.0 During the past 12 months, did you ever have a period lasting one month or longer when most of the time you felt worried, tense, or anxious?
F3.3 How much did/do these worries interfere with your ability to carry out your normal activities- a lot, some of the time, a little, or not at all?
F5.0 Do you expect that life will get better for you and your family in the next few years?
F5.2 Do you have plans to do things to make life better for you and your family?

Table 3: Financial Access Measures
D2.0 Do you have an outstanding loan from a commercial bank?
D2.2 Have you had a loan from the commercial bank in the past that you have repaid?
D2.3 Do you participate in a savings group or SHG?
D2.7 Are you a member of *bisi*?
D2.11 Do you have life insurance?
D2.12 Do you ever deposit money in any other institution or savings group?

The data also includes information on the physical health of households in the sample. The survey includes information of biomarkers such as blood pressure, body temperature, and height and weight measurements for a subset of the respondents. I elect to measure physical health using a measure of relative health level that I created. The physical health section of the individual survey asks about twenty-eight different health problems for men and thirty health issues for women [Appendix 4]. The respondent is asked whether they have experienced the symptom in the last thirty days. Issues range in severity and include problems such as dry cough, headache, trouble breathing, and paralysis. I divide the sample into four categories: excellent health (less than three health issues), fair health (three to five health issues), poor health (six to nine health issues), and extremely poor health (more than ten). Of the total 12,951 unique observations, 9,049 individuals are classified as being in excellent health, 2,635 are in fair health, 1,065 are in poor health, and the final 202 are considered to be in extremely poor health. I created a group dummy variable for physical health; in the analysis, individuals are compared to respondents categorized as being in ‘excellent’ health.

Surveys were also administered at the household level to collect information on a variety of household characteristics. I combined the household and individual surveys by matching the household information to all individuals within that household. Information on the size of the household includes the number of adults, children, and temporary lodgers living together. The

household survey contains a variety of questions regarding financial status, which is helpful in determining relative levels of poverty. These questions include whether the household is below the poverty line, has an antodaya card, and whether the household purchased anything from the public distribution system in the last thirty days. An antodaya (or "antyodaya") card is a card given to the poorest of the poor in both urban and rural India, particularly to "primitive tribal" people (Right to Food Campaign 2003). I elect to use whether the household has an antodaya card as the primary measure of poverty in my analysis because the poorest of the poor is a subsection of the population that is uniquely poised to have the most to gain or to lose from participation in financial services. Additional important household characteristics captured by the household survey include whether anyone in the household is mentally retarded or disturbed, whether anyone in the household was a victim of a crime in the last twelve months, and if everyone in the household eats at least two regular meals a day. Eating at least two full meals a day represents household wealth as well as contributing to the emotional and physical state of survey respondents.

The data contains several measures of financial access that vary in scale and formality. These financial access measures do not explicitly refer to microfinance organizations but instead collect information on the type of financial products that individuals in Udaipur access. Microfinance as a field operates under a fluid definition of what the term 'microfinance' can mean. For the purposes of this analysis, I use microfinance to refer to small-scale, possibly informal financial services and products targeted at under-banked, low-income populations. The survey asks individuals whether they have accessed a number of different financial products, the explanations of which follow. These include an outstanding loan from a commercial bank, a loan from a commercial bank in the past that they have repaid, participation in a savings group or self-

help group (SHG), membership in a *bisi*, life insurance, deposit money in other institution or savings group, and participation in a women's group or income-generating group. Financial access data is also collected at the household level by asking whether anyone in the household has an outstanding loan and has a bank or savings account. A *bisi* is a type of ROSCA, a financial self-help organization wherein a group of people informally gather to collectively save money and take turns loaning out the "pot" of collected savings each meeting, until every group member has had a turn with the lump sum. SHGs are a popular form of microfinance in India that operate in conjunction with banks, forming a group-bank linkage model. SHGs are generally comprised of ten to twenty members who collect savings together, deposit the money into a bank, and take loans dependent on the group deposit amount. Although the surveys do not use the term microfinance, "commercial bank" may refer to a microfinance organization, as the Udaipur district is extremely rural and impoverished and thus an ideal location for MFI penetration. Although the survey does not directly address traditional microcredit, the various financial services it does include represent a range of microfinance products.

Table 4: Summary Statistics

Variable	Observations	Mean	St. Deviation	Min	Max
Sex	12,951	0.164	0.370	0	1
Age	12,764	35.038	16.184	14	105
Married, living with spouse	12,951	0.646	0.478	0	1
Below poverty line	12,845	0.566	0.496	0	1
Physical health	12,951	0.415	0.708	0	3
Household size	12,905	6.769	2.522	1	21
Children in household	12,363	3.971	2.197	0	13
Life satisfaction	12,943	3.144	0.928	1	5

Methodology

Financial Access Measures

I grouped survey questions into categories based on the type of financial product they related to and then used those groupings to investigate a general yet categorical effect of the certain type of financial tool on mental health. The broadest of all of the variables is "financial access", a dummy that is equal to one if the respondent indicated that they participated in any financial service or product: loan from a commercial bank, loan from savings group, member of a *bisi*, have life insurance, and other money depository. The variable "anysavings" indicates whether the individual participates in any kind of savings group, including a savings group, self-help group, other groups, or anyone in the household has a bank or savings account. "Groupmember" groups together the survey questions related to any group model, whether financial or other, and joins them together under one umbrella variable. The variable "loanoustanding" measures whether the individual has an outstanding loan from a commercial bank, *bisi*, or savings group.

Empirical Model

I use panel data to run a fixed-effects regression, holding individuals constant across both waves of surveying. The use of fixed effects is extremely important for the analysis because mental health is a variable that is entirely dependent on the individual, making it essential that the regressions control for within-person characteristics. In general, the regressions compare people who have accessed some type of financial product to people without financial assistance to see if there are differences in mental health status, all else held constant. The mental health indicators are the dependent variables in the regressions, while the dummy variables for

participation and the demographic controls are the independent variables. The general model of the regression is shown below.

> [mental health indicator] = β_1 + β_2[financial access measure] + β_3 age + $\beta_4$sex + β_5 marital status + β_6 educational attainment + β_7 poverty level + β_8 physical health + β_9 number of people in HH + β_{10}number of children in HH + β_{11} mentally disable person in HH + β_{12} whether all HH members eat 2 full meals a day + β_{13} anyone in HH victim of a crime + β_{14} season + β_{15} village + ε

Further regressions are specific to distinct mental health status indicators and the various types of financial services. For example, the regression with "life satisfaction" as the dependent variable and group participation as the form of financial service is as follows:

> [life satisfaction rating] = β_1 + $\beta_2$groupmember + β_3 age + $\beta_4$sex + β_5 marital status + β_6 educational attainment + β_7 poverty level + β_8 physical health + β_9 number of people in HH + β_{10}number of children in HH + β_{11} mentally disable person in HH + β_{12} whether all HH members eat 2 full meals a day + β_{13} anyone in HH victim of a crime + β_{14} season + β_{15} village + ε

The regressions vary the mental health indicator being used as the dependent variable as well as whether the general financial services dummy is used or if one type of financial service is selected for analysis.

A positive coefficient on β2, the coefficient on the financial access measure, indicates that having an outstanding loan increases the unit of the mental health measure. For the second regression pictured above, a positive coefficient shows that participating in a group savings program increases the rating of satisfaction with one's life by a certain amount on the one to five scale. In general, a positive coefficient on the "accessfinance" measure indicates an increase in the mental health measure. An increase in the mental health measure can indicate a benefit of microfinance or a detriment, as an increase in depressive symptoms or stress would be represented by a positive coefficient but would be a negative impact.

The regressions control for demographic information including age, sex, marital status, educational attainment, poverty level (represented by whether the household has an antodaya card), physical health, number of people in the household, number of children in the household, whether the household includes mentally disabled person, whether household members eat at least two full meals a day, whether anyone in the household was the victim of a crime in the last year, season, and village number. There are six different classification of marital status, separated into individual dummy variables: married and living with spouse, married but not living with spouse, separated or divorced, widowed, committed partner ("nata"), and never married. There is no variable for race included; although the individual survey contained information on caste, the responses were inconsistently recorded.

Motivation for Selection of Controls

Physical health is one of the primary characteristics that affect well-being, with poor health and illness strongly correlated with a decrease in well-being (Diener and Seligman 2004, Helliwell 2003). Just as healthy people are happier, it has also been found that happy people are actually healthier, with lower blood pressure and faster recovery times (Diener and Seligman 2004). It is also important to consider the connection between physical and mental health as an overlap between the two may contribute to changes in the status of either. For example, mental health problems such as excessive worry and stress could be brought on due to a physical limitation such as disease or injury. Just as a physical condition may lead to worsening mental health, mental health concerns may result in a physical health issue such as disease (Stewart-Brown 1998). In cases such as this, both physical and mental health would be improved through treatment at a healthcare facility. The survey data used in this paper addresses a wide variety of physical health concerns, measures, and actions taken by the respondent to recover. For the

respondents that report a physical health ailment, whether it can be identified to be in connection to a mental health concern or not, the existence of such a problem is included in the analysis to address the overlap between physical ill health and poor emotional well-being.

Personal identifiers such as age, gender, ethnicity, and marital status have a small yet significant impact on subjective well-being. While day-to-day fluctuations in happiness are to be expected, happiness is also not constant over the life cycle. Most researchers agree that there is a U-shaped pattern of well-being that is observed throughout the life cycle, with the bottom of the curve occurring around middle age (Blanchflower and Oswald 2004, Frey and Stutzer 2002). There is also a gender divide when it comes to happiness, with men reporting marginally less happiness than women (Blanchflower and Oswald 2004, Di Tella et al. 2003). For minority populations, ethnicity has a negative impact on well-being, most likely due to discrimination (Dowling and Yap 2013). The connection between close relationships such as family, friends, and marital status and subjective well-being is complicated by the ways in which relationships are identified. Overall, being married increases happiness and traumatic events such as becoming widowed or divorced decrease happiness (Helliwell 2003).

Income, education, and employment are separate yet interdependent determinants of happiness making it difficult to isolate the effects of any single one of these factors on subjective well-being[5]. The data used in my analysis does not include information on employment status; however, I am able to control for both educational attainment and income level. The returns of education and employment reach beyond income in the ways in which they affect happiness. Education is positively correlated with feelings of self-worth and prestige in addition to more

[5] The Easterlin paradox, a staple of happiness economics developed by economist Richard Easterlin in the 1970s, states that within developed countries, wealthy people are generally happier than poorer ones but when comparing between countries over time, happiness is uncorrelated with national per capita income. The Easterlin paradox exclusively considers developed economies where income is sufficient to meet basic human needs. For people living in poverty, defined as income insufficient to meet basic needs, absolute income has more of an effect on happiness.

tangible concerns such as employment and income (Di Tella et al. 2003, Hayo and Seifert 2003, Helliwell 2003, Frey and Stutzer 2002, Castriota 2006). Being unemployed has strong negative effects on well-being, often due to a loss of self-esteem. Without the social position and status that accompany employment, individuals may experience a drop in happiness and often become depressed (Di Tella et al. 2001, Frey and Stutzer 2002).

The relationship between happiness and income may be unclear, but the relationship between income and the other factors that determine well-being is more transparent: more wealth is correlated with better physical health, the ability to reach higher levels of education, an increased likelihood of escaping unemployment faster, etc. Therefore, the connection between income and happiness is more complex than a direct causal relationship between those two isolated measures. Accessing financial services may have spillover effects on the other determinants of happiness, in turn affecting subjective well-being to a larger degree than is apparent from direct analysis of those two variables alone. When analysis controls for income, wealth, and other financial characteristics that microfinance may affect, only the independent effect of access to finance is identified. This approach neglects to recognize that through impacting income, access to finance touches many aspects of a client's life and its impact on subjective well-being is amplified through these dependent relationships. Of course, this framework for thinking about the positive effects of access to finance on psychology operates on the assumption that access to finance raises income or wealth. While such a causal relationship has been the focus of many economic studies, it remains unclear which types of microfinance products and services have the greatest benefit, as impacts vary across cultures, levels of poverty, gender, and among other countless factors.

Results

The mental health of indivdiuals is negatively impacted by outstanding loans in the household, whether from a commercial bank, *bisi*, or savings group. There is a negative relationship between having an outstanding loan and life satisfaction; an outstanding loan decreases life satisfaction by 0.11 units, significant at the 5% level [Table 5]. Life satisfaction is measured on a scale of one to five, therefore the impact of about 1/10 of a unit on this scale is notable. In addition to decreasing the amount by which an individual is satisfied with their life, having an outstanding loan significantly impacts stress. Microfinance clients with outstanding loans report being more stressed than individuals without an outstanding loan. The impact of an outstanding loan on periods of long-term (greater than one-month) stress is 0.071 units and the result is significant at the 1% level [Table 5]. As a binary variable, stress is measured within the data on as either 0 or 1; an increase in stress by 0.071 units is therefore a small but significant impact of financial access. Outstanding loans do not appear to have a significant impact on depressive symptoms or optimism about the future.

Table 5: *Impact of Outstanding Loans on Mental Health Measures*			
Fixed Effects: OLS	Life Satisfaction	Stress	Optimism
Loan Outstanding	-0.110**	0.071***	-0.004
Age	0.011**	-0.009***	0.020***
Marriage			
2	-0.154	0.050	0.014
3	-0.240	-0.034	0.042
4	-0.104	0.113	-0.058
5	0.026	0.019	-0.090
6	0.170	0.007	-0.061**
Education level	-0.000	0.007	0.003*
Antodaya card	-	-	-
Health level			
1	-0.135***	0.038**	-0.037
2	-0.281***	0.132***	-0.060**
3	-0.691***	0.388***	-0.064
Number household members	-	-	-
Number household children	-	-	-
Mentally ill in household	-	-	-
Eat 2 meals/day	-	-	-
Victim of a crime	-0.223***	0.121***	-0.015
Village ID	-	-	-
_cons	2.777***	0.284***	-0.171
N	6661	6664	6665

Significance level: 1%: *** , 5%: **, 10%: *

“ – ” indicates dropped due to collinearity

Note: seasonal and sex controls also included in regressions

The finding that outstanding loans decrease life satisfaction and increase stress suggests that the repayment burden of an outstanding loan is greater than the consumption smoothing relief a loan provides. It is important to note that outstanding loans affect both overall and day-to-day measures of happiness. Life satisfaction, an aggregate measure, is negatively impacted, as is stress, which the survey asks about in small, specific measures of time (occurrence over a month). The negative impact of having an outstanding loan could be due to over-indebtedness. Default on payments, cross-indebtedness (borrowing from multiple sources or having multiple

outstanding loans), and reduced standard of living while taking out loans can all indicate whether an individual is over-indebted. This dataset contains information on the number of outstanding loans a household has in total, which allows me to use household cross-indebtedness as an indicator of over-indebtedness.

To investigate whether over-indebtedness impacts the relationship between outstanding loans and stress levels, I divide the sample into two groups and run the regressions for each subset of the sample. If financial clients have two or fewer loans, they are less at risk of being over-indebted, while clients with three or more loans are at higher risk. I find that being over-indebted significantly increases the probability that an individual reports stress and a lower life satisfaction compared to people who have only one or two loans [Table 6]. The impact of an outstanding loan on life satisfaction is insignificant for an individual in a household with two or fewer loans. For people living in households with three or more loans, having an outstanding loan decreases life satisfaction by 0.19 units - much more than the sample not restricted by number of household outstanding loans. The impact of an outstanding loan on stress is likewise insignificant when the sample is restricted to individuals with loans within households that in total have two or fewer loans. Clients with outstanding loans who are part of households with three or more loans experience an increase in stress by 0.11 units, about the same as the unrestricted sample.

Some caveats of the over-indebtedness analysis need to be mentioned: including the total number of household loans in the regression cuts the number of observations by over a third, down from 4,773 observations to 1,894. It is also important to note that the household loan measure comes from the household rather than the individual survey, therefore there are some inconsistencies in reporting that may be present in the data. The total number of household loans

is a better measure of the risk of household over-indebtedness rather than individual over-indebtedness; however, it is not possible to measure aggregate levels of household stress within this data set.

Table 6: ***Impact of Household Over-indebtedness on Mental Health Measures***

Fixed Effects: OLS	Life Satisfaction (1) Amount household outstanding loans <= 2	Life Satisfaction (2) Amount household outstanding loans < 2	Stress (3) Amount household outstanding loans <= 2	Stress (4) Amount household outstanding loans < 2
Loan Outstanding	-0.024	-0.194**	0.058	0.113***
Age	0.035**	0.010	-0.011**	-0.010***
Marriage				
2	-	-0.223	-	0.027
3	-1.211**	-0.422	0.286	-0.066
4	-0.128	-0.142	0.322**	0.025
5	0.239	-0.117	0.004	0.031
6	0.061	-0.072	-0.299	-0.006
Education level	0.015	0.000	0.001	0.013**
Antodaya card	-	-	-	-
Health level				
1	0.020	-0.147**	0.012	0.037
2	0.077	-0.272***	0.107**	0.010***
3	-0.866***	-0.754***	0.455***	0.364***
Number household members	-	-	-	-
Number household children	-	-	-	-
Mentally ill in household	-	-	-	-
Eat 2 meals/day	-	-	-	-
Victim of a crime	0.133	-0.345***	0.179**	0.054
Village ID	-	-	-	-
_cons	-1.203**	2.865***	0.473*	0.259**
N	1894	4773	1894	4770

Significance level: 1%: *** , 5%: **, 10%: *

“ – ” indicates dropped due to collinearity

Note: seasonal and sex controls also included in regressions

Overall, a lack of significant results of financial access on mental health measures indicates that microfinance has a limited impact on mental health. Having an outstanding loan is the only financial access measure found to have a significant effect on mental health measures. Consistent with previous literature that finds an increase in stress during the time of participation in financial programs (Fernald et al. 2008), I find that it is only when an individual is currently involved with finance, through an outstanding loan, that mental health is impacted. My results show that mental health is not impacted by either savings or group membership. The use of panel data collected across several years allows for the evaluation of the long-term impact of microfinance. My results show that in addition to limited impacts during microfinance participation, there are no lasting impacts from previous financial access on mental health indicators.

Neither saving nor group membership contribute to mental health outcomes, either in a positive or negative way. This finding is surprising given the emphasis within the microfinance community of group membership as a means to leverage social capital (Woolcock and Narayan 2000). My results show an insignificant impact of group membership on any mental health indicator. This result implies that the impact of social support is negligible or insufficient to overcome other emotional burdens associated with group membership.

Mental health measures such as optimism and depression appear to be unaffected by access to finance, even when a client has an outstanding loan. Even in the subsection of the sample restricted to only the households at risk of over-indebtedness, there are no significant symptoms of depression when an individual has an outstanding loan. It is interesting to note that depressive symptoms are largely unaffected by access to finance, particularly as life satisfaction is sometimes impacted by finance. Life satisfaction, a measure of happiness, and depressive

symptoms, which indicate unhappiness, represent the opposite ends of the happiness scale. The measure of life satisfaction differs from the depressive symptoms in a key way that may explain why happiness is affected when depression is not. The question, “How satisfied are you with your life right now?” evaluates overall happiness, while the questions targeted at depressive symptoms inquire about the occurrence of depressive symptoms within a defined period of time, the last week. The distinction between overall, general measure of happiness and a brief period may account for the differences across these measures. It also shows that microfinance may have more of an impact on general mental outlook than actual symptoms of changes in mental health. Changes in mental outlook may not manifest in symptoms of emotional distress. None of the mental health measures are significantly impacted by having had a loan in the past that has been repaid. Therefore, receiving a loan has a negative impact on mental health measures while the loan is outstanding but in the long-term, once the loan has been repaid, microcredit is neither a benefit nor detriment to mental health.

There is no change in poverty status across the time period, for either microfinance clients or non-clients. This finding suggests that while microfinance may cause small increases or decreases in income or wealth in the short-term, the changes are not sustained over a period of several years. A similar failure to endure exists for mental health impacts; while having an outstanding loan may alter life satisfaction and stress, past loans or participation in microfinance services do not affect mental health measures.

Limitations and Concerns

Selection bias may exist within the data. To evaluate the relationship between participation in financial services and mental health outcomes, individuals who participated in financial services need to be compared to other people who had the option of participating but

instead chose not to. To address the concern that people who accessed financial products may only differ from people who did not because they had access to the financial products in their village, I created proxies for availability of the financial tools. The proxy for availability operates under the assumption that if anyone in the village accessed a particular financial product then that product must indeed be available in that area. The variable "[financial_product] Availability" is equal to one if any member of that village answered 'yes' to whether they currently take advantage of that product and equal to zero if nobody in the village did. Availability proxies were created for *bisi*s, commercial banks, savings groups, life insurance, and 'other' financial tools or savings groups. A limitation of this approach is that the proxy for availability is subject to measurement error. Neither the magnitude of the coefficient or the significance level of the variable of interest, mental health, are significantly impacted when the availability of financial institutions are included in the analysis [see Appendix 3 for financial availability].

There is also the possibility of endogeneity, or two-way causation, within the sample. The decrease in life satisfaction and increase in stress associated with financial access could be due to a negative life event that motivated the individual to seek financial assistance, rather than the result of the financial access itself. For example, a health shock would increase stress and motivate an individual to take out a loan; their subsequent increase in stress would then be attributable to the health shock as well as the loan. It may also be the case that the loan lessened the amount of stress experienced, as the client potentially would have been worse off, or more stressed, without the loan.

Conclusion

This study uses survey data collected from the rural distract of Rajasthan, India between 2002 and 2009 to investigate the relationship between access to finance and mental health indicators. Individuals that accessed financial services, including loans, savings, and organized group financial activities, were no more likely to display symptoms of depression or report increases in optimism. Saving neither contributed to depression or stress, improved the probability of being satisfied with one's life, or increased optimism about life improving in the future. Access to financial services, whether loans or savings, did not increase the probability of depression or stress, nor did it impact life satisfaction and optimism. Group membership also failed to show either a positive or negative impact on mental health.

Having an outstanding loan was found to both decrease life satisfaction and increase stress. This negative effect on mental health suggests that the impacts of access to finance extend beyond a clients' wallet and that such mental concerns should be considered when evaluating the outcomes of a microfinance product. Microfinance institutions should use these findings when creating financial products by incorporating mental health and behavioral aspects in product design.

References

Ahmed, S., Chowdhury, M. (2001). Micro-credit and Emotional Well-Being: Experience of Poor Rural Women from Matlab, Bangladesh. *World Development*, *29*(11), 1957-1966.

Angelucci, M., Karlan, D., & Zinman, J. (2013). Win Some Lose Some? Evidence from a Randomized Microcredit Program Placement Experiment by Compartamos Banco. *National Bureau of Economic Research, Working Paper: 19119*.

Banerjee, A., Deaton, A., Duflo, E. (2004). Health, Health Care, and Economic Development: Wealth, Health, and Health Services in Rural Rajasthan. *American Economic Review, 94*(2), 326-330.

Banerjee, A., Duflo, E., Glennerster, R., Kothari, D. (2010). Improving Immunization Coverage in Rural India: Clustered Randomized Controlled Evaluation of Immunization Campaigns With and Without Incentives. *British Medical Journal, 340.*

Banerjee, A., & Duflo, E. (2011). *Poor Economics: A Radical Rethinking of the Way To Fight Global Poverty*. New York, New York: Public Affairs.

Baumeister, R., Bratslavsky, E., Finkenauer, C., & Vohs, K. (2001). Bad Is Stronger Than Good. *Review of General Psychology*, *5*(4), 323–370.

Blanchflower, D. G., & Oswald, A. (2004). Well-Being Over Time in Britain and the USA. *Journal of Public Economics*, *88*(7), 1359–1386.

Blanchflower, D. G., & Oswald, A. (2008). Is Well-Being U-Shaped Over The Life Cycle? *Social Science & Medicine*, *66*(8), 1733–1749.

Brickman, & Campbell. (1971). Hedonic relativism and planning the good society. *Adaptation Level Theory?*, 287–305.

Castriota, S. (2006). Education and Happiness: A Further Explanation to the Easterlin Paradox? *CEIS*, *Quaderni*.

Costa, P., & McCrae, R. (1980). Influence of Extraversion and Neuroticism On Subjective Well-Being: Happy and Unhappy People. *Journal of Personality and Social Psychology*, *38*(4), 668–678.

DeLoach, S., & Lamanna, E. (2011). Measuring the Impact of Microfinance on Child Health Outcomes in Indonesia. *World Development*, *39*(10), 1808–1819.

Di Tella, R., MacCulloch, R., & Oswald, A. (2003). The Macro-Economics of Happiness. *The Review of Economics and Statistics*, *85*(4), 809–827.

Diener, E., & Seligman, M. (2004). Beyond Money: Toward An Economy of Well-Being. *Psychological Science in the Public Interest*, *5*(1), 1–31.

Dowling, M., Yap, C. (2013). Happiness and Poverty in Developing Countries: A Global Perspective. Basingstoke, Hampshire. New York, NY.

Dunford, C. (2001). Sustainable Integration of Microfinance and Education in Child Survival, Reproductive Health, and HIV/AIDS Prevention for the Poorest Entrepreneurs. *Journal of Microfinance*, *3*(2).

Easterlin, R. (n.d.). Does Economic Growth Improve the Human Lot? Some Empirical Evidence. *Nations and Households in Economic Growth*, *89*.

Fernald, L., Hamad, R., Karlan, D., Ozer, E., & Zinman, J. (2008). Small Individual Loans and Mental Health: A Randomized Controlled Trial Among South African Adults. *BMC Public Health*, *8*(409). Retrieved from http://www.biomedcentral.com/1471-2458/8/409

Frey, B., & Stutzer, A. (2002). The Economics of Happiness. *World Economics*, *3*(1).

Graham, C., & Eggers, A. (2004). Does Happiness Pay? An Exploration Based On Panel Data From Russia. *Journal of Economic Behavior & Organization*, *55*(3), 319–342.

Graham, C., & Pettinato, S. (2002). Frustrated Achievers: Winners, Losers, and Subjective Well-Being In New Market Economies. *Journal of Development Studies*, *38*(4), 100–140.

Grameen Bank. http://www.grameen-info.org. Accessed April 2014.

Hayo, B., & Seifert, W. (2003). Subjective Economic Well-Being in Eastern Europe. *Journal of Economic Psychology*, *24*(3), 329–348.

Helliwell, J. (2003). How's Life? Combining Individual and National Variables to Explain Subjective Well-Being. *Economic Modeling*, *20*(2), 331–360.

Hussain, B., & Strasse, K. (2010). Embodiment and Emotionality of Women Credit Clients: Scrutinizing Agency Constraints of Microcredit Clients in Sunamganj, Bangladesh. *Asian Social Science*, *6*(11).

Kahneman, D., & Tversky, A. (1979). Prospect Theory: An Analysis of Decision Under Risk. *Econometrica*, *47*(2).

Kim, J., Watts, C., Hargreaves, J., Ndhlovu, L., Phetla, G., Morison, L., Busza, J., Porter, J., Pronyk, P. (2007). Understanding the Impact of Microfinance-Based Intervention on Women's Empowerment and the Reduction of Intimate Partner Violence in South Africa. *American Journal of Public Health*, 97(10), 1794-1802.

Leatherman, S., Dunford, C. (2010). Linking Health to Microfinance to Reduce Poverty. *Bulletin of the World Health Organization*, *88*(6).

Leatherman, Metcalfe, Geissler, and Dunford. (2012). Integrating Microfinance and Health Strategies: Examining the Evidence to Inform Policy and Practice. *Health Policy and Planning*, *27*(2), 85-101.

Lykken, D., & Tellegen, A. (1996). Happiness Is A Stochastic Phenomenon. *Psychological Science*, *7*(3), 186–189.

Lyubomirsky, S. (2007). *The How of Happiness*. New York, New York: The Penguin Group.

Mani, A., Mullainathan, S., Shafir, E., & Zhao, J. (2013). Poverty Impedes Cognitive Function. *Science*, *341*(6149), 976–980.

Microcredit Summit Campaign. http://www.microcreditsummit.org. Accessed April 2014.

Oishi, S., Diener, E., Lucas, R., & Suh, E. (1999). Cross-Cultural Variations in Predictors of Life Satisfaction: Perspectives from Needs and Values. *Personality and Social Psychology Bulletin*, *25*(8), 980–990.

Pronyk, P., Hargreaves, J., Morduch, J. (2007). Microfinance Programs and Better Health: Prospects for Sub-Saharan Africe. *Journal of the American Medical Association*, *298*(16), 1925-1927.

Right To Food Campaign. (2003). Description of the Schemes Covered by the Supreme Court Orders. http://www.righttofoodindia.org/schemes/scheme.html.

Seva Mandir. Transforming Lives. *Brochure*. http://www.sevamandir.org/wpcontent/uploads/2014/02/Seva%20Mandir%20Brochure.pdf

Schuler, S., Hashemi, S., Badal, S. (2010). Men's Violence Against Women in Rural Bangladesh: Undermined or Exacerbated by Microcredit Programmes?. *Development in Practice*, *8*(2), 148-157.

Stewart-Brown, S. (1998). Emotional Well-Being and Its Relation to Health: Physical Disease May Well Result from Emotional Distress. *British Medical Journal*, *317*(7173), 1608–1609.

Thaler, R. H., & Benartzi, S. (2004). Save More Tomorrow™: Using behavioral economics to increase employee saving. *Journal of political Economy*, *112*(S1), S164-S187.

Vohs, K. (2013). The Poor's Poor Mental Power. *Science*, *341*, 969-970.

Woolcock, M., Narayan, D. (2000). Social Capital: Implications for Development Theory, Research, and Policy. *World Bank Research Observer*, *15* (2): 225-249.

World Bank. (2013). The New Microfinance Handbook: A Financial Market System Perspective. *World Bank*, Washington D.C.

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Appendix 1: Survey Compilation and Data Reconciliation

Due to the fact that the individual and household surveys were administered separately and to several individuals within each household, there are multiple areas in which household level information differs depending on the respondent within the household. There were many instances within households where the household survey had been given to multiple individuals within the household and individual answers differed on household level information. A discrepancy between responses appeared particularly on questions with fluid definitions, such as size of household. Household size can be a flexible number, depending on whether one considers extended family, children, guests, or lodgers as part of the household. To address this problem, I created two variables for household size, one that assigned the minimum number of household members a respondent reported and the other assigning the maximum number. For the purposes of my regression, I use the maximum number of people within the household because the maximum number captures persons that may not be technically a part of the immediate, permanent family living in one place but that still impact the household.

A similar problem occurred for determining the number of children in the household; I once again created two variables and assigned a minimum and maximum value to each respectively. I include the maximum value for number of children in my analysis for reasons similar to household size and for consistency. Other measures where I created two variables and assigned minimum and maximum values for the household include whether the household is below the poverty line, has an antodaya card, purchased anything from the public distribution system in the last thirty days, includes a mentally retarded or disturbed person, has a bank account, and eats at least two full meals a day. For whether the household is below the poverty line, I use the maximum response for the dummy variable; if any individual within the household

reported that the household is below the poverty line, then each individual within that household is considered to live below the poverty line, whether they indicated that they do or not. I did the same thing for whether the household has an antodaya card and if it purchased anything from the public distribution system in the last thirty days because these measures are all indicators of relative levels of poverty. I used the maximum (equal to 1 if someone in the household responded ‘yes’) rather than the minimum value for these measures of poverty because I felt that it would be more inaccurate to characterize a household as being richer than it is than to characterize it as being poorer than it is for this sample where so many of the households are living in deep poverty and small changes in relative status can have a huge impact. Regardless of how many people within the household answered yes, if there were one person that responded no, that the household was not below the poverty line, then that entire household would be counted as above the poverty line.

Appendix 2: Macro Influences On Subjective Well-Being

Macro influences on subjective well-being that are positively correlated with happiness include national income, population health, quality of government, and human rights (Frey & Stutzer 2002, Diener 2004). Living in a country governed by social and political institutions that are viewed as trustworthy and free from corruption makes people happier (Helliwell 2003 and 2005) as does freedom, whether economic or individual (Diener et al. 1995). Less favorable macro-level indicators such as higher inflation and unemployment rates negatively impact a population (Graham & Pettinato 2002, Eggers & Graham 2004). In general, indicators of insecurity such as living in an area with a high rate of crime also make people less happy.

Appendix 3: Availability Proxies

Percent of Individuals with Access to Financial Services					
	Bank Availability	Bisi Availability	Group Availability	Insurance Availability	Other Group Availability
Available (% of total)	87%	61%	88%	47%	89%
Not available (% of total)	13%	39%	12%	53%	11%
Total number of individuals	15,293	15,293	15,293	15,293	15,293

Appendix 4: Physical Health Measure

The measure of physical health was constructed using responses to the survey questions listed below. While an imperfect measure of an individual's physical health, the size of the coefficient on the variable of interest, mental health measure, and the level of significance of the results do not significantly vary when the physical health measure is altered to include one more or less health symptom. Unfortunately, this method of representing physical health status fails to account for the severity of each condition. It would have been ideal to include respondent information on whether each existing condition was serious or not; however, there was too many responses missing to the survey's follow-up question, "Was the condition serious?" to include it in the analysis.

Now I would like to ask you about some health conditions that people sometimes complain about. Have you experienced _____ in the last 30 days?					IF YES: Is/was the condition serious?	
			YES	NO	YES	NO
	1	Cold symptoms……	1	2	1	2
	2	Dry cough…..……	1	2	1	2
	3	Productive cough……...	1	2	1	2
	4	Cough with blood……..	1	2	1	2
	5	Blood in spit.....	1	2	1	2
	6	Hot fever……..…….	1	2	1	2
	7	Diarrhea…….	1	2	1	2
	8	Body ache.....……..	1	2	1	2
	9	Weakness/fatigue.....	1	2	1	2
	10	Problems with vision…….	1	2	1	2
	11	Headache…….……..	1	2	1	2
	12	Back ache……..….	1	2	1	2
	13	Vomiting……	1	2	1	2
	14	Worms in stool……..	1	2	1	2
	15	Trouble breathing…..……..	1	2	1	2
	16	Pain in upper abdomen...…	1	2	1	2
	17	Pain in lower abdomen...…	1	2	1	2
	18	Genital ulcers……..…	1	2	1	2
	19	Painful urination……..…	1	2	1	2
	20	Swelling ankles……..	1	2	1	2
	21	Hearing problems……...	1	2	1	2
	22	Skin problems……...…..	1	2	1	2
	23	Chest pain……...…	1	2	1	2
	24	Memory loss……..…	1	2	X	X
	25	Full paralysis……..…	1	2	X	X
	26	Partial paralysis……..…	1	2	X	X
	27	Night sweats.....	1	2	1	2
	28	Weight loss.....	1	2	1	2
	996	Other (specify)……..…	1	2	1	2
		IF RESPONDENT IS FEMALE:				
	29	Menstrual problems…….	1	2	1	2
	30	White discharge……	1	2	1	2