The Impact of Psychological Asset Building on the Effectiveness of Peru's *Haku Wiñay*

Juan Sebastian Correa *

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Abstract

Poverty graduation programs are aimed at giving a big push out of poverty to rural households on very vulnerable economic conditions. These programs are regarded as a success since short and even long term impacts have been observed on economic well-being indicators of participating households. One of the usual components of these programs is an explicit live skills coaching module. Anecdotal evidence points towards a very important role of this module on the success of the program. But to our knowledge, there is no clear evidence in the literature identifying the psychological mechanisms through which it operates. The *Haku Wiñay* program in Peru follows almost the "classic formula" of graduation interventions, except for the lives skills coaching. This provides a unique opportunity to understand how the coaching module works by offering an ancillary coaching intervention to a subgroup of the *Haku Wiñay* participants of 2017 cohort. Participants of the additional program are found to increase their internal locus of control — the belief of having control over the outcomes of events that affect their lives — and the value of a measure for hope relative to non-participants by around half and a fifth standard deviation respectively. *Haku Wiñay* participants with initial levels of locus of control above the median have an impact on annual income of the program that is more than 3 times larger than for those with initial levels below the median. These results suggest that the ancillary coaching intervention has the potential to have an effect on economic well-being through an increase in locus of control.

*University of California, Davis; jscorrea@ucdavis.edu

1 Introduction

Multifaceted graduation programs have been shown to be an effective approach to generate lasting improvements in the well-being of rural people in poverty (Banerjee et al. (2015), Banerjee et al. (2016), Bandiera et al. (2017)). Although its components usually vary across contexts, the program traditionally includes the transfer of a productive asset, training on agricultural technologies and/or business administration, and building beneficiary self-confidence and other psychological assets through soft-skills or coaching interventions. While the reduced form impacts are impressive, and there is a theoretical case for strong complementarities between the transfer of tangible and psychological assets (Barrett et al. (2018)), exactly how and why graduation programs work is incompletely understood. Reported heterogeneous responses to the intervention (Bandiera et al. 2017) add complexity to the understanding of the graduation programs, but it only makes it more critical to comprehend the mechanisms through which it operates in order to design programs that reach all ultra-poor households.

Peru's on-going *Haku Wiñay* [1] program, which provides all of the elements of the BRAC-based graduation model except the psychological asset building, provides an important opportunity to quantify the relevance of the psychological attributes on the program's success by allowing to measure how much additional impact can an extra coaching and psychological asset building module add to a poverty reduction program. Program implementers have emphasized the importance of the coaching component in the positive results of the multifaceted intervention, arguing that it has been consistently considered by local implementers and by the participants themselves as probably the most crucial element for the success of Graduation-type programs (de Montesquiou et al. (2018)). The highlighting of this module as central for the success of the program points in the direction of the importance of having optimal psychological attributes. Nevertheless, beyond the anecdotal evidence, there hasn't been an analysis that quantifies the relevance of the coaching component nor provides a clear picture of the mechanism through which it operates.

This paper aims at answering two main questions. First, we want to carefully identify the mechanisms that explain why these additional interventions work. For this goal, we seek to provide evidence to whether two key psychological concepts — locus of control and hope — are relevant to the success of

[1] *Haku Wiñay* means "Let us Grow" in Quechua

graduation type interventions. Locus of control is the degree to which people believe that they have control over the events that affect their lives — internal locus of control —, as opposed to external forces — external locus of control — (Rotter (1966)). We define hope as *aspirational* hope in the sense that it motivates action aimed at an aspiration (Lybbert and Wydick (2018b)). There is mounting evidence that poverty undercuts both cognitive and non-cognitive skills (Mullainathan 2013, Haushofer and Fehr 2014, Wuepper and Lybbert 2017). Both locus of control and hope fall into the latter category. Others have speculated that graduation programs work because they reverse these negative effects of poverty by raising subjective mental capacities (Duflo (2012)). We are not aware of previous efforts in the context of graduation programs to measure these psychological variables, and our goal is to not only implement the ancillary interventions that should reverse these negative consequences of poverty, but also to measure psychological attributes so that information can be used to design even more effective programs in the future. Second, we want to test whether economic outcomes as measured by annual income responds positively to higher levels of the two aforementioned psychological variables. There is increasing evidence of the relevance of these factors in economic decision-making (Abay et al. (2017), Lybbert and Wydick (2018b)), turning them into a source of potential heterogeneous responses to poverty alleviation interventions. If we are able to show that i) the ancillary program has a positive effect on the psychological variables and ii) income is higher for households with higher levels of locus of control and/or hope, there is indicative evidence for the mechanism through which coaching operates to increase income in graduation-type interventions.

To answer these questions, we use the 2017 cohort of the *Haku Wiñay* (HW) program in Peru, that as described above, does not include a coaching module. We exploit the discontinuity in the eligibility criteria for villages to be considered for the HW program to identify the effect of the programs. Our sample initially consisted of 53 villages, 29 that satisfied the eligibility criteria and 24 that didn't and 999 households. Among the eligible villages for HW, we employ a partial population design where we randomize villages into being either not treated by the ancillary intervention or partially treated (ancillary intervention not offered to everyone in the village). This allows us to capture spillover effects from the ancillary treated households to non-treated households in the same village. We use a regression discontinuity approach to estimate the intention-to-treat effects of the interventions on our

post-treatment survey. This allows us to capture differences between households only exposed to HW and those that were exposed to both HW and coaching (directly or indirectly). We further analyze the existence of heterogeneous effects of psychological variables on annual household income level using the same estimation strategy.

We find that belonging to a HW eligible village increases income by around 1400 Soles (USD 800 in 2017 PPP). Moreover, we are able to show that households with an initial level of locus of control above the median as measured by the baseline, have on average an impact of HW on income of about 1200-1600 Soles (USD 700-900 USD in 2017 PPP) higher than those with initial locus of control levels below the median. For this subgroup with initial locus of control above the median, the impact of HW is more than 40% higher than the income of those that belong to the same subgroup but belong to villages not eligible for treatment. We are also able to show that the coaching intervention increases both the locus of control and hope measures, although the difference for the latter with those that only receive the main intervention is not significant. We also find some evidence that coaching makes participants adopt agricultural practices that are readily available for them through the HW intervention.

These results provide indicative evidence favoring the hypothesis that coaching has the potential to have an effect on economic well-being through an increase in locus of control. We are not able to verify this directly since the coaching intervention ended very close to the date of our second and most recent data collection. Nevertheless, the results are promising and provide robust evidence favoring the potential coaching has in magnifying the effects of a program like HW. In the second quarter of 2021 we expect to run a new survey that will allow us to confirm these findings.

The rest of the paper is organized as follows: section 2 will expand on the literature of non-cognitive skills and targeted interventions. Section 3 will explain carefully the psychological instruments that are being used and how are they measured. Section 4 presents the research design in detail, explaining the programs and data we collected. Section 5 shows the estimation strategy. Section 6 presents the results. Section 7 concludes.

2 Non-cognitive skills and targeted interventions

Locus of control, hope, and non-cognitive skills in general have been studied in a variety of economic analysis for the last 20 years. An important percentage of the research centers on these measurements as explanatory variables, seeking to explain schooling choices (Heckman et al. 2996; Coleman and DeLeire 2003), labor markets outcomes (Heineck and Anger (2010); Caliendo et al. (2015)), savings decisions (Cobb-Clark et al. 2016), among other outcomes. Most of this literature focuses on developed countries where these types of questionnaires have been used and validated more extensively. More recently, the literature has started to use these measures, locus of control in particular, in developing contexts to measure technology adoption (Malacarne 2019;Abay et al. 2017;Wuepper et al. 2020) and savings behaviors (Abay et al. 2016).

Another strand of empirical literature more closely related to this paper deals with analyzing how targeted programs can affect non-cognitive skills, and the effect this has on economic behavior. Again, there is a substantial quantity of research in this area that studies WEIRD[2] populations. The focus on non-WEIRD populations is more recent but increasingly rich. For instance, Bernard et al. (2014) and Krishnan and Krutikova (2013) find that targeted interventions increase measured levels of locus of control and self-efficacy, a concept closely related to locus of control, and other non-cognitive skills. The former also finds evidence of positive effects in savings behavior in the short run for a sample in rural Ethiopia while the latter shows better early labor market outcomes for a young population in Bombay. Lybbert and Wydick (2018a) finds increased levels of hope among a sample of indigenous women in Mexico that were exposed to a light-touch intervention targeting aspirations but fail to find effects on enterprise revenues and profits for participants of the program. In the same line, Baranov et al. (2020) show that a brief light-touch intervention in a population coming from an informal urban settlement in Kenya aimed at promoting gratitude, self-affirmation, and aspirations succeeds at increasing a gratitude index, but fails to have effects on decision making. The lack of behavioral responses to these targeted programs may be indicative of the importance of holistic approaches, such as the one graduation programs take.

These programs aiming at bettering non-cognitive skills vary widely in duration and approach which

[2]Western, educated, industrialized, rich and democratic (WEIRD)

makes it hard to draw clear-cut conclusions about their efficacy, especially for the interest of this paper since little has been studied of their effect in the context of graduation programs. The only analysis of the relevance of such programs in graduation contexts that we are aware of is the one by Sedlmayr et al. (2020). The authors find some indication that a coaching intervention complements other transfers, perhaps bolstering investment in productive assets and, more strongly, promoting positive psychological attributes. Nevertheless, their design doesn't allow to clearly isolate the effect of coaching.

Overall, coaching interventions of the sort incorporated into graduation programs are intended to generate and strengthen a battery of non-cognitive skills, including the motivation and ability of a person to design and carry out plans, and to adaptively learn and problem solve. These interventions are substantially longer than the light-touch targeted interventions mentioned earlier and incorporate a strong "hand-holding" component, since implementers consistently state that individualized attention is crucial for the success of the program (de Montesquiou et al. (2018)). From this perspective, coaching can be seen to develop what might be termed attitudinal assets that, akin to other assets, permit individuals to realize improved standards of living. Carter (2016), Lybbert and Wydick (2018b) and Malacarne (2019) show this theoretically. Besides the theoretical case for focusing on the importance of these assets, the choice of measuring particularly locus of control and hope is empirically justified by the strong evidence of even short and impersonal interventions having effects on these variables. In the following section we expand on both these concepts.

3 Psychological instruments: Locus of Control and Hope

3.1 Locus of Control

The locus of control measures the degree to which people believe they can control the events that affect their lives. It differentiates between an external locus of control and an internal one. According to Rotter (1966), having an external locus control means that the individual believes that the successes or failures in her life are controlled by external forces that she cannot control. On the other hand, an individual is said to have an internal locus of control if she considers that she has control over the outcomes of events in her life. To measure this concept, we used the Levenson (1981) I-P-C (internality-

chance-powerful others) scale, which is commonly used in the literature. This scale measures one index for each internality, chance and powerful others. The internality scale measures the extent to which people believe they can control their own lives. Contrary to internality, the chance scale measures the perception of chance being in control of your life. The powerful others scale measures the belief that life is predictable essentially because it is dominated by powerful third parties (leaders local, government, some god, etc). The chance and powerful others scale aim at understanding the forces at play behind the beliefs of a person with an external locus of control.

To build each index, respondents have to answer whether they agree or not with a question and to what extent. Examples of questions included are: for internality, "when you make plans, are you almost certain that you can make them work?" For chance, "when you're doing well in life, is it because you're being lucky?" For powerful others, " Is what happens in your life determined by powerful people?". Higher values of both chance and powerful others imply a more external locus of control. We chose not to reduce the dimensionality of these indices because we wanted to understand precisely which type of external locus (chance and powerful others) an intervention as the one we propose ends up affecting, if any. We standardize each scale to give them mean zero and unit variance to provide a more comparable interpretation for impacts. Appendix A shows the complete questionnaire that was asked. We eliminated 2 questions of each scale because they were not appropriate for the context for a total of 6 questions per scale. We adjusted the language so that they were more understandable for the context of rural Peru. We adjust the answers for the presence of acquiescence bias following Rammstedt et al. (2013) given the challenges that measuring non-cognitive skills brings in rural contexts (Macours and Laajaj (2020)).

Stability of the locus of control — Locus of control was initially proposed as a relatively stable personality trait. On the other hand, there's been a general consensus on the malleability of domain-specific locus of control. There's a plethora of evidence that shows how this locus of control responds to different interventions (panic attacks (Katerndahl 1991, memory loss (Hastings and West 2009, driving (Huang and Ford 2012). Nevertheless, there are strands of the literature that have provided evidence that the general concept is also prone to change (Menec et al. (1994), Cobb-Clark and Schurer (2011), Nowicki et al. (2018)) both through time and as a cause of targeted interventions. Since most of this evidence comes from the global north, the knowledge about these concepts is scarce for non-WEIRD

populations. Hence, it remains an open question to understand how these measurements behave in rural environments in the global south.

3.2 Hope

Our measure of hope comes from Lybbert and Wydick (2018a). This measure of hope is *aspirational*, in the sense that the individual actively seeks what they want to improve their well-being. The measure is made up of 3 separate indices that we combine into one: aspirations, agency and pathways. Agency or self-efficacy, is the belief of being able to achieve specific goals, and pathways refers to the individual's ability to seek solutions to the problems that they may face when they want to meet a certain goal. To measure aspirations we ask questions such as: "Is it better to learn to accept reality than to dream about the future?" Or, "Is it better to have aspirations and dreams for your family than to accept each day as it comes?" For agency or self-efficacy, "Can you think of several ways to solve a problem that arises in your farm?". An for pathways an example of a question is "if the sales of your farm are low, do you know how to find other buyers?" Participants answer the same way as they answer the locus of control questions. First the say whether they agree or disagree, and then to what extent. The possible answers are: totally disagree, disagree, agree, or totally agree. In order to reduce the dimensionality, we create a unique index from these three measure that and summarize this reduce measure as hope, following Lybbert and Wydick (2018a). We follow Anderson (2008) on his approach to create a summary index from a set of multiple outcomes. This measure is also standardized. Higher values of the index indicate higher hope levels. Appendix A shows the complete questionnaire we used to build this measure.

4 Research Design

4.1 *Haku Wiñay*

Haku Wiñay is a three year program designed and implemented by the Ministry of Development and Social Inclusion (MIDIS in Spanish) of Peru that targets subsistence farmers whose household head is between the ages of 18 and 65. It started as a pilot in 2012 and it was expanded the next year to a governmental program as part of the governmental strategy of development and social inclusion policies

called "Include to Grow" (MIDIS (2012)). Initially, the program was designed to give the beneficiaries of *Juntos* — Peru's main CCT program — sufficient tools for them to insert themselves on a robust growth path and not depend solely on the transfer. As stated by FONCODES, the dependency within MIDIS in charge of implementing HW, the motivation behind HW is that low-income rural households should have the sufficient capabilities to allow them higher levels of productivity and diversification of activities. HW aims at solving this problem as it is a capacity-building program that focuses on increasing the autonomous income of households so that they can *graduate* from poverty. From 2012 to 2018, more than 230,000 people have participated in the program with a cost close to USD 600,000,000 (2017 PPP)[3].

The program has two different main components: "Product 1" and "Product 2" (FONCODES (2016)). Product 1 consists of delivering training and assets related to agricultural technologies and of the improvement of housing conditions. The transferred assets usually include animals such as chickens or guinea pigs, materials to build sheds for these animals, improved seeds, and where water is available, infrastructure for irrigation. It is important to note that not everybody receives the same package. The program uses a needs-based approach, encouraging participants to demand transfers that suit their interests and needs and in congruence with their surrounding environment.

A member of the community is in charge of the technological training. This person is called a *Yachachiq* and she pays bi-monthly visits to each household during the first 10 months, monthly visits in the subsequent year, and sporadic visits in the last year of the program. The *Yachachiq* is usually selected because of her farming skills and knowledge, and is responsible for visiting around 30 to 40 households. The *Yachachiq* offers training to household members in how to prepare organic fertilizers, in pasture and forage management, in how to build a vegetable garden and in how to raise small animals (chickens and guinea pigs in particular). The latter two are usually aimed at the adult female of the household, since women are traditionally in charge of gardening and of taking care of small animals. Most of the asset transfers and training happen during the first year of the intervention. The program also builds a new kitchen in case the old one is inside the household and provide guidelines on the adequate distribution of physical environments and solid waste disposal. All participating households

[3]All USD values will be expressed in 2017 purchase power parity, for a cost of

receive "Product 1". "Product 2" consists of financing business ideas of groups formed by households that are successful at winning a contest. These groups consist of 3 to 4 households that get together and design a business plan with the guidance of a *Yachachiq*. The business ideas are then presented in a fair where local leaders and other members of the project vote to choose which projects are the most viable. 40% of the amount delivered must be invested in technological and commercial assistance, while the rest must be dedicated to the acquisition of goods or supplies. Around 40% of HW participants participated in the contest, and about half of those participants won. Overall, the cost of the implementation per household was around 4600 Soles (USD 2640).

4.1.1 Target population

Treatment is offered at a village level. FONCODES defines the characteristics that have to be met by individual villages in order to become eligible. A list of all the villages that meet their criteria is then sent to the regional authorities for them to choose the villages to intervene.

In 2017, our cohort of study, the eligible villages were made up of those that belonged to districts[4] in the border (usually, districts characterized by being in the Amazon) and by those that met the following requirements:

1. Villages characterized by subsistence agriculture according to the 2012 agricultural census. This implies that the average size of the agricultural unit[5] in these villages has to be less than the median for all the villages in the agricultural census.

2. Villages belonging to districts with a poverty rate higher than 40% or to districts prioritized for the implementation of the reduction of chronic child malnutrition.

3. Villages with at least 40 households.

4. Villages where at least 60 % of the households have at least one NBI [6] (unmet basic need).

[4] Districts are the immediately higher administrative division.

[5] An agricultural unit is defined as the plot or group of plots used totally or partially for agricultural production, including livestock, by an agricultural producer, irrespective of the size, tenure regime or legal situation. (INEI (2012))

[6] The NBI is an index proposed by ECLAC widely used in Latin America to identify critical deficiencies on a given population in order to characterize poverty. In Peru, the index is build according to the following indicators. 1) Households with inadequate physical characteristics. 2) Households with overcrowding. 3) Households without any kind of drainage. 4) Households with children that do not go to school. 5) Households with high economic dependence.

4.2 Coaching intervention

The coaching program is a 9 month program that aims to strengthen soft skills that allow the achievement of goals. The program was designed by social workers and social-psychologists at the Institute of Peruvian Studies (IEP) that had previous experience on this topic and that used as inspiration the structure of similar programs. Overall, the program targets the fostering of self-awareness and the recognition of the surrounding environmental conditions so that each person can fully grasp how they perceive themselves and in which context they are situated. It also promotes the setting of a goal and the creation of a plan to reach it. Additionally, the program seeks to strengthen non-cognitive skills that encourage the participant to believe that their goals are within their reach. It mostly targets the person in the household that participates the most in HW but is designed to actively involve the spouse and other family members.

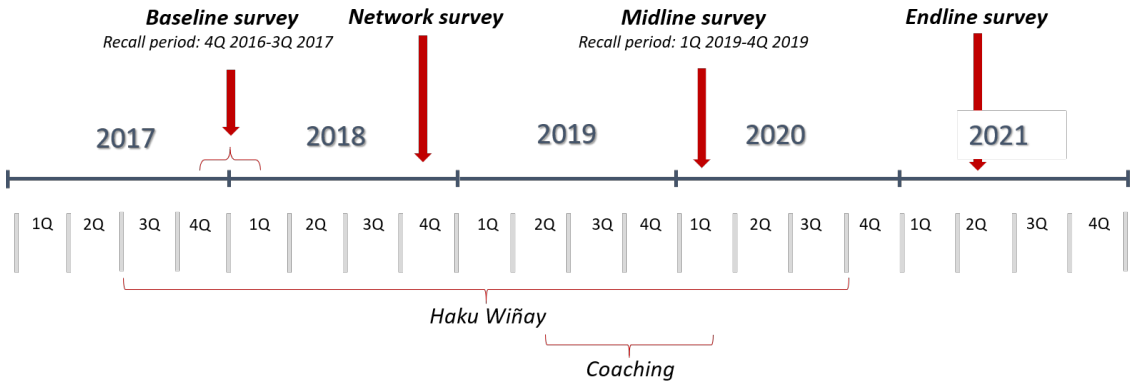
The program was implement by staff trained by the program designers. It is worth noting that the trainers are not certified coaches, but usually people with previous experience in technical assistance programs with knowledge of the context and economic conditions of the beneficiaries of the program. In order to not confuse HW participants, the coaches were never current *Yachachiqs*. They did not identify as HW staffers so that the participants were aware that they were not bringing any additional materials or assets for them. The coaching sessions were individual and would usually last about 2 hours. There were 18 sessions in total, with a session taking place every two weeks and sometimes weekly.

This coaching module was divided in two phases. The first phase which lasts two months is mostly focused on setting up an achievable goal and on recognizing the ways to reach it. In the sessions of the second phase, the coach monitors the steps and actions the participant is taking to achieve her goal. It focuses on overcoming the struggles and barriers the participant may be encountering on her path to reach her goal. By doing this, the coach also works on the development of non-cognitive skills that help fulfill the participant's plan. It is important to notice that this intervention gave no additional resources to the participants for them to use towards the goal completion. Appendix B shows a table with the type of goals the participants set for themselves and the titles of of the sessions that were part of the program. The guide that was used by the coaches is available from the author upon request.

4.3 Timing of the interventions and surveys.

Up until now, we've gathered three rounds of surveys for this project. A baseline in late 2017-early 2018, a second survey in October 2018 where we gathered information on participants networks, and a midline survey in early 2020. Figure 1 shows a timeline with the dates of the surveys and the start and span of the interventions. As mentioned earlier, the core of the asset transfers and training occur during the first year, so at least one full agricultural cycle has passed under the influence of the intervention. This allows us to capture changes in income in the midline survey. The coaching intervention finished just before the midline survey. Because of this, we are not able to capture the effect of this ancillary intervention on income. We expect to be able to capture this effect when we run the endline survey in the second quarter of 2021. By then, a full agricultural cycle would have gone by after the end of the coaching intervention.

Figure 1: Timeline of interventions and surveys



4.4 Methodology

We imposed a series of restriction to the villages that satisfied the criteria outline in Section 4.1.1 in order to get our sample. We did this in three stages. First, we kept only the villages that had a high presence of *Juntos* (the CCT program) population. We imposed this restriction since most graduation-type programs also have a cash transfer component. As mentioned in Section 4.1, HW started as a program targeting *Juntos* but now this is no longer a requirement. Villages in 5 departments satisfied this criteria: Ayacucho, Cajamarca, Cusco, Huánuco and Ancash. In the second stage, we kept villages that belonged to districts where at least one village selected to be intervened had 60% to 70% of their

population with at least one NBI, and at least one village with 50% to 60% their population with at least one NBI. Our identification strategy rests on the discontinuous jump in the probability of being selected into treatment at the 60% NBI threshold. Hence, we chose a window small enough so that the villages were comparable but wide enough to be able to have the statistical power to identify the potential effects of the program. As we will show in the following sections, we are able to show that the sufficient conditions for a consistent identification of the program effect hold for our chosen window and sample. After this second stage we ended up with 28 villages to the left of the threshold and 40 villages to the right. Of these 40 villages, only 28 had been selected by HW for intervention. In the third stage, in order to increase the proportion of villages selected for treatment, we eliminated the ones the we were able to prove that due to their characteristics had had a low probability of being chosen. These were villages that according to the local authorities that were in charge of the program implementation, would not get selected because they were too far away from the rest of eligible villages. This is a valid criteria for exclusion since HW operates in places where they can gather at least 400 participants in relatively close proximity. This usually involves grouping multiple villages together under the umbrella of a unique committee (*Nucleo Ejecutor Central*) that is in charge of implementing and overlooking the program. 7 villages in total exit the pool this way: 1 village to the left of the threshold, 2 selected villages to the right and 4 unselected villages to the right [7]. Additionally, two other districts were excluded. The first one because it had a high proportion of unselected villages to the right of the threshold (6 out of 8) and the second one because in the calls made to this region it was reported that no village in this district had been selected by the program.

After this last stage, 24 villages remained in the study that were to the left of the threshold and 29 villages to the right. The villages to the left are the control group and those to the right are intention-to-treat (ITT) group. 26 out of the 29 in the ITT group were villages selected to be intervened by HW. Based on information provided by the local authorities, we thought initially that only one village of the control group would end up being selected for treatment. This would have implied that the percentage of households intervened in the control group would have been around 5%. However, through the surveys

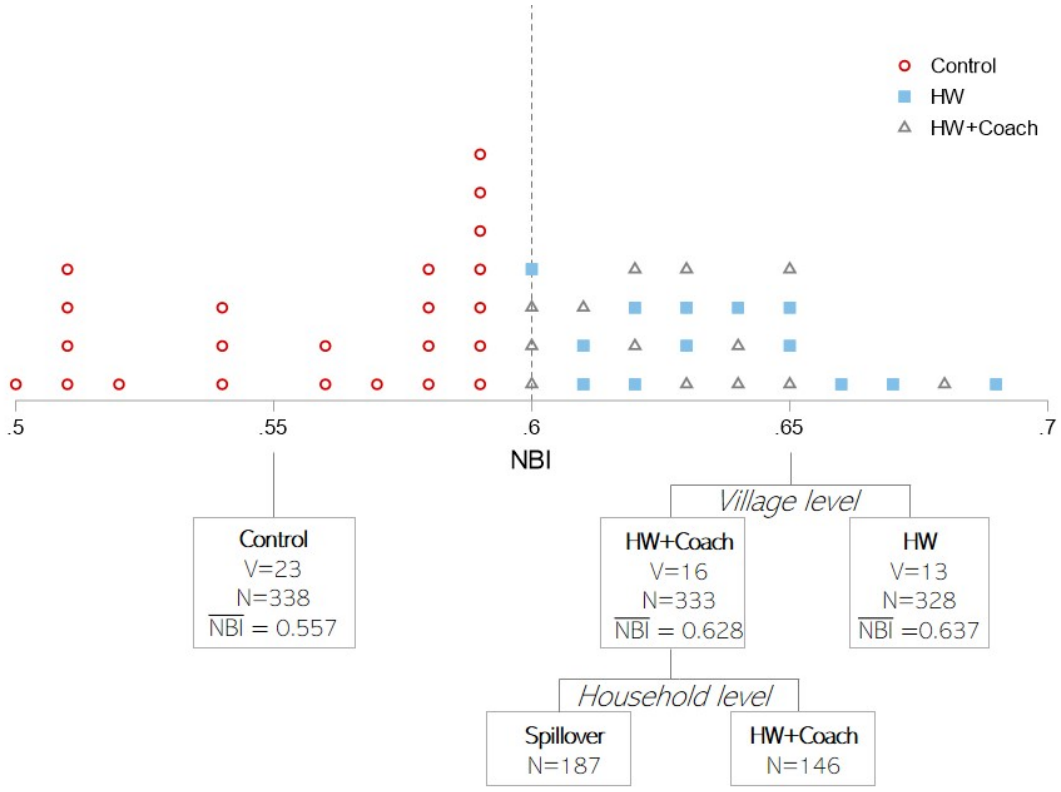
[7] Using information from the National Institute of Statistics and Informatics (INEI in Spanish), we constructed maps of the districts included in the study. Based on these maps and the distance information obtained through calls to the regions we obtained the travel time between each village and the HW-eligible villages in their same district. We excluded the 7 villages for which the travel time to the closest eligible village was greater than 1 hour and 45 minutes.

we found out that the number of villages selected for treatment in the control group was higher. The percentage of households intervened by the program is 24% in the control group and 72% in the group ITT. Figure 2 shows a diagram with the initial distribution of villages over the NBI score variable. Each marker on the diagram represents a village.

We further selected a random sample of villages initially assigned to HW that did indeed receive the program for the additional coaching intervention. Following Baird et al. (2018) we implemented a partial population design in which we offered coaching in 16 of the 26 villages where HW was actually implemented. The other 10 only received HW. Our objective is to estimate not only the direct effects of coaching but also the possible spillover effects of those treated by coaching towards those who did not receive this treatment. A randomization at the village level where in the selected village the treatment is offered to the entire sample does not allow us to estimate this effect. A saturation design enables us to identify this potential spillover effect.

The most basic saturation design is the partial population design. Besides the 10 control villages where no one received the additional treatment, we also have untreated households in the villages where treatment was offered. These treated villages are assigned a coaching saturation level of less than one. The saturation level is nothing more than the proportion of households within the village sample that are to receive the treatment. In this case, the saturation level of the villages where the coaching will be offered is 50%. This design allows us to identify the existence of a spillover effect of coaching from the treated to the untreated within the villages with a positive saturation. Our chosen saturation and proportion of treated villages maximizes the statistical power to identify not only the effect on the treated but also the existence of possible externalities.

Figure 2



Data

The initial sample available for the study was as follows: 338 households in the 23 villages in the HW control group and 661 households in the 26 villages assigned to the HW ITT group. These villages belong to 5 different departments (Ancash, Ayacucho, Cajamarca, Cusco and Huanuco) and to 11 different districts in those departments. Due to the fact that some households were not located in the midline survey and the exclusion of a district in which the baseline information was found not to be credible, the total number of households in both surveys is 784 (261 observations in 20 villages and in the ITT group of HW with 523 observations in 25 villages), down from 873 valid surveys in baseline. Table C1 in Appendix C compares baseline characteristics between those that exit that sample and those who remain. None of the differences are statistically significant.

In the 16 villages treated with HW and coaching, our population of interest (the universe of households that are both HW and *Juntos* users) is 477 households. Our sample size in those villages is 338 households. To achieve an effective saturation level of 50%, we offer coaching to 239 households, which is

half of the households that belong to our population of interest. 142 of these households come from our sample and 97 are out of sample households . It is important to point out that 84% of the households in the sample that were offered coaching participated in at least 4 sessions. This means that these households finished at least the first phase of the soft skills program.

Our sample at the midline survey is reduced to 287 village households with both HW and coaching. Of the HW villages that were not treated with coaching, we have 201 households. Of the 142 households that were offered coaching we have information for 126 of them in both surveys. This last group is the ITT of coaching program.

5 Estimation Strategy

5.1 Balance

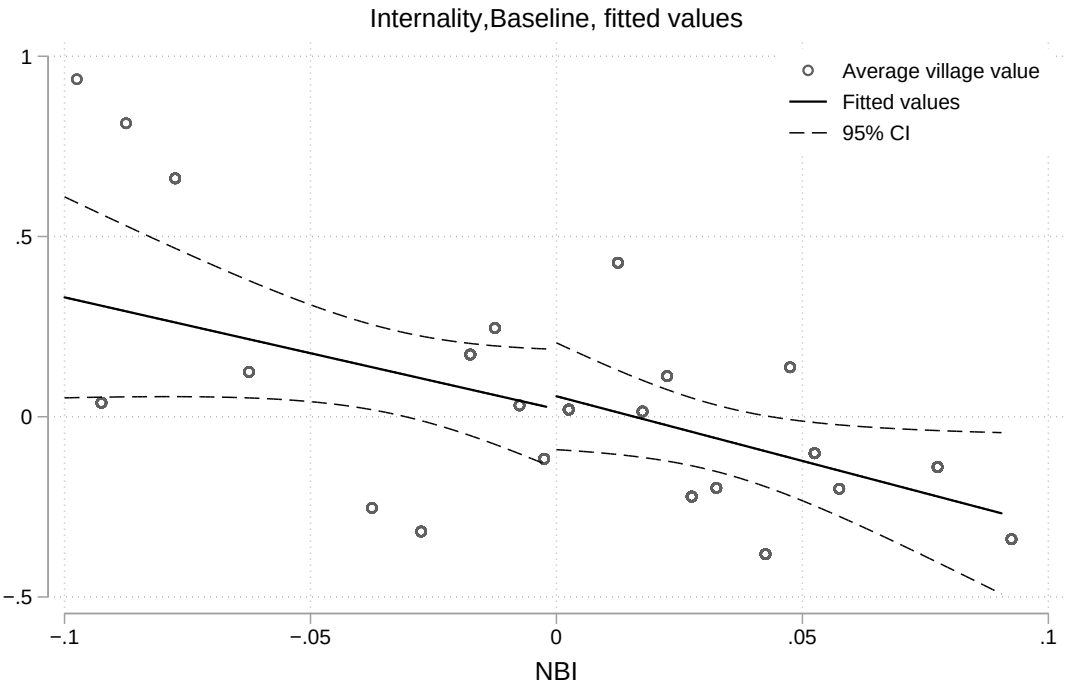
Village assignment to HW was not random. To be eligible for treatment, a village had to meet a series of requirements as described both in Section 4.1.1 and Section 4.4, including that at least 60% of the population had at least one NBI. To carry out the evaluation, we chose to compare villages that had 60% to 70% of their population with at least one NBI, with those that had 50% to 60% of their population wtih at least one NBI. In order to estimate the effect of the program consistently, the only relevant variable that jumps discontinuously at the threshold must be the assignment variable. We show that the set of variables relevant for our study are balance locally by estimating the following model:

$$Y_{i,v,0} = \alpha_0 + \tau HW_v + \beta \tilde{X}_v + \gamma HW_v \tilde{X}_v + \varepsilon_{i,v} \tag{1}$$

where $Y_{i,v,0}$ is the relevant variable for household i in village v at baseline, HW_v is a dummy variable equal to 1 if village v is to the right of the threshold of the running variable and 0 otherwise, and $\tilde{X}_v$ is the running variable (percentage of households with at least one NBI) centered around 0. If the sample is balanced, there should be no discontinuous jumps at the threshold, implying that τ should not be statistically significant for the variables.

A usual first step to see whether the condition of no discontinuous jump at the threshold holds

Figure 3



for covariates is to visually inspect how the variable behaves before and after the threshold. Figure 4 shows a picture for the internality index. As expected, the index is higher for relatively richer villages (to the left of the threshold) and falls as the running variable moves to the right. Once it hits the threshold there is no discontinuous jump, which provides some evidence favoring the fulfillment of the sufficient conditions for the consistency of the estimator. The formal test which is estimating the model presented in Equation 1 for all the relevant variables is presented in Table 1. Variables included in this table are variables that the literature suggests may be correlated with psychological attributes. Besides the psychological variables the table includes: annual baseline income, households characteristics such as household size and plot size, characteristics of the household head including sex, age and years of schooling and a variable indicating if the household has used fertilizer in the past. τ is not significant for any variable. Furthermore, a chi-squared test based on a system of seemingly unrelated regression with as many equations as baseline covariates cannot reject the null hypothesis that the discontinuity gaps are jointly equal to zero.

Table 1: Balance, RD

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Treatment	921.68	0.54	0.61	1.01	0.31	-0.01	-0.11	0.20	-0.16	0.18	0.07
	(639.78)	(0.83)	(0.64)	(0.74)	(0.38)	(0.05)	(0.11)	(0.14)	(0.20)	(0.21)	(0.14)
NBI rate	-9703.32	-6.64	4.67	-11.93	-6.50	0.23	3.25	-2.14	-1.37	0.27	-1.21
	(11934.04)	(7.64)	(10.48)	(15.24)	(5.16)	(1.01)	(2.53)	(2.26)	(2.74)	(1.87)	(2.01)
NBI rate ×											
Treat.	-3639.37	-1.95	-12.63	3.68	0.84	-0.09	-4.58	-2.67	4.89	0.61	-1.07
	(15506.86)	(17.33)	(13.18)	(18.98)	(7.47)	(1.17)	(3.45)	(2.90)	(4.47)	(3.94)	(2.88)
R^2	0.01	0.01	0.01	0.00	0.01	0.00	0.03	0.01	0.01	0.01	0.00
N	742	767	784	784	784	784	784	784	784	784	784

Standard errors clustered at a village level in parenthesis. All models include fixed effects per district. Dependent variable for each column is as follows: (1) Income (Soles), (2) Amount of land at disposal (hectares), (3) Years of education of household head, (4) Age of household head, (5) Household size, (6) Sex of household head, (7) Has used fertilizer, (8) Internality Index (9) Powerful others Index, (10) Chance Index, (11) Hope index

$^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Balance for villages assigned to coaching — We test for balance between villages that were assigned to coaching and those that were not. These villages are all to the right of the threshold. Table 2 shows the mean for the same variables as in Table 1for villages with no coaching (only HW) and the villages selected for coaching and the difference between the two. Household heads in the coaching villages are disproportionately female relative to non-coached villages: 21% are female in the former and only 14 % in the latter. This difference is significant at a 5% level. The rest of the variables are balanced. We again conduct a chi-squared test based on a system of seemingly unrelated regression with as many equations as baseline covariates and it cannot reject the null hypothesis that the difference between the means of the two groups are jointly equal to zero.

Table 2: Baseline balance, coaching villages

	No coaching	Coaching	Diff (2-1)
Socio-economic char.			
Total Income	3795.34	2969.68	-825.66
Plot size (ha)	1.96	2.34	0.38
HH head eaducation	6.37	6.61	0.24
HH head age	41.71	41.85	0.14
HH size	4.62	4.38	-0.24
HH head sex	0.15	0.21	0.06*
Technology			
Has used fertilizer	0.75	0.77	0.02
Psychological characteristics			
Hope Index	-0.02	-0.01	0.01
Internality Index	0.01	-0.02	-0.03
Powerful others Index	-0.05	0.07	0.12
Chance Index	0.00	0.03	0.03
N	236	287	

Standard errors clustered at a village level.

*$p < 0.10$, **$p < 0.05$, ***$p < 0.01$

5.2 Specification

5.2.1 Effect of the program on income

We first investigate the regression discontinuity intention-to-treat (ITT) effects on income measured by our midline survey ($t = 1$) using a regression discontinuity approach. The impact of the HW program is estimated using (straightforward) variations of the following model:

$$Y_{i,v,1} = \alpha_0 + \tau HW_v + \beta \tilde{X}_v + \gamma HW_v \tilde{X}_v + \varrho_{i,v,0}\delta + \varepsilon_i \quad (2)$$

where $Y_{i,v,t}$ is the annual income of household i in village v in period 1. The rest of the variables are the same as in Equation 1: HW_v is a dummy variable equal to 1 if village v is to the right of the threshold of the running variable making the village eligible for treatment and 0 otherwise, and $\tilde{X}_v$ is the running variable (percentage of households with at least one NBI) centered around 0. We also include $\varrho_{i,v,0}$ which is a vector of control variables for household i in village v. This vector includes baseline income and all the variables in Table 2. The error terms of Equation 2 are clustered at the village level to account for the nature of the assignment to treatment.

Heterogeneous effects on income. We investigate potential heterogeneous effects in the midline income level by running separate regressions for different subgroups of households. In particular, our regressions differentiate between households with baseline levels of psychological measures below or above the median for each of the four psychological constructs. Running the above model with interactions to account for the potential heterogeneities may lead to inconsistent estimates of τ (Calonico et al. 2019).

5.2.2 Effect on psychological variables

We then proceed to estimate the regression discontinuity intention-to-treat (ITT) effects of the additional coaching intervention on psychological variables on the midline survey ($t = 1$). To the right of the threshold there are three distinct groups that received different combination of interventions:

1. Only HW. For this group, $HW_v^g = 1$ and 0 otherwise. This group only receives HW. The superscript g intends to differentiate this group from the variable HW_v which is equal to 1 for all households in villages to the right of the threshold.

2. HW+"Spillover". For this group, $S_{i,v}$=1 and 0 otherwise. This group is comprised of households that did not receive coaching but that belong to villages v where coaching was offered. They only receive HW and potential spillovers from coached households.

3. HW+Coaching. For this group, $C_{i,v} = 1$ and 0 otherwise. This group is made of households that

received the coaching intervention additionally to HW.

In order to estimate the distinct effect for each of the three groups, we compare each of them with the pure control group. For this, we estimate the following model:

$$P_{i,v,1} = \alpha_0 + \tau I_{i,v} + \beta \tilde{X}_v + \gamma I_{i,v} \tilde{X}_v + \varrho_{i,v,0} \delta + \varepsilon_{i,v} \tag{3}$$

where $P_{i,v,1}$ is the psychological outcome for the household head in village v in household i in period 1. $I_{i,v}$=$HW_v^g, S_{i,v}, C_{i,v}$, depending on which effect its being evaluated. The error term ($\varepsilon_{i,v}$) is clustered at the village level to account for within-village error correlation.

6 Results

6.1 Effect of HW on annual income

Figure 4 shows graphically the result for Equation 2. The results from the linear model are presented in Table 3. The first two columns show the results for the whole centered bandwidth, from -0.1 to 0.1. The effect of being assigned to HW is close to USD 1100 in annual income and USD 800 when we include controls. For the model with controls, the effect is close to 40% larger than the average value for the households to the left of the threshold. Moreover, when we choose a smaller bandwidth, the effect is even larger. Columns 3 and 4 show the results for a centered bandwidth that goes from -0.05 to 0.05. The effect for this bandwidth is slightly larger for the model with no controls and for the model with controls shown in column 4, the effect is USD 1000. The results appear to be quite robust to these specifications. We further estimate a non-parametric model using a triangular kernel and an MSE-optimal bandwidth selector. The effect of the local linear model with controls increases substantially and the ITT estimate is now over USD 1400. Table 4 shows the result for this estimation.

Figure 4

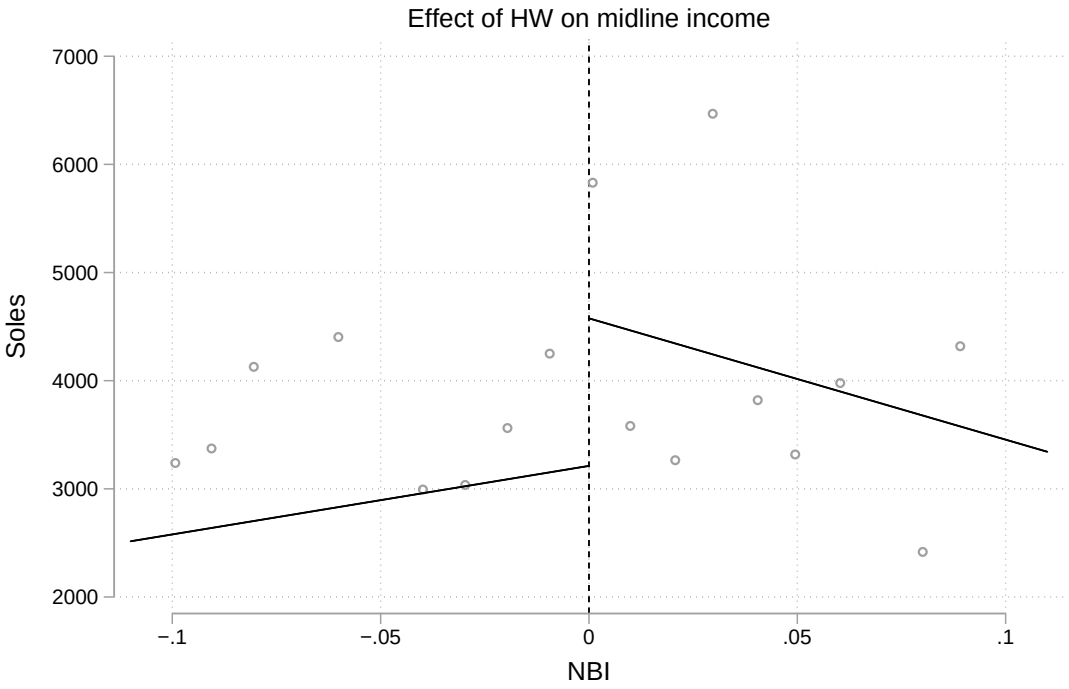


Table 3: *Effect of Haku Wiñay on midline Income*

	[-0.1, 0.1]		[-0.05, 0.05]	
	Income, ML	Income, ML	Income, ML	Income, ML
HW	1879.80**	1407.70**	1970.23*	1729.36**
	(817.99)	(634.39)	(1066.37)	(710.28)
Centered NBI	-2736.74	5354.87	-36081.57	-47928.76
	(11753.33)	(11859.54)	(41205.26)	(39026.50)
HW*NBI	-8485.06	-16237.27	73944.13	83410.67*
	(18487.31)	(17239.27)	(46237.76)	(43401.87)
Constant	3496.83**	3150.73	2804.95**	2257.26
	(1633.77)	(2006.65)	(1341.44)	(2226.12)
Controls	No	Yes	No	Yes
R^2	0.06	0.12	0.07	0.13
N	716	699	503	494
Mean control	3793.24	3793.24	3816.72	3816.72

Standard errors clustered at a village level in parenthesis. All models include fixed effects per district. First two columns show a model with a bandwidth of [-0.1, 0.1]. Columns 3 and 4 show a model with a bandwidth of [-0.05, 0.05]. Included baseline controls are land size, household size, years of education of the household head, age of the household head, if the household head has ever used fertilizers of any kind, sex of household head and baseline annual income. Also, baseline levels for each of the four psychological measures.
$^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Heterogeneous effects on income. The previous results show that the HW intervention has a positive significant effect on midline income for our sample. We now want to investigate whether baseline psychological measures have any effect on the impact of the intervention on income. This question

Table 4: *Effect of Haku Wiñay on midline Income, non-parametric*

	(1) Income, ML
RD_Estimate	2501.179*** [691.149]
Robust 95% CI	[1234.391 ; 4544.228]
Kernel Type	Triangular
Observations used to the left	118
Observations used to the right	184
Conventional p-value	0.000
Robust p-value	0.001
Order Loc. Poly. (p)	1.000
Order Bias (q)	2.000
BW to the left	0.018
BW to the right	0.018

Standard errors clustered at a village level in brackets. Model includes fixed effects per district. Included baseline controls are land size, household size, years of education of the household head, age of the household head, if the household head has ever used fertilizers of any kind, sex of household head and baseline annual income. Also, baseline levels for each of the four psychological measures.
*p ¡ 0.10, **p ¡ 0.05, ***p ¡ 0.01.

translates to finding out whether people with better initial psychological levels are able to use the resources of the program better than those with lower levels, as measured by midline income. In order to investigate this question, we estimate the model presented in Equation 2 for different subgroups of households, based on whether their baseline level of internality, chance, powerful others and Hope3 are each above or below the median.

The results for this analysis are presented in Table 5. The effects of the assignment to HW favor those above the median of the baseline level of internality (Panel A). For this group, the effect of assignment to treatment is around 1800 Soles (USD 1000). This effect is significant at a 5% level. In comparison, the effect of assignment to treatment for those that have a baseline measure of internality below the median is only 630 Soles (USD 360 USD) and the effect is not statistically significant. The difference between the two coefficients is significant at a 10% level, confirming that households with higher initial levels of internality outperform those with lower ones. Panels B and C show the results for chance and powerful others. Households whose household head had baseline measures of these variables below the median (less external Locus of Control) appear to outperform those that have baseline measures above the median (more external Locus of Control), although most effects are not statistically significant.The

effect for below the median baseline powerful others Index is statistically significant at a 5% level (close to 1800 Soles), and the difference is significant at a 10%. The bottom part of the table shows Panel D, where there appears to be no difference in the effect on income of assignment to treatment for those above and below the median of the Hope3 index.

Table 5: *Income responses to heterogeneity in baseline psychological measures.*

	Control mean	HW Treatment effect
Panel A. By Baseline Internality		
Below median	3644.56	627.61
		(840.46)
Above median	3978.41	1803.68**
		(796.90)
Panel B. By Baseline Chance		
Below median	3755.11	1134.48
		(934.44)
Above median	3857.48	860.68
		(938.89)
Panel C. By Baseline Powerful others		
Below median	4091.28	1753.84**
		(848.23)
Above median	3445.53	103.60
		(727.73)
Panel D. By Baseline Hope3		
Below median	3439.99	1165.70
		(1013.23)
Above median	4149.37	900.69
		(1011.45)

First column reports the mean value of annual Income at midline below the cutoff. Standard errors clustered at a village level in parenthesis. All models include fixed effects per district. Included baseline controls are land size, household size, years of education of the household head, age of the household head, if the household head has ever used fertilizers of any kind, sex of household head and baseline annual income. Also, baseline levels for each of the other three psychological characteristics.

$^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

6.2 The role of the coaching intervention

The evidence until now tells us that households with a more internal locus of control as measured by the internality and powerful others index are able to benefit more in terms of income from the assignment to HW than those with lower initial levels. But what is the role of the ancillary coaching intervention on the psychological variables? Do households with coaching increase their psychological indices more than households without it? If the answer to the previous question is yes, this fact together with the finding of heterogeneous effects of the program by baseline levels of psychological variables would provide indicative evidence of the potential of this intervention to further benefit households in terms of increased income. Our study design allows us to answer this question. A subgroup of the villages assigned to HW were also selected to participate on the coaching program which was offered randomly to around half of our sample in each of the selected villages. This means that to the right of the threshold there are three distinct groups: i) households in villages where only HW was offered, ii) households in villages where HW and coaching were offered but who didn't receive the latter intervention (from now on referred to as the spillover group of households), and iii) households in villages where HW and coaching were offered and who were invited to participate in the coaching program (coached households). We estimate Equation 3 for each of the psychological variables comparing those to the left of the threshold with each of these groups. We further compare the treatment coefficients for each variable to test whether these are different across the three groups.

Table 6 presents the results for these regressions. The first column shows the results for the three regressions for internality. The effect of coaching is positive and significant at a 1% level. This effect is 4 times bigger than the effect for spillover households. In contrast, the effect for households that only received HW is negative and very close to 0 and it is not statistically significant. Households in the spillover group appear to benefit from the fact that their neighbors are being exposed to the ancillary treatment, but as we noted the effect is not significant. We test the joint hypothesis of equality for these three coefficients and we can reject it at a 1 % significance level (last row in the table). The table also shows a significant effect for chance. The coaching intervention decreases this measure, implying that there is a shift towards a more internal Locus of Control in that dimension. The test for the equality of the coefficients rejects the null hypothesis at a 10% significance level. The effects of both HW and the

spillovers are also negative but small and not significant. The effects for the powerful others index are positive, except for the spillovers group. There are no significant effects for any of the three regressions for this index. Nevertheless, it is interesting that there is an increase in the coefficient for coaching and HW. This could be reflecting the fact of an increased reliance on both the *Yachachiq* and coaching agent, which would be an unintended consequence of both programs. The effect for the Hope3 index is significant for all three regressions. The effect for the coaching subgroup (0.48) is more than 50% larger than for those assigned only to HW (0.31). Moreover, the effect on the index for households only assigned to HW is sizable. For the rest of the indices, the effect on the psychological variables appeared to come mostly from the coaching intervention. But for the Hope3 index, both interventions seem to increase substantially its value. The size of the effect for the only HW subgroup goes in line with what practitioners believe about the effect on "life attitudes" and "psychological outlook" of the lessons learned from *Yachachiqs* and interactions with implementers of HW (Conger 2016). The test for the equality of coefficients across the three models does not reject the null hypothesis. The p-value for the χ^2 statistic of the test comparing the coefficient for the only HW subgroup regression with that of the coaching subgroup regression is 0.11, making the difference only marginally not significant. Nevertheless, the size of the effect for the spillover group (0.27) which is very similar to that of the only HW subgroup, suggests that there is indeed an added effect associated to the coaching intervention, although our estimates are not precise enough to show it.

Table 6: *Regression discontinuity impact on psychological variables, by treatment group, Household head*

	Internality	Chance	Power. oth.	Hope3
Only HW	-0.04	-0.03	0.11	0.31***
	(0.13)	(0.16)	(0.15)	(0.09)
HW + Spillovers	0.11	-0.05	-0.03	0.27*
	(0.12)	(0.12)	(0.16)	(0.15)
HW + Coaching	0.49***	-0.29*	0.16	0.48***
	(0.17)	(0.16)	(0.18)	(0.13)
Control mean	-0.05	-0.09	-0.14	-0.14
$H_0 \colon \tau_{HW} = \tau_{HW+S} = \tau_{HW+C}$				
p-val, χ^2	.003	.122	.322	.185

Standard errors clustered at a village level in parenthesis. All models include fixed effects per district. Included baseline controls are land size, household size, years of education of the household head, age of the household head, if the household head has ever used fertilizers of any kind, sex of household head and baseline annual income. Also, baseline levels for each psychological characteristic.

$^*p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

These results imply that indeed there are gains in terms of increased psychological outcomes from being exposed to coaching. Both internality and chance shift towards a more internal locus of control, and the Hope3 measure also increases, although the difference between the HW intervention and the coaching for the latter is not big enough for it to be statistically significant. Putting together the pieces of evidence, there is indicative evidence that the ancillary coaching intervention could help make the HW intervention a better program. The betterment of the psychological variables through coaching together with the heterogeneous responses of income favoring high values of baseline psychological measures (particularly internality), point at a direction through which coaching may help increase economic outcomes.

Effects of coaching on agricultural practices on the short term. These midline results do not allow us to see an effect of coaching on income since the program ended too close to our latest survey. We

focus our attention on agricultural practices that are bound to see changes in the short run and that may lead to future returns. in particular, we look at the practices that may change as a consequence of the goals that participants in the program have set for themselves. Most of the participants set for themselves goals that aimed at increasing their agricultural income (Table B1 in Appendix B). Among these, a high proportion of households wanted to increase their production of both guinea pigs and poultry. Technicians suggest that a first step for achieving a higher production of these animals is to have them spend the night in pens. HW offered the materials and technical advice for each household to build a structure for their animals to spend the night. From our visits to the field we were able to see that their were some households that had received the materials to build sheds or pens but that never started doing it. Hence, there is space for the coaching intervention to have an effect on this practice.

Table 7 shows the result for the same specification of Equation 3 but the outcome variable is a dummy equal to 1 if guinea pigs spend their night in a pen and 0 otherwise for column 1 and a dummy equal to 1 if chickens spend their night in a pen and 0 otherwise for column 2. The effects for both guinea pigs and chickens is significant for the coaching subgroup. Coaching increases the probability of guinea pigs spending their night in a pen by 100% over the control group. It is also 10 percentage points higher than the effect of only HW and spillovers. But we can't reject the null hypothesis of these 3 coefficients being the same. The effects are similar for chickens. Coaching increases the probability of chickens sleeping in a pen by 21 percentage points over the control, and 5 percentage points over the only HW and spillover groups. Although the differences between groups are not significant, these midline results may indicate future increased gains in income associated with the production of these animals.

Table 7: *Regression discontinuity impact on whether small animals spend their night in a pen, by treatment group*

	Guinea pig pen	Chicken pen
Only HW	0.22**	0.16
	(0.09)	(0.10)
HW + Spillovers	0.22**	0.16
	(0.09)	(0.10)
HW + Coaching	0.32***	0.21**
	(0.08)	(0.08)
Control mean	0.30	0.25
H_0: $\tau_{HW} = \tau_{HW+S} = \tau_{HW+C}$		
p-val, χ^2	.32	.402

Standard errors clustered at a village level in parenthesis.The model includes fixed effects per district. Included baseline controls are land size, household size, years of education of the household head, age of the household head, if the household head has ever used fertilizers of any kind, sex of household head and baseline annual income. Also, baseline levels for each psychological characteristics and baseline levels of whether guinea pigs (model 1) and chickens (model 2) spend their nights in a pen.

*$p < 0.10$, **$p < 0.05$, ***$p < 0.01$.

7 Concluding discussion

Poverty alleviation programs aiming at exclusively relaxing material constraints associated to households in extreme poverty may be missing an opportunity to enhance the economic effects of the program by not directly targeting psychological attributes. The loosening of internal constraints through a life skills coaching module proves to be an effective way of shifting the locus of control towards a more internal axis, making participants gain a sense of control over their lives and of increasing hope, which fosters an optimistic outlook about the future. Participants that enter the program with high levels of these

measures are shown to make better use of the resources offered by the program since their midline measures of annual income are substantially larger than those with lower initial values.

Our research questions were designed to help us unpack and understand how graduation programs work. These midline results point quite robustly towards an answer. We were able to capitalize on this unique scenario of a graduation-type program and measure whether coaching by itself moves the needle of psychological attributes that have been found to be determinant of investment and technology adoption decisions. The endline survey will allow us to close the loop and confirm whether in effect, the suggestive evidence of the relevance of coaching on income through its effect on an increased level of internality is in fact true.

It remains to be seen whether the changes in the psychological variables are permanent. The literature regarding the stability of these measures, in particular the one associated with locus of control, is not conclusive. Our endline survey in the second quarter of 2021 will shed light on whether these effects are persistent or they dissipate with time. Moreover, we will have to account for the effects that the COVID-19 may have had on the livelihoods of the people in our survey. Transport in the country was disrupted for almost six months, decreasing the number of potential buyers for their products. For instance, the price of potato, which close to 70% of our sample produces and consumes, fell close to 70 % during the first months of the pandemic. This implies a major shock to their income. Also, since transportation was restricted, seasonal workers had a very difficult time transporting themselves to other locations. The government set up a fund to grant credit to smallholder farmers so that they can finance the 2020-2021 agricultural cycle. But even in late October of 2020, when the sowing in the highlands (where most of our sample is located) for a wide variety of agricultural products should be underway, the credits have failed to reach most farmers. It is very likely that the upcoming agricultural cycle is done with few inputs which will most likely affect the quantity and quality of the harvest. Hence, it may be the case that there is little relief from the COVID shock anytime soon. This shock may well undermine the gains made with the coaching intervention.

References

Abay, K. A., Assefa, T. W., and Berhane, G. (2016). Locus of control, hyperbolic preferences, and demand for commitment and savings: Evidence from rural ethiopia. Working Paper.

Abay, K. A., Blalock, G., and Berhane, G. (2017). Locus of control and technology adoption in developing country agriculture: Evidence from ethiopia. *Journal of Economic Behavior & Organization*, 143:98 – 115.

Anderson, M. (2008). Multiple inference and gender differences in the effects of early intervention: A reevaluation of the abecedarian, perry preschool, and early training projects. *Journal of the American Statistical Association*, 103(484):1481–1495.

Baird, S., Bohren, J. A., McIntosh, C., and Özler, B. (2018). Optimal design of experiments in the presence of interference. *The Review of Economics and Statistics*, 100(5):844–860.

Bandiera, O., Burgess, R., Das, N., Gulesci, S., Rasul, I., and Sulaiman, M. (2017). Labor markets and poverty in village economies. *The Quarterly Journal of Economics*, 132(2):811–870.

Banerjee, A., Duflo, E., Chattopadhyay, R., and Shapiro, J. (2016). The long term impacts of a "graduation" program: Evidence from west bengal. Working Paper.

Banerjee, A., Duflo, E., Goldberg, N., Karlan, D., Osei, R., Parienté, W., Shapiro, J., Thuysbaert, B., and Udry, C. (2015). A multifaceted program causes lasting progress for the very poor: Evidence from six countries. *Science*, 348(6236):1260799.

Baranov, V., Haushofer, J., and Jang, C. (2020). Can positive psychology improve psychological well-being and economic decision-making? experimental evidence from kenya. *Economic Development and Cultural Change*, 68(4):1345–1376.

Barrett, C. B., Carter, M. R., and Chavas, J.-P. (2018). The economics of poverty traps. In Barrett, C. B., Carter, M. R., and Chavas, J.-P., editors, *The Economics of Poverty Traps*. University of Chicago Press.

Bernard, T., Dercon, S., Orkin, K., and Taffesse, A. S. (2014). The future in mind: Aspirations and forward-looking behaviour in rural ethiopia. CSAE Working Paper Series 2014-16, Centre for the Study of African Economies, University of Oxford.

Caliendo, M., Cobb-Clark, D. A., and Uhlendorff, A. (2015). Locus of control and job search strategies. *The Review of Economics and Statistics*, 97(1):88–103.

Calonico, S., Cattaneo, M. D., Farrell, M. H., and Titiunik, R. (2019). Regression discontinuity designs using covariates. *The Review of Economics and Statistics*, 101(3):442–451.

Carter, M. R. (2016). What farmers want: the "gustibus multiplier" and other behavioral insights on agricultural development. *Agricultural Economics*, 47 supplement:85–96.

Cobb-Clark, D. and Schurer, S. (2011). Two economists' musings on the stability of locus of control. IZA Discussion Paper Series No. 5630.

Cobb-Clark, D. A., Kassenboehmer, S. C., and Sinning, M. G. (2016). Locus of control and savings. *Journal of Banking & Finance*, 73:113 – 130.

Coleman, M. and DeLeire, T. (2003). An economic model of locus of control and the human capital investment decision. *Journal of Human Resources*, 38(3):701–721. Cited By :108.

Conger, L. (2016). Peru case study. In Sheldon, T., editor, *Preserving the Essence, Adapting for Reach: Early Lessons from Large-Scale Implementations of the Graduation Approach. Four Case Studies and Synthesis Analysis.*

de Montesquiou, A., Sheldon, T., and Hashemi, S. M. (2018). *From Extreme Poverty to Sustainable Livelihoods, A Technical Guide to the Graduation Approach.* Partnership for Economic Inclusion, 2nd edition.

Duflo, E. (2012). Human values and the design of the fight against poverty.

Hastings, E. C. and West, R. L. (2009). The relative success of a self-help and a group-based memory training program for older adults. *Psychology and Aging*, 24:586–594.

Haushofer, J. and Fehr, E. (2014). On the psychology of poverty. *Science*, 344(6149):862–867.

Heckman, J. J., Stixrud, J., and Urzua, S. (2996). The effects of cognitive and noncognitive abilities on labor market outcomes and social behavior. *Journal of Labor Economics*, 24(3):411–482.

Heineck, G. and Anger, S. (2010). The returns to cognitive abilities and personality traits in germany. *Labour Economics*, 17(3):535 – 546.

Huang, J. L. and Ford, K. J. (2012). Driving locus of control and driving behaviors: Inducing change through driver training. *Transportation Research Part F: Traffic Psychology and Behaviour*, 15(3):358–368.

INEI (2012). Características socioeconómicas del productor agropecuario en el perú. iv censo nacional agropecuario. Technical report.

Katerndahl, D. A. (1991). Relationship between panic attacks and health locus of control. *The Journal of Family Practice*, 32:391–396.

Krishnan, P. and Krutikova, S. (2013). Non-cognitive skill formation in poor neighbourhoods of urban India. *Labour Economics*, 24(C):68–85.

Levenson, H. (1981). Differentiating among internality, powerful others, and chance. in h. lefcourt (ed.), (vol. 1). In Lefcourt, H. M., editor, *Research with the Locus of Control Construct*, volume 1, pages 15–63. New York: Academic Press.

Lybbert, T. and Wydick, B. (2018a). Hope as aspirations, agency and pathways: Poverty dynamics and microfinance in oaxaca, mexico. In Barrett, C. B., Carter, M. R., and Chavas, J.-P., editors, *The Economics of Poverty traps*. University of Chicago Press.

Lybbert, T. and Wydick, B. (2018b). Poverty, aspirations, and the economics of hope. *Economic Development and Cultural Change*, 66(4).

Macours, K. and Laajaj, R. (2020). Measuring skills in developing countries. *The Journal of Human Resources*, Forthcoming.

Malacarne, J. G. (2019). The farmer and the fates: Locus of control and investment in rainfed agriculture. Working paper.

Menec, V. H., Perry, R. P., Struthers, C. W., Schonwetter, D. J., Hechter, F. J., and Eichholz, B. L. (1994). Assisting at-risk college students with attributional retraining and effective teaching. *Journal of Applied Social Psychology*, 341(24):675–701.

Mullainathan, S. (2013). *Why Having Too Little Means So Much*. Henry Holt & Company.

Nowicki, S., Ellis, G., Iles-Caven, Y., Gregory, S., and Golding, J. (2018). Events associated with stability and change in adult locus of control orientation over a six-year period. *Personality and Individual Differences*, 126:85–92.

Rammstedt, B., Kemper, C. J., and Borg, I. (2013). Correcting big fi
ve personality measurements for acquiescence: An 18-country cross-cultural study. *European Journal of Personality*, 27(1):71–81.

Rotter, J. (1966). Generalized expectancies for internal versus external control of reinforcement. *Psychological Monographs: General and Applied*, 80(1):1–28.

Sedlmayr, R., Shah, A., and Sulaiman, M. (2020). Cash-plus: Poverty impacts of alternative transfer-based approaches. *Journal of Development Economics*, 144:102418.

Wuepper, D. and Lybbert, T. J. (2017). Perceived self-efficacy, poverty, and economic development. *Annual Review of Resource Economics*, 9.

Wuepper, D., Zilberman, D., and Sauer, J. (2020). Non-cognitive skills and climate change adaptation: empirical evidence from ghana's pineapple farmers. *Climate and Development*, 12(2):151–162.

Appendices

A Locus of control and Hope questionnaires

Table A1: Locus of control questionnaire

	Index	***Question***
i1	Chance	When you're doing well, is it because you're lucky?
i2	Powerful others	Is what happens in your life determined by powerful people?
i3	Internality	When you make plans, can you make them work?
i4	Chance	Is it easy for you to protect yourself from bad luck?
i5	Chance	Can fate be changed?
i7	Powerful others	Can you protect yourself if you conflict with someone powerful?
i8	Chance	Is it better to plan for the future? or leave the future to chance?
i9	Powerful others	To get what you want, must you please people more important than yourself?
i10	Internality	Can you decide what will happen in your life?
i11	Internality	Can you protect your personal interests?
i12	Internality	When you get what you want, is it because you worked hard to get it?
i13	Powerful others	For your plans to work, do you have to accommodate them to the wishes of the people in power?
i14	Internality	Is your life determined by your own actions?
i15	Internality	If you became a leader, would it be because of your abilities?
i16	Chance	When you get what you want, is it because you are lucky?
i17	Powerful others	For you to be a leader, do you need the approval of powerful people?
i18	Chance	To be a leader, do you have to be lucky enough to be in the right place at the right time?

Table A2: Hope questionnaire

	Index	***Question***
i19	Aspirations	What is better, accept reality? or dream of a better future?
i20	Aspirations	What is better, have aspirations for your family? Or accept each day as it comes?
i21	Aspirations	Are you satisfied with the production of your farm?
i22	Aspirations	When you have a farm, do you have to set goals?
i23	Aspirations	Do you have plans and goals to improve the productivity of your farm?
i24	Self-efficacy	Can you learn to use a new technology to make your farm more productive?
i25	Self-efficacy	Is effort very important for the optimal production of the farm?
i26	Self-efficacy	Is luck very important for the optimal production of the farm?
i27	Self-efficacy	Does the future of your farm depends on your own actions? or on the actions of others?
i28	Self-efficacy	If you try, can the production of your farm improve?
i29	Self-efficacy	Can people like you help bring about positive change in the community?
i30	Avenues	Can you solve the problems you find in your farm, even if they are difficult?
i31	Avenues	If your farm sales are low, do you know how to find other buyers?
i32	Avenues	Are you easily discouraged when there are problems in your farm?
i33	Avenues	If you lose the entire harvest in one season, would you try to plant other crops in the next season?

B Coaching plans and modules

Table B1 shows the categories where the goals set by the participants that finished all the coaching modules fall into. The goals related to small animals were mostly about building better pens for both chickens and guinea pigs so that the production could grow. Other agricultural related goals included increasing the number of cows, planting improved seeds for a variety of crops, making proper sheds for pigs, among others. Non agricultural goals included having a bakery, a restaurant and selling handcrafts.

Table B1: Types of goals set by coaching participants

Goals	**Number of households**	**Percentage of total**
Related to small animals	81	43%
Other ag goals	71	38%
Non-ag goals	37	20%
Total	189	

Table B2

Coaching modules, phase 1
Session 1: Getting to know me
Session 2: My personal goal for the benefit of my family
Session 3: My reality and options to achieve my goal
Session 4: My action plan

Table B3

Coaching sessions, phase 2
Session 5: My new habits and thoughts
Session 6: Commitment to what I want to achieve
Session 7: Making changes to solve difficulties
Session 8: Knowing resilience
Session 9: Looking for solutions
Session 10: Good communication in the activities I do
Session 11: Perseverance to achieve what I set out to do
Session 12: Acknowledging my fears
Session 13: Assessing my goal progress
Session 14: What I learned from these trainings

C Attrition

Table C1: Attrition

	HH in BL and ML	HW in BL	Diff (2-1)
Socio-economic char.			
Total Income	4780.12	5002.16	222.03
Plot size (ha)	2.15	2.08	-0.07
HH head eaducation	6.34	6.72	0.38
HH head age	41.67	41.49	-0.17
HH size	4.52	4.29	-0.22
HH head sex	0.18	0.26	0.07
Technology			
Has used fertilizer	0.41	0.34	-0.04
Psychological characteristics			
Hope Index	-0.00	0.01	0.01
Internality Index	-0.00	0.03	0.04
Powerful others Index	-0.01	0.11	0.13
Chance Index	0.00	-0.00	-0.00
N	784	89	

$^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$
Standard errors clustered at a village level