IDB Invest IDB LAB

Development through the Private Sector Series
July 2019

TN No. 18

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Experimental Evidence on Heuristic-Based Business Training in Ecuador

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Cover page design: Greta Design

July 2019

Less is More: Experimental Evidence on Heuristic-Based Business Training in Ecuador *

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July, 2019

Abstract

Using a randomized-control trial, we tested the effectiveness of a traditional training program and a tailor-made training program based on heuristics—practical approaches to problem solving that require low cognitive effort—for microentrepreneurs in Ecuador. We find that the heuristic training has statistically significant and economically meaningful impacts on indexes of sales and profits relative to the control, with effect sizes of 0.06 and 0.08 standard deviations, respectively (equivalent to increases of 7.3 percent in sales and 8.2 percent in profits with respect to the control group). Results are larger in magnitude for female than for male entrepreneurs and for microentrepreneurs with low recall (in the digit span recall test, a measure correlated with the ability to use attention to avoid distraction) than for entrepreneurs with high recall. The traditional training, meanwhile, did not have any significant impact on these measures relative to the control group.

JEL Classification: *C93, L26, O12*

Keywords: heuristics, entrepreneurship, business training, randomized-control trial, gender

*This study was financed by IDB Lab of the Inter-American Development Bank (IDB). We would like to thank Banco del Pichincha, especially Maria Belén Sánchez, Patricio Amaya, and Silvia Yépez for their support in conducting the study. We also would like to thank Luz María Dávalos for her excellent work in the field as coordinator. The opinions expressed in this paper are those of the authors and do not necessarily reflect the views of Swarthmore College, or of the Inter-American Development Bank, IDB Invest, or IDB Lab, their respective Board of Directors, or the countries they represent.

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1 Introduction

Low levels of business knowledge or skills prevent many micro entrepreneurs in developing countries from making the financial and management decisions needed to successfully run and grow their businesses (Bruhn et al. 2010; Cho et al., 2016). This has led to business training being a centerpiece of technical assistance programs for microentrepreneurs and small businesses in developing countries (Blattman and Ralston, 2015). However, while some recent studies have found positive impacts of business training on knowledge and practices,[1] the evidence of the impacts on business outcomes has been both limited and mixed.[2] This has led people to question the standard approaches to business training and adopt new techniques informed by research in psychology and behavioral economics.

Most notably, Drexler et al. (2014) present compelling causal evidence suggesting that trainings that teach simple heuristics, or rules of thumb, are more effective than traditional training programs, particularly in contexts where the target populations might have low skill levels. The efficacy of this approach is built on the idea that traditional business training programs may provide too much information, or information that is too complex to be practical or actionable. For individuals who have less education or have less cognitive bandwidth, this complexity may blunt the effectiveness of training programs.

Though the evidence from Drexler, et al. (2014) is promising, a number of open questions remain in the literature around trainings that teach simple heuristics. First and foremost, we still do not understand the mechanisms behind why these trainings seem to be more effective than traditional trainings. That is, while Drexler, et al. (2014) present compelling estimates of average treatment effects, they do not dig deeper into the behavioral foundations for the effectiveness of the training program they report on, because they do not collect data on individual-level behavioral measures. Second, given the scarcity of literature on the causal impact of such behaviorally-informed training methods, there is a need for independent replications to determine the generalizability of these early results. In particular, it is worth noting that the sample in Drexler, et al. (2014) was comprised of nearly all women (90%). Such replications are also important in the context of cost effectiveness, where the evidence on the relative merit of heuristics-based training versus "off the shelf" traditional training is not definitive.

In this paper, we report on a randomized control trial in Ecuador that tests and compares the effectiveness of two types of business training program for small business owners: a traditional training program and a program focusing on easily-digestible, rule of thumb-style business practices (which we call "heuristic training"). The design of the intervention allows us to make important contributions to the nascent literature of "behavioral" business training programs. First, we collect individual-level data on the digit span recall test—a measure correlated with the ability to use attention to avoid distractions—which allows us to explore why these training programs may be more effective, and for whom.[3] Second, our sample includes more men than in previous work, which allows us to explore the gender dynamics at play. More specifically, in Ecuador as in many other countries, women spend more time

[1] See the meta-analyses in McKenzie and Woodruff (2014), Cho and Honorati (2014), and Grimm and Paffhausen (2015), for example.

[2] McKenzie and Woodruff (2014), for example, find that only a small number of studies show impacts for small businesses on profits or sales.

[3] The digit span recall test is designed to measure working memory capacity. Subjects are shown a string of digits that they need to reproduce immediately in the original order. It captures the subject's capacity to successively distribute their attention into discrete units and organize them for retrieval.

doing unpaid work than men.[4] Therefore, since women in these contexts need to carry out more activities concurrently (Offer and Schneider, 2011; Sullivan and Gershuny, 2013), women may be more cognitively taxed than men, which might influence the efficacy of training programs.[5] Extensive literature in psychology points to the adverse effects of multitasking on performance (Kahneman 1973; Pashler 1994; Ophir et al. 2009) and the correlation of these negative effects with the cognitive effort that the tasks require. Third, our intervention allows us to add an important independent replication of "behavioral" versus traditional training to existing literature.

It is worth noting that our intervention does differ from Drexler et al. (2014) in several other ways, beyond the collection of individual-level data on the digit span recall test. First, the heuristic training we study (one four-hour session) is shorter than the one in Drexler et al. (2014) (five weekly sessions of three hours each). Second, our training was tailored to the needs of the entrepreneurs identified during the design phase using a positive deviance approach. Third, our training used visual cues and a "challenge" to increase the adoption of the best practices covered by the training program. Specifically, the treatment training used an opt-in "challenge," whereby bank officers kept track of the adoption of the rules of thumb during their regular field visits and during the 30 days following the training.

Our results show statistically significant and economically meaningful impacts on indexes of sales and profits for the heuristic training relative to the control of no training (0.06 and 0.08 standard deviation effect sizes, respectively; equivalent to increases of 7.3 and 8.2 percent, respectively). Meanwhile, for the same measures, we cannot distinguish the effects of the traditional training from zero. These positive results for the heuristic training appear to be driven by the training's effect on sales and profits for microentrepreneurs' "regular" and "good" days. The study also allows us to identify one of the main channels through which the heuristic training affects outcomes: inventory control and management. Furthermore, the heuristic training is also cost-effective; specifically, it has an internal rate of return of at least 37 percent, assuming conservatively that the effect completely disappears after one year, and including the cost of the design of the training.

We also find larger effects of the heuristic training for female entrepreneurs than for male entrepreneurs, mainly because women adopt the rules of thumb at a greater rate than their male counterparts. The analysis also shows that results are stronger for entrepreneurs with low recall (in the digit span recall test), a measure correlated with the ability to use attention to avoid distractions. Based on the data collected at baseline, women in our sample seem to be more cognitively taxed than men, suggesting that the gender results may be at least partially due to this fact. Overall, while we cannot draw definite conclusions, our results do suggest that cognitive load may "tax" entrepreneurs and influence the effectiveness of business training programs, both in general and across gender lines.

The rest of this paper is organized as follows. Section 2 provides background and briefly describes the most relevant related literature, Section 3 describes the two interventions, Section

[4] According to the most recent World Bank Indicators for Ecuador, the proportion of time spent on unpaid domestic and care work for women (17.92%) is considerably higher than for men (4.92%). This situation is quite similar to other Latin American countries, but it differs substantially with respect to developed countries, where these activities are more equally divided. For instance, in the U.S. women spent 15.9% of their time on unpaid domestic household and caring chores, while men spent 9.79%. Meanwhile, in European countries like Sweden (15.97% vs. 12.64%) and Denmark (11.25% vs. 15.63%), these figures are even more equitable.

[5] Mani et al. (2013) argue that given the limited capacity of the human cognitive system, concerns related to poverty consume mental resources, i.e. "tax the cognitive system", and impair people's cognitive capacity which could affect the quality of their decisions.

4 describes the experimental design and the data, Section 5 describes the empirical strategy, Section 6 presents the results, and Section 7 concludes.

2 Related Literature

Recent empirical evidence has found a strong positive association between business practices and firm performance and growth. For example, Bloom and co-authors have used the World Management Survey, which measures management practices at large manufacturing firms around the world, to show that better management practices are associated with higher productivity, profitability, and sales growth.[6] In a similar vein, based on data from small businesses and microenterprises in developing countries, McKenzie and Woodruff (2015) find that a one standard deviation increase in an index of business practices is associated with an 18 percent increase in profits, a 35 percent increase in labor productivity, and a 22 percent increase in total factor productivity.[7]

Improving business practices is especially important in developing countries, where microentrepreneurs often lack the managerial knowledge needed to run and grow their businesses (Bruhn et al. 2010; Cho et al., 2016). A recent report from the OECD (2017) finds that few young entrepreneurs in developing countries possess basic business skills; for example, only 11 percent of entrepreneurs in Madagascar make use of written accounts, while only 34 percent do so in Vietnam. It is not surprising, then, that the profits generated by entrepreneurs in the countries covered in the OECD report were, on average, below the level of wages earned by salaried employees. Similarly, a survey conducted in Uganda reveals that poor management practices (e.g., poor record keeping, inadequate inventory control, incorrect pricing) are correlated with small business failure.[8]

Inspired by the need for better business practices in the developing world, international institutions and governments have increasingly subsidized training programs. For example, the World Bank invested US$9 billion in 93 skills training programs between 2002 and 2012—approximately US$100 million per program. Meanwhile, the International Labor Organization's Start and Improve Your Business (SIYB) program has trained more than 4.5 million people in 100 countries. Other well-known business training interventions include the UNCTAD/EMPRETEC program, the Freedom from Hunger program developed for microfinance clients, the GTZ/CEFE program, and business plan competitions and training implemented by Technoserve, among others (McKenzie and Woodruff, 2014; Blattman and Ralston, 2015).

Despite the enormous resources invested, very little was known about the causal effects of these programs until quite recently. In the last decade, numerous evaluations have provided evidence in this area, including from programs in Bosnia and Herzegovina (Bruhn and Zia, 2011), Ghana (Karlan et al., 2012; Mano et al., 2012), Mexico (Bruhn et al., 2013; Calderon et al., 2013), Peru (Karlan and Valdivia, 2011; Valdivia, 2011), Sri Lanka (de Mel et al., 2014), and Tanzania (Berge et al., 2012). Meanwhile, McKenzie and Woodruff (2014) provide a meta-analysis of business training evaluations in Africa, Asia, Eastern Europe, and Latin America (Mexico, Dominican Republic, Peru), while Cho and Honorati (2014) and Grimm

[6] See Bloom and Van Reenen (2007), Bloom and Van Reenen (2010), Bloom et al. (2010), and Bloom et al. (2014).

[7] The authors developed a set of 26 questions to measure key business practices and used them to estimate a "business practices score".

[8] Tushabomwe-Kazooba, 2006.

and Paffhausen (2015) conducted meta-analyses for a wider range of interventions aimed at improving the business skills of micro-entrepreneurs and small business owners.

These studies have generally found that business training programs have positive impacts on business knowledge and practices. However, these positive impacts on knowledge and practice have not necessarily translated into better business performance—indeed, most of the empirical evidence suggests little impact on profits or sales. McKenzie and Woodruff (2014) attribute this to low statistical power to detect effects (due to small sample sizes), and a short period between the intervention and the ex-post survey (meaning the effects might not have fully materialized). That said, even when business training programs do have positive effects, much more evidence is needed to assess their cost-effectiveness.[9]

One possible limitation of traditional business training programs is that the depth of understanding they require can be very taxing on entrepreneurs' mental bandwidth. Generally speaking, the activities and best practices emphasized at these trainings, such as calculating cash flow or keeping accurate records, require non-trivial levels of effort and cognitive engagement. However, small business owners or micro-entrepreneurs in emerging markets often find themselves cognitively stretched as-is; they generally must make frequent decisions about how much inventory to purchase, where to get better terms for a loan, how to deal with power outages and theft, etc. In light of this, it is possible that the greater complexity in processes introduced by training programs might exacerbate cognitive load. Thus, a detailed business training might influence knowledge or even some behaviors, but fail to impact outcomes like sales or profit because entrepreneurs' limited attention is paid to urgent aspects of their businesses, which "crowds out" attention that could be paid to specific aspects highlighted in the training. Evidence from the psychology literature suggests that subjects under increased cognitive load are more likely to miss unexpected task-relevant stimuli or be distracted by task-irrelevant stimuli, and thereby underperform at the task at hand (Lavie et al. 2004, Causse et al. 2016). Researchers have further argued that increased cognitive load is detrimental because it renders subjects unable to actively maintain stimulus-processing priorities throughout task performance (Lavie, 2005).

Because of this potential limitation in traditional business training programs, modern development practice is starting to adopt new approaches to business training, limiting the effortful attention required from entrepreneurs by using techniques rooted in behavioral science. Drexler et al. (2014), for example, report on an intervention in the Dominican Republic that explored the use of a simplified training based on rules of thumb, finding that it was significantly more effective at improving business practices (e.g., keeping accounting records, separating business and personal accounts) than a standard training program. Notably, the authors found significantly better performance from the rules of thumb training on an index of revenue measures and on sales during bad business weeks.

Another potential limitation of traditional business training is that they are designed as one-size-fits-all programs. That is, it is often assumed that the problems and limitations faced by entrepreneurs in different countries and sectors can be addressed by the same topics and methodologies. Recent empirical evidence, however, suggests a need to revise these assumptions. Cole and Fernando (2016), for example, find that demand-oriented information provided to entrepreneurs via mobile phones increases productivity more than a one-off provision of supply-driven information. Arráiz et al. (2013) find that businesses that receive tailored services from consulting firms to strengthen their management practices and improve

[9] Blattman and Ralston, 2015.

their capabilities increase their sales, employ more workers, and pay higher salaries compared to similar firms that did not receive the services. Bloom et al. (2013) find that firms in the Indian textile industry that receive extensive management consulting increase productivity and growth, an effect driven by improvements in quality, efficiency, and inventory management. Finally, Bruhn et al. (2018) show the positive impacts of access to one year of management consulting services on total factor productivity, return on assets, employment, and salaries for small and medium enterprises in Mexico.

Campos et al. (2017), meanwhile, report on an intervention that focuses more on the personality and attitude of an entrepreneur than on specific skills. Specifically, the authors study a training program in Togo that draws on elements of personal initiative (self-starting, proactive and persistent behavior) and action regulatory theory from psychology, in an effort to teach entrepreneurs to develop a proactive mindset. The authors find positive and significant effects on several intermediate outcomes relative to a traditional training, such as business practices, personal initiative behavior, a capital and labor inputs index, an innovation index, the diversity of the product line, and an access to finance index. Furthermore, the authors find that these various improvements led to higher sales and profits.

While the interventions in these studies provide services to meet the specific needs of entrepreneurs, many of them are quite costly. Notably, there is evidence to suggest that micro and small entrepreneurs would be unwilling to pay these costs, despite the benefits. Cole and Fernando (2016) argue that even though the service they study is economical—it costs US$7 for a 9-month subscription—farmers in a series of willingness to pay experiments reveal they would pay only about US$2 for the service.

Overall, while the initial results on the use of training techniques that incorporate behavioral science and tailor-made content are promising, greater evidence is needed regarding their impact on business outcomes. In this paper, we make three broad contributions to work in this domain. First, we provide evidence on the effectiveness of business training programs based on simple and digestible rules of thumb, building on prior work by Drexler, et al. (2014). Importantly, we find positive impacts not only on knowledge and practice, but also on outcomes for entrepreneurs. Second, we provide evidence regarding the underlying mechanisms through which the training affects business outcomes. Specifically, we find that the heuristic training encourages more efficient inventory tracking and improved product selection in particular. Furthermore, using individual-level behavioral measures, we are able to offer insights about how cognitive load influences the efficacy of the heuristic approach. Third, because our sample is more gender-balanced than Drexler, et al. (2014), we are able to explore the important role of gender in this context.

3 Intervention

In 2015, the Inter-American Development Bank's IDB Lab partnered with Banco Pichincha, the largest financial institution in Ecuador, to design and test two types of business training programs for small business owners: a traditional training program and a new training program focusing on easily-digestible, rule of thumb-style business practices, which we will call "heuristic training." The IDB Lab contracted GRID Impact to develop the heuristic training, in consultation with Banco Pichincha and IDB Lab staff.[10] Fundación CRISFE developed

[10]GRID Impact is a consulting firm that uses behavioral science and human-centered design to generate solutions for social challenges.

the traditional training, based on its more than 20 years of experience providing financial and entrepreneurship training programs.[11] Banco Pichincha oversaw the implementation of both trainings. The intervention targeted a sample of 2,408 entrepreneurs in the provinces of Pichincha and Guayas, where the two largest cities in Ecuador, Quito and Guayaquil, are located.[12] These entrepreneurs also served as "non-bank correspondents", contracted by Banco Pichincha to process financial transactions for its clients.

3.1 Traditional Training

The content and design of the traditional training was very similar to that used in typical business training programs.[13] The training covered financial management and accounting concepts and was framed around three modules, namely:

- "Organization and Financial Planning," which covered: how to keep records of business revenues and expenses, personal or family consumption of inventory, and inflows and outflows in bank accounts; weekly and monthly consolidation of revenues and expenses; inventory management; and business and family budget preparation, which involved setting priorities in budgets.
- "Credit," which covered: how to evaluate the need for credit for investment and the ability to pay for it; how to keep records of accounts receivable and accounts payable; how to set payment plans; how to avoid over-indebtedness; and how to get out of debt.
- "Saving and Financial Goals," which covered: how to set financial goals and plan investments for business growth; the importance of having liquidity and savings to cover contingencies and unforeseen expenses; and how to set savings plans and goals based on revenues and expenses.

The delivery of the traditional training took advantage of the existing organizational structure of Banco Pichincha. Specifically, it was integrated into the regular, in-person field visits by bank officers to the entrepreneurs. Thus, bank officers were trained by CRISFE to deliver the training program, which they did during their regular visits.

Entrepreneurs were visited by bank officers two times per month and each visit lasted between 15 and 30 minutes. The length of the training varied across entrepreneurs because of variance in the individual situations of each entrepreneur (e.g., how long it took to cover the material, existing knowledge of the topic, etc.). The training material included a flip chart with the content of each module, concepts, and some examples to show how to register revenues, track expenses, prepare budgets, etc. This material was presented by bank officers every other week and discussed with entrepreneurs.

[11] Fundación CRISFE is a non-profit organization, which receives funding from various institutions including Banco Pichincha. One of its main areas of work is financial and entrepreneurship education.

[12] In Ecuador all financial institutions are required by law to develop and implement financial education programs for their clients and the public in general. Resolution JB-2013-2393, issued in January 2013 by the Ecuadorian Superintendency of Banks and Insurance, establishes requirements for these programs, regarding key principles, content, material, target audience, and other aspects. The nature of the programs varies for each financial institution.

[13] For examples of standard business training programs, see McKenzie and Woodruff (2014).

3.2 Heuristic Training

The design of the heuristic training was informed by recent research on the effectiveness of using simple, actionable heuristics or rules of thumb when developing business training programs (Drexler et al., 2014). Behavioral research suggests that heuristics can play a key role in decision-making when environmental uncertainty and complexity make optimal decision-making difficult. Specifically, heuristics can help a decision-maker approximate the appropriate decision quickly (Busenitz and Barney, 1997; Gigerenzer and Gaissmaier, 2011). Furthermore, recent research suggests that simple information is easier to absorb and recall (Kahneman, 2011; Schoar and Datta, 2014), and that excessive information might affect people's ability to absorb key messages (Bhargava and Manoli, 2015; Persson, 2018). Moreover, research in behavioral science has shown that simplifying procedures can have large impacts in settings as varied as tax form completion (Service et al., 2014), retirement savings plan enrollment (Beshears et al., 2013), weight loss (Mata at al., 2010), and university loan applications (Bettinger et al., 2012).

In order to develop the heuristic training, the consulting firm identified best practices in the field through interviews following a positive deviance approach. The firm conducted semi-structured, in-depth interviews with three groups of entrepreneurs, as classified by our partner bank: 1) good clients with well-managed businesses; 2) problem clients with less well-managed businesses; and 3) non-clients or former clients. Based on the interviews, the consulting firm identified the behaviors likely to explain entrepreneurs' success—such as paying themselves a salary (instead of taking money from their businesses) or registering their business profits. The firm then compared these entrepreneurs' behaviors to the behaviors of their less successful peers to validate the selection of best practices. The consulting firm also conducted interviews with the staff of Banco Pichincha and other key stakeholders to better understand the context in which the entrepreneurs operated.

The heuristic training was framed around four broad rules of thumb categories, namely:

- "Set Up," which sought to create an organized system for managing cash flow and regular expenses in the business. It covered different rules of thumb, including using a cash box to separate money into categories, starting every day with the same amount in the cash box, and replenishing the cash box daily.
- "Sell and Tally," which focused on calculating profits each day and managing short and long-term cash flow in a simple and accurate way. The rules of thumb encouraged here were creating rules for tallying business profits and losses daily by calculating the amount of money in the cash register at the start and end of the day, and tallying business profits and losses weekly and/or monthly. They also included separating business from personal money, creating a system for paying oneself and employees a regular salary, and replacing only stock that has been sold.
- "Pay Out," which sought to create rules for allowing customers to use credit and creating a system for paying down debt regularly.
- "Save Up," which sought to create a system for setting aside regular savings. The rules of thumb here included setting aside a daily amount for emergencies (at least US$1), and creating a personal savings goal and a separate place to save for that goal.

It is important to emphasize that the heuristic training differed from the traditional training in both content and methods, though both approaches covered similar topics. Unlike the

traditional training, the heuristic training was classroom-based, and structured as one four-hour session. The number of entrepreneurs in a given session was capped at 25, to ensure effective participation of attendees. A total of 33 sessions were conducted across the two provinces. The day and time of the sessions were determined according to the entrepreneurs' schedules, with midweek and later in the day more popular (as this was when business volume was generally lower). The locations for the trainings were chosen to minimize the travel time for the invited entrepreneurs. In addition, Banco Pichincha provided free taxi rides to and from the training to decrease the hassle cost of participating.

The pedagogical instruments, unique to the heuristic training, included "ice-breaker" exercises to help participants introduce themselves to one another, presentations and discussions of each of the four categories of rules of thumb described above, individual and small group exercises related to each of the four categories, and open group discussions.[14] In addition, during and at the end of the training, materials were provided to help entrepreneurs implement the rules of thumb (including cash boxes, financial journals, rules of thumb summary sheets, and expenses calendars).[15] Entrepreneurs were also awarded a certificate for successfully completing the training at the end of the workshop.

The training workshop for potential facilitators of the heuristic training was carried out in August 2015. Upon completion of the workshop, the potential facilitators were evaluated and the best performers were selected to actually run the heuristic trainings. In total, 11 out of 19 potential facilitators were selected to implement the training. Additionally, in October 2015, just before the heuristic trainings started, the selected facilitators participated in another workshop designed to reinforce the content of the heuristic training, conduct practice mock-up sessions, and provide feedback to facilitators. The facilitators also received a "facilitator's guide," which included a full description of the content of each of the four rule of thumb categories, as well as examples and exercises to use during the sessions.

In addition to providing training on the four rule of thumb categories, the intervention included a second stage aimed at encouraging their adoption. This was based on research in psychology and economics, which has shown that there can be significant gaps between individuals' intentions and their actions. In order to bridge that gap and change people's behavior, different types of interventions ranging from plan-making prompts (Milkman et al., 2011; Abel et al., 2017) to providing information on social norms (Allcott, 2011), to commitment devices (Rogers et al., 2014) have been shown to be effective.

In our case, we asked entrepreneurs to participate in a voluntary "30-Day Challenge" as a form of behavioral motivation. Entrepreneurs in the heuristic training were informed about the voluntary challenge during the training, and were told about the associated rewards, detailed below. They were also informed that bank officers would track their adoption of

[14]For instance, during the presentation of the first rule of thumb category, "Set Up," in order to practice "separating money" the facilitator passed out cash boxes and play money to participants. Participants were asked to name the compartments of their cash boxes (e.g., "transactions," "profits from yesterday," "savings," etc.) and divide money into each section, leaving some to complete transactions. Then, the facilitator proposed some pedagogical scenarios to the group to practice. For example, "Pretend you just made a sale and you need to make change. Where would you put the money? Where would you make change?".

[15]The financial journal provided guidance and served as a training resource for entrepreneurs. It contained a section that allowed entrepreneurs to track and measure the following on a monthly basis: business expenses, inventory, and profit and loss reconciliation. It also included examples of how to fill in the financial journal and other helpful resources (e.g., summary of the rules of thumb, examples of credit rules and savings plans, tips, etc).

the rules of thumb if they opted into the challenge.[16] The purpose of the challenge was to encourage participants to put into practice the rules of thumb at their businesses, for at least 30 days. Our hope was that by repeating the processes they had learned, we could convert the training content into a set of long-lasting good habits. For example, recent research suggests that incentives can shape behavior, like gym attendance or handwashing, but more importantly that incentivizing repeated behavior can produce habit formation post-intervention (Charness and Gneezy, 2009; Acland and Levy, 2015; Hussam, et al., 2017).

During the challenge, bank officers kept track of entrepreneurs' progress during their regular field visits, while also reinforcing the rules of thumb that entrepreneurs had learned.[17] We also offered rewards for task completion. Specifically, if entrepreneurs completed at least half of the tasks associated with a given rule of thumb category, they were awarded a completion sticker in their financial journal (up to four stickers, one for each rule of thumb category). Furthermore, if at least two of the four rules of thumb categories were successfully completed in 30 days, entrepreneurs were awarded a Star Certification decal and entered into a drawing to win a cash register, the prize they selected as most attractive. This design was motivated by Barasz et al. (2017), who show that grouping tasks or items together as part of a set (pseudo-set framing) motivates people to complete sets that appear incomplete—even though, in their case, it entails more effort without additional rewards.

In total, 91.4 percent of entrepreneurs who attended the heuristic training participated in the "30-Day Challenge," and 91.6 percent of those who participated in the "30-Day Challenge" received the Star Certification decal and participated in the lottery for the prize. Before the drawing of the lottery, we conducted an external audit on a random sample of entrepreneurs to verify the fulfillment of the challenge's conditions.

4 Experimental Design

Our intervention targeted a sample of 2,408 micro and small entrepreneurs who run businesses in a variety of sectors in Ecuador, including small retail stores, bakeries, barbershops, fruit stores, hardware stores, and cybercafés. In addition to their primary business, these entrepreneurs serve as "non-bank correspondents" for the largest financial institution in Ecuador. A non-bank correspondent is a retail outlet contracted by a financial institution to act as a distribution channel and process the financial transactions of the bank's clients (in much the same way that convenience stores in the US offer ATM services for partner banks). The 2,408 entrepreneurs were randomly selected for inclusion in this experiment from the 4,580 non-bank correspondents that operated in the provinces of Guayas and Pichincha in August 2015.[18] The full population of 4,580 non-bank correspondents that operated in

[16] Entrepreneurs who decided to participate in the "30-Day Challenge" were asked to pledge their commitment to follow the rules of thumb in the financial journals, which they received as part of the training material distributed by the bank.

[17] Bank officers were trained on the rules of thumb, and also on field visit procedures, to understand how to measure, reward, and reinforce each rule of thumb during their visits. Bank officers were asked to verify what was completed with physical evidence; for example, noting if the cash box was actually in use, the financial journal was actually in use, etc. Officers then tracked what exactly was and was not completed. Generally, bank officers visited entrepreneurs every other week. Thus, during the 30-day challenge, bank officers generally made at least two visits to each entrepreneur.

[18] The full sample was stratified based on province, the bank officer assigned to the entrepreneurs, and the classification assigned by the financial institution to the entrepreneurs based on the number of financial transactions completed for the bank's clients per month. This was done to ensure a representative sample.

the provinces of Guayas and Pichincha were already working with one of 35 bank officers who visited entrepreneurs every other week (each bank officer was assigned to an average of 123 entrepreneurs). The visits were intended to deliver bank-related materials, discuss any issues related to the non-bank correspondence part of the business, and provide support and maintenance for the bank's point-of-sale. Entrepreneurs only interact with their one assigned bank officer.

Prior to the intervention, each business owner (or manager, in case the owner was not the primary decision-maker) who agreed to participate in the study was given a face-to-face, comprehensive baseline questionnaire about business characteristics, business practices, business operational results, and access to finance. In addition, the questionnaire collected information about the business owner's characteristics, personality traits, household composition, and use of time. The baseline survey was conducted between August and October 2015 and the trainings started implementation in November 2015. An endline survey was then conducted between November and December 2016 after the intervention was complete. Both surveys were conducted by a professional survey firm unaffiliated with the financial institution.

The 2,408 entrepreneurs were randomly assigned to three different groups: 803 were assigned to the traditional training (12 bank officers), 801 were assigned to the heuristic training (11 bank officers), and 804 were assigned to the control group (12 bank officers). Treatment was assigned at the bank officer level, since bank officers were part of the delivery of the training for both the traditional and the heuristic training and we wanted to avoid contamination between groups. We used administrative data available at the time of the assignment to stratify the sample according to the following variables: 1) province; and 2) a measure related to the number of financial transactions a given correspondent completed for the bank's clients per month (using the classification assigned by the financial institution to the entrepreneurs). Baseline survey data was not available at the time of the group assignment.

4.1 Data and Baseline Characteristics

Table 1 shows descriptive statistics for the full sample and the three experimental conditions using baseline data, as well as the mean differences between the three assignment groups. As a randomization check, we test for joint orthogonality and cannot reject the null hypothesis that the observable characteristics of the entrepreneurs and their businesses measured at baseline are similar across the randomly-assigned groups. Specifically, the p-values from the pairwise joint orthogonality tests are as follows: p=0.943 when comparing the control to the traditional training; p=0.259 when comparing the control to the heuristic training; p=0.470 when comparing the traditional training to the heuristic training; p=0.744 when comparing the three groups simultaneously. However, we do find some significant differences across some of the 20 baseline characteristics (which is not surprising given the large number of characteristics measured). Specifically, entrepreneurs assigned to the heuristic training have higher sales and larger profits, compared to the control and the traditional training groups, and are less likely to operate in the manufacturing sector compared to the control group. Meanwhile, entrepreneurs assigned to the traditional training spent 20 minutes more per day working in their businesses than entrepreneurs in the control group.

The average entrepreneur in our sample is 39.7 years old, with 12.4 years of schooling and 3.8 years of experience in the sector before starting the business. Entrepreneurs in the sample have on average 2.1 children and 68.4 percent of the entrepreneurs are female. Overall, 78.5 percent of entrepreneurs started their own business, and 29.7 percent are op-

portunity entrepreneurs (as opposed to necessity entrepreneurs). Furthermore, 80.7 percent of entrepreneurs indicated a desire to grow their businesses, and report working on their businesses for an average of 12.4 hours per day.

The businesses in the sample are on average 9.4 years old, with an average of 0.5 employees in addition to the business decision maker. Most businesses operate in the retail trade sector (71.1 percent), and the average capital invested in the business is about US$11,500. On a regular day, the businesses in the sample serve on average 63.7 clients, with average sales of US$212 and profits of US$44 on a regular business day.

5 Empirical Strategy

The random assignment to treatments allows us to calculate unbiased estimates of the effect of being offered the training programs (intention to treat, ITT) on different variables of interest. Using equation (1), the parameters β give us estimates of the programs' average effect on outcome y.

$$y_i^e = \alpha + \beta_1 T_i + \beta_2 H_i + \gamma y_i^b + \sum \theta_s 1(i \in s) + \varepsilon_i \tag{1}$$

where y_i^e is the value of the outcome variable of interest measured at endline for entrepreneur i; T_i and H_i are indicators for being assigned to the traditional training program or the heuristic training program, respectively; y_i^b is the value of the outcome variable of interest measured at baseline and included when available; and θ_s are strata dummies, following Bruhn and McKenzie (2009). The variables used for stratification are a dummy for the province where the business operates and dummies for the classification assigned by the financial institution to the entrepreneur i depending on the number of financial transactions completed for the bank per month, a proxy for sales—for a total of eight stratum. We use a similar specification—a linear probability model—for binary outcomes. Standard errors are clustered at the bank officer level (see Abadie, Athey, Imbens, and Wooldridge, 2017).

We also estimate the impact of the treatment on the treated (ToT) using equation (2).

$$y_i^e = \alpha + \beta_1 AttendedT_i + \beta_2 AttendedH_i + \gamma y_i^b + \sum \theta_s 1(i \in s) + \varepsilon_i \tag{2}$$

where $AttendedT_i$ and $AttendedH_i$ indicate if entrepreneur i attended the traditional or the heuristic training program, respectively. We use the random assignment to the treatments, T_i and H_i, as instruments for attendance since attendance is endogenous. While entrepreneurs assigned to the heuristic training program had to physically mobilize to a training location, entrepreneurs assigned to the traditional training received the training in their business location. The participation rate for entrepreneurs assigned to the heuristic training was 53.9 percent, while the participation rate for entrepreneurs assigned to the traditional training was 73.9 percent.

We estimate the impact of the training programs on 20 outcome variables related to the adoption of best practices taught during both trainings as well as the impact on sales, profits, and number of clients served. Sales and profits, as well as number of clients served, are grouped in three different indexes that contain values for these variables for bad, regular, and good days. The adoption of best practices is grouped in four categories related to the organization of the business (corresponding to "set-up" in the heuristic training but without a correspondence in the traditional training), record keeping (corresponding to "sell and tally"

Table 1: Summary statistics based on baseline survey data

	Full Sample	Control (1)	Traditional (2)	Heuristics (3)	Diff. (1)-(2)	Diff. (1)-(3)	Diff. (2)-(3)
Female	0.684	0.697	0.674	0.680	0.023	0.016	0.007
	(0.465)	(0.460)	(0.469)	(0.467)	[0.326]	[0.486]	[0.775]
Age	39.661	39.640	39.969	39.373	-0.329	0.266	-0.596
	(10.950)	(10.800)	(11.020)	(11.040)	[0.546]	[0.625]	[0.280]
Years of schooling	12.413	12.431	12.329	12.481	0.102	-0.050	0.152
	(3.501)	(3.327)	(3.523)	(3.648)	[0.551]	[0.775]	[0.396]
Number of children	2.074	2.116	2.077	2.027	0.038	0.088	-0.050
	(1.362)	(1.349)	(1.353)	(1.384)	[0.568]	[0.196]	[0.467]
Year of experience in sector	3.779	3.898	3.763	3.674	0.135	0.224	-0.089
	(5.955)	(6.084)	(6.022)	(5.759)	[0.655]	[0.449]	[0.763]
Started their own business	0.785	0.791	0.791	0.774	0.000	0.017	-0.017
	(0.411)	(0.407)	(0.407)	(0.418)	[0.990]	[0.409]	[0.417]
Age of business	9.402	9.275	9.544	9.387	-0.270	-0.112	-0.158
	(8.217)	(8.237)	(8.370)	(8.048)	[0.516]	[0.784]	[0.701]
Daily hours worked in business	12.395	12.244	12.586	12.354	-0.342	-0.110	-0.232
	(3.822)	(3.615)	(4.371)	(3.408)	[0.087]	[0.531]	[0.236]
Opportunity entrepreneur	0.297	0.297	0.303	0.290	-0.005	0.008	-0.013
	(0.457)	(0.457)	(0.460)	(0.454)	[0.815]	[0.737]	[0.570]
Number of employees	0.458	0.435	0.446	0.492	-0.011	-0.057	0.046
	(1.194)	(1.150)	(1.146)	(1.282)	[0.854]	[0.352]	[0.448]
% who wants to grow business	0.807	0.807	0.801	0.814	0.006	-0.007	0.013
	(0.394)	(0.395)	(0.400)	(0.389)	[0.744]	[0.730]	[0.502]
Best practices (standardized)†	0.000	-0.010	-0.002	0.012	-0.008	-0.023	0.014
	(1.000)	(1.011)	(1.002)	(0.989)	[0.867]	[0.650]	[0.774]
Manufacturing	0.033	0.041	0.034	0.024	0.007	0.017	-0.010
	(0.178)	(0.199)	(0.180)	(0.152)	[0.433]	[0.050]	[0.235]
Wholesale trade	0.021	0.017	0.024	0.022	-0.006	-0.005	-0.001
	(0.144)	(0.131)	(0.152)	(0.148)	[0.378]	[0.469]	[0.874]
Retail trade	0.711	0.703	0.700	0.732	0.003	-0.029	0.032
	(0.453)	(0.457)	(0.459)	(0.443)	[0.900]	[0.200]	[0.159]
Services	0.235	0.239	0.243	0.222	-0.004	0.017	-0.021
	(0.424)	(0.427)	(0.429)	(0.416)	[0.850]	[0.431]	[0.329]
Sales on a regular day (log)	4.896	4.839	4.854	4.997	-0.015	-0.158	0.143
	(0.972)	(0.963)	(0.975)	(0.971)	[0.761]	[0.001]	[0.003]
Profits on a regular day (log)	3.434	3.375	3.411	3.515	-0.036	-0.140	0.104
	(0.877)	(0.891)	(0.870)	(0.863)	[0.414]	[0.002]	[0.017]
# of clients served on a regular day	63.651	61.714	63.194	66.055	-1.479	-4.341	2.861
	(66.800)	(67.220)	(65.570)	(67.610)	[0.656]	[0.198]	[0.391]
Capital invested in business (log)	8.548	8.521	8.525	8.598	-0.005	-0.077	0.072
	(1.398)	(1.495)	(1.369)	(1.327)	[0.951]	[0.288]	[0.293]
Number of observations	2408	804	803	801	1607	1605	1604
Joint orthogonality test (p-value)			—0.744—		0.943	0.259	0.470

Standard deviation of variables appear in parenthesis. p-value of t-test for difference in means appear in brackets. (†) Aggregate business practice is a normalized z-score composite of all reported business practices.

in the heuristic training and "organization and financial planning" in the traditional training), credit (corresponding to "pay out" in the heuristic training and "credit" in the traditional training), and savings (corresponding to "save up" in the heuristic training and "saving and financial goals" in the traditional training). Instead of testing the multiple outcomes independently, we follow Kling, Liebman and Katz (2007) and Karlan and Valdivia (2011) and construct index measures for these families of business practices, sales, profits, and number of clients served—to avoid rejecting, by chance, the null hypothesis of no effect due to the large number of outcome variables. We also rescale each of the outcome variables, such that higher values are associated with practices that improve the performance of the business, and standardize each measure using the control group mean and standard deviation following Campos et al. (2017).

We test for heterogeneous treatment effects with respect to gender and a measure of working memory, which is correlated with the ability to control attention to maintain or suppress information. Specifically, we re-estimate equations 1 and 2 restricting the sample to women (1,646 observations) and men (762 observations), and entrepreneurs with short-memory test results below (1,339 observations) and above (1,069 observations) the mean.

6 Results

Our hypothesis was that a training based on heuristics would be more impactful than a traditional training because it demands less cognitive bandwidth. We tested this hypothesis by evaluating the intention to treat (ITT) and treatment on the treated (TOT) impacts of randomly being assigned to each training program. We were able to contact and interview 87 percent of the participants for the endline—although the incidence of business exit is 7.7 percent of the businesses that were interviewed at baseline, a fraction of the contacted businesses declined to be interviewed. As shown in Table 2, the differences in attrition rates as well as the business exit rates among the groups are not statistically different from zero. We also consider the non-bank correspondent exit rate, the percentage of participants that are no longer non-bank correspondents with our partner bank at endline, since a decline in clients' traffic could negatively affect sales and confound the effect of the program. Of the businesses contacted and interviewed at endline, 30.2 percent were no longer non-bank correspondents with our partner bank. Moreover, the differences in non-bank correspondent exit rates among the groups (heuristics, traditional and control) are not statistically different from zero.

Table 3 shows the impact of the training programs on sales, profit, and number of client indexes.[19] Columns 3 and 4 show the effect of being offered the training programs (ITT) while columns 6 and 7 show the effect of attending the training (TOT). Columns 5 and 8 show the p-value for the F-test of the equality of the coefficients for traditional and heuristics effect for the ITT and TOT, respectively. The heuristic training has an impact on sales for the group of entrepreneurs that was invited to the training (ITT), an increase of 0.0616 standard deviations with respect to the control group (equivalent to an increase in sales of 7.3 percent); as well as an impact on sales for the group of entrepreneurs that attended the training (TOT), an increase of 0.1064 standard deviations with respect to the control group (equivalent to an increase in sales of 12.5 percent). It also has an impact on profits for the group of entrepreneurs that was invited to the training (ITT), an increase of 0.0801

[19] We also estimate the impact of the training programs on expenses but we do not find statistically significant differences with respect to the control group.

Table 2: Attrition Rates

	Obs	Control	ITT Traditional	ITT Heuristics	p-value
	(1)	(2)	(3)	(4)	(5)
Attrition	2408	0.123	0.016	0.004	0.462
			(0.016)	(0.015)	
Business exit	2344	0.070	0.015	0.008	0.510
			(0.012)	(0.012)	
Non-bank correspondence exit	2097	0.309	-0.003	-0.012	0.532
			(0.018)	(0.015)	

Coefficients reported in columns (3) and (4) come from regressions of the form described in equation (1). Robust standard errors clustered at the bank officer level in parentheses. * Denotes significance at the 10%-level, ** at the 5%-level, and *** at the 1%-level. p-values for F-test of equality of coefficients in (3-4) for traditional and heuristics effects in (5). Regressions include randomization strata.

Table 3: Sales, profits, and number of clients indexes

	Obs	Control Mean	ITT Traditional	ITT Heuristics	p-value (3)-(4)	TOT Traditional	TOT Heuristics	p-value (6)-(7)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Sales index	2033	0.0000	0.0339	0.0616 *	0.4395	0.0489	0.1064 **	0.2939
			(0.0371)	(0.0309)		(0.0535)	(0.0527)	
Profit index	1943	0.0000	0.0073	0.0801 *	0.1089	0.0107	0.1375 *	0.0667
			(0.0503)	(0.0434)		(0.0721)	(0.0747)	
No. clients index	2092	0.0000	0.0648	-0.0010	0.3527	0.0929	-0.0016	0.3688
			(0.0701)	(0.0513)		(0.0988)	(0.0880)	

Coefficients reported in columns (3-4) and (6-7) come from regressions of the form described in equations (1-2). Robust standard errors clustered at the bank officer level in parentheses. * Denotes significance at the 10%-level, ** at the 5%-level, and *** at the 1%-level. p-values for F-test of equality of coefficients for traditional and heuristics effects in (5) for ITT and (8) for TOT. Regressions include randomization strata.

standard deviations with respect to the control group (equivalent to an increase in profits of 8.2 percent); and an impact on profits for the group of entrepreneurs that attended the training (TOT), an increase of 0.1375 standard deviations (equivalent to an increase in profits of 14.1 percent). The heuristic training has no impact on the number of clients served by the businesses—which is not surprising since the training did not address how the entrepreneurs could proactively attract more customers. Meanwhile, the impact of the traditional training on the sales, profit, and number of clients indexes with respect to the control group are not statistically distinguishable from zero.

In the Appendix (see table A1) we show that these impacts on sales and profits are not due to changes in reporting quality, since the trainings do not have any impact on reporting errors for sales or profits, or on the raw (and absolute) difference between profits based on reported sales and expenses and self-reported profits.

Additional detail on the impact of the training programs on the sales and profit indexes shown in Table 3 are unpacked in Table 4. The results show that the heuristic training has positive and statistically significant impacts on sales and profits (in logs) on regular and good

Table 4: Sales and profits (in logs)

	Obs	Control Mean	ITT Traditional	ITT Heuristics	p-value (3)-(4)	TOT Traditional	TOT Heuristics	p-value (6)-(7)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Sales on bad day	2032	4.044	0.0410	0.0486	0.880	0.0592	0.0839	0.748
			(0.0512)	(0.0454)		(0.0736)	(0.0765)	
Sales on regular day	2033	4.731	0.0349	0.0710 **	0.347	0.0504	0.1227 **	0.224
			(0.0380)	(0.0310)		(0.0548)	(0.0540)	
Sales on good day	2032	5.134	0.0305	0.0801 ***	0.097	0.0440	0.1382 ***	0.042
			(0.0315)	(0.0293)		(0.0452)	(0.0506)	
Profits on bad day	1941	2.820	0.0040	0.0549	0.297	0.0059	0.0942	0.239
			(0.0514)	(0.0451)		(0.0736)	(0.0777)	
Profits on regular day	1943	3.484	0.0115	0.0783 **	0.091	0.0169	0.1345 **	0.051
			(0.0426)	(0.0362)		(0.0612)	(0.0627)	
Profits on good day	1941	3.933	0.0062	0.0953 **	0.033	0.0092	0.1636 **	0.014
			(0.0456)	(0.0413)		(0.0652)	(0.0704)	

Coefficients reported in columns (3-4) and (6-7) come from regressions of the form described in equations (1-2). Robust standard errors clustered at the bank officer level in parentheses. * Denotes significance at the 10%-level, ** at the 5%-level, and *** at the 1%-level. p-values for F-test of equality of coefficients for traditional and heuristics effects in (5) for ITT and (8) for TOT. Regressions include randomization strata.

days, but not on bad days.[20] The impact of the traditional training on sales and profits (in logs) on bad, regular, or good days are all statistically indistinguishable from zero. In addition, the impacts of each training program on the number of clients served on bad, regular, and good days are not statistically different from zero, and are not shown in the table.

To examine the channels through which the training programs influenced entrepreneurs, we explore the impact of each program on the adoption of best practices in Table 5. The results show large and positive impacts on the adoption of best practices for the heuristic training, but smaller and statistically insignificant impacts for the traditional training. This is true for both the ITT and TOT estimates. The ITT effect sizes for the heuristic training on best practices range from 0.0759 standard deviations for practices associated with savings to 0.2542 standard deviations for practices associated with record keeping. Likewise, the TOT effect sizes for the heuristic training range from 0.1326 standard deviations for practices associated with savings to 0.4447 standard deviations for practices associated with record keeping.

The results thus far do not reveal what exactly about the trainings (and the heuristic training in particular) increase sales and profits. Both training programs cover material that teaches entrepreneurs to better understand their businesses and make decisions based on that new knowledge. While most of this material could have indirect impacts on sales and profits, through better management of the business, there is one practice that can have a direct impact on sales and potentially profits: inventory control and management. Specifically, by stocking the right amount and type of inventory, entrepreneurs can free funds previously tied to products that are obsolete or that have low turnover, while boosting sales and profitability. Therefore, we explore treatment effects on inventory control and management in Table 6.

The results from Table 6 indicate that the heuristic training has positive and statistically

[20] We explicitly ask entrepreneurs to report sales during bad, regular, and good periods.

Table 5: Adoption of Best Practices

	Obs	Control Mean	ITT Traditional	ITT Heuristics	p-value (3)-(4)	TOT Traditional	TOT Heuristics	p-value (6)-(7)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
BP: All†	2099	0.000	0.0645	0.2080 ***	0.031	0.0929	0.3638 ***	0.007
			(0.0647)	(0.0442)		(0.0918)	(0.0825)	
BP: Organization	2098	0.000	0.0522	0.1882 ***	0.075	0.0752	0.3292 ***	0.023
			(0.0702)	(0.0559)		(0.0989)	(0.0948)	
BP: Rec. keeping	2099	0.000	0.0996	0.2542 ***	0.031	0.1434	0.4447 ***	0.006
			(0.0695)	(0.0466)		(0.0988)	(0.0877)	
BP: Credit	2099	0.000	0.0421	0.1360 ***	0.123	0.0607	0.2379 ***	0.063
			(0.0503)	(0.0464)		(0.0713)	(0.0829)	
BP: Savings	2098	0.000	-0.0034	0.0759 *	0.154	-0.0048	0.1326 *	0.098
			(0.0588)	(0.0446)		(0.0830)	(0.0781)	

Coefficients reported in columns (3-4) and (6-7) come from regressions of the form described in equations (1) and (2), respectively. Robust standard errors clustered at the bank officer level in parentheses. * Denotes significance at the 10%-level, ** at the 5%-level, and *** at the 1%-level. p-values for F-test of equality of coefficients for traditional and heuristics effects in (5) for ITT and (8) for TOT. Regressions include randomization strata. (†) Includes all best practices common to the two trainings (excludes best practices associated to "Organization").

Table 6: Inventory control and management

	Obs	Control Mean	ITT Traditional	ITT Heuristics	p-value (3)-(4)	TOT Traditional	TOT Heuristics	p-value (6)-(7)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Tracks inventory	2099	0.911	0.0172	0.0369 **	0.341	0.0248	0.0645 **	0.189
			(0.0204)	(0.0176)		(0.0287)	(0.0292)	
Buys inv. that sells	2099	0.374	-0.0108	0.0610 **	0.013	-0.0154	0.1066 **	0.006
			(0.0220)	(0.0251)		(0.0309)	(0.0437)	
Expenditure in inv.	2065	130.79	-5.6131	9.4875	0.033	-8.0865	16.3669	0.023
			(6.9463)	(6.0983)		(9.7947)	(10.7363)	
Loses sales (no inv.)	2099	0.531	0.0060	0.0018	0.917	0.0087	0.0032	0.929
			(0.0401)	(0.0342)		(0.0567)	(0.0590)	

Coefficients reported in columns (3-4) and (6-7) come from regressions of the form described in equations (1-2). Robust standard errors clustered at the bank officer level in parentheses. * Denotes significance at the 10%-level, ** at the 5%-level, and *** at the 1%-level. p-values for F-test of equality of coefficients for traditional and heuristics effects in (5) for ITT and (8) for TOT. Regressions include randomization strata.

significant impacts on measures related to inventory control and management, relative to the control. Specifically, entrepreneurs in the heuristic training group are more likely to report tracking their inventory and buying products that sell better (rather than products promoted by the supplier, products bought for stock variety, etc.). Notably, the heuristic training does not seem to have encouraged significantly greater expenditure by entrepreneurs—the estimate on expenditure on investment is positive but not statistically different from zero. This suggests that the heuristic training encourages a shift in the way entrepreneurs buy inventory and how they manage it, which helps them optimize inventory selection. Entrepreneurs in the heuristic training group, however, still report losing sales because of lack of inventory in the same proportion as the other groups (although we do not know if the unsatisfied demand comes

from low versus high turnover products). Meanwhile, the impact of the traditional training on all of these inventory control and management variables are statistically indistinguishable from zero.

6.1 Gender Differences

We also examine whether the heuristic training and the traditional training have heterogeneous treatment effects for male versus female entrepreneurs (Tables A4, A5, and A6). Columns 1 and 2 in Table A4 show the effect of being offered the training program (ITT) whereas columns 3 and 4 show the effect of attending the training (TOT). The results show that the heuristic training has positive and statistically significant impacts on some of the variables for women but less so for men, while the impacts of the traditional training are not distinguishable from zero—either for men or women.

Table A5 focuses on the treatment effects of the heuristic training only, and shows that women adopted the best practices taught during that training in a larger proportion than men for the most part. Consequently, their businesses exhibited higher sales and profits than for women in the control group. Although we cannot rule out similar impacts for men and women on most measures (with the exception of best practices associated with savings), the point estimates consistently show larger effects for women than for men.

These findings might be partly explained by women doing worse at baseline, and then catching up with men. Indeed, as we show in Table 7, women had fewer years of schooling and followed fewer best business practices than men at baseline. This is consistent with the finding in Drexler et al. (2014) that the impact of the rule of thumb training is especially pronounced for microentrepreneurs with lower skills or poor initial business management practices. Table 7 also shows that women in our sample devoted significantly more time to household chores and the care of children and the elderly than men, although they devoted on average the same number of hours per day and the same number of days per week to working on their businesses as men (see Table 7). Daminger (2019) argues that non-physical household work related to household management (i.e., anticipating needs, identifying solutions, making decisions, and monitoring results)—which is not captured in the time-use data that we collected—entails heavy cognitive work mostly carried out by women. Since it does not require physical work and is often invisible, it has the potential to interfere with paid work and leisure time. Based on this, it is reasonable to conclude that women in our sample were more cognitively taxed than men, which may help explain why the heuristic training was more valuable for them than for men.

There is evidence in our data to support this interpretation of a gender gap in cognitive bandwidth. Specifically, as part of the data collection process, we carried out a demanding, short-memory test—the digit span recall test. We conducted the test during business hours to reflect the real-world conditions entrepreneurs experience on a daily basis. Table 7 shows that men recall on average a third of a digit more than female business owners—a statistically significant difference. Psychology studies indicate that these measures are correlated with high-order cognitive abilities or general intelligence (Unsworth and Engle 2007), but also that these measures are susceptible to interference and distractions (May et al. 1999; Lustig et al. 2001), including our cellphones (Ward et al. 2017) and poverty-related concerns (Mani et al. 2013). If we assume that women have the same general cognitive ability as men, that women multi-task more, and such distractions affect memory span, one would expect that women tested in real-world conditions would obtain lower scores than men (as we observe).

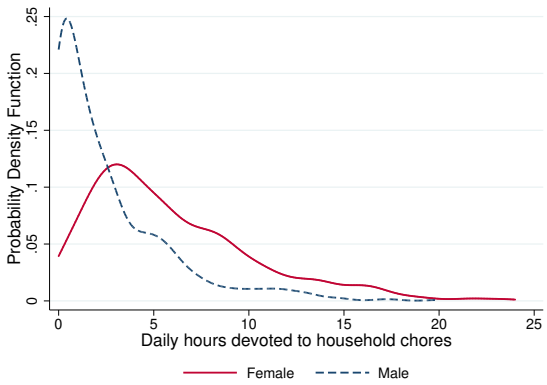
Table 7: Gender Differences at Baseline

		Mean			
	Total	Male	Female	Diff.	p-value†
Age	39.661	39.503	39.734	-0.232	0.630
Married	0.583	0.571	0.588	-0.017	0.432
Years of schooling	12.413	12.856	12.208	0.647	0.000***
Number of children	2.074	1.891	2.158	-0.267	0.000***
Daily hours devoted to household chores	2.393	1.039	3.019	-1.980	0.000***
Daily hours devoted to care (children and the elder)	2.492	1.541	2.932	-1.391	0.000***
Number of days a week the business is open	6.674	6.677	6.673	0.005	0.852
Daily hours devoted to working in the business	12.395	12.452	12.369	0.083	0.619
% who combines care, housework, and business activities	0.414	0.217	0.505	-0.288	0.000***
Best business practices (standardized)	0.000	0.163	-0.076	0.239	0.000***
Digit span recall test	6.321	6.522	6.228	0.295	0.000***

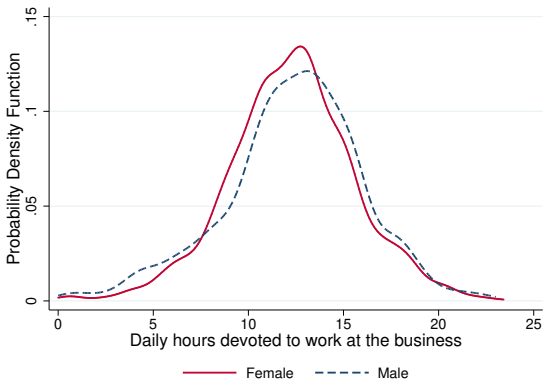
(†) t test for difference in means: *** denotes significance at 1%, ** significance at 5%, and * significance at 10%.

Figure 1: Distribution of time spent doing household chores and care activities (left) and working at their businesses (right) at baseline

(a) Household chores and care activities



(b) Business



As suggestive evidence, we conducted a regression of the number of digits recalled by the entrepreneurs on the entrepreneur's years of schooling, the ratio of children to adults in the household, and the time spent doing household chores and taking care of children and the elderly (see table A2). The results show that, as expected, the number of digits recalled is positively correlated with years of schooling, negatively correlated with the ratio of children to adults in the household (presumably because having more children places a greater cognitive strain on parents), and negatively correlated with time spent doing household and care work (presumably because the more unpaid work you do, the more cognitively taxed you are at work). We also find clear evidence of a gender gap in digits recalled, with women recalling fewer digits than men even when controlling for years of schooling.

6.2 Working Memory Test Differences

Further evidence regarding the impact of the trainings based on the digit span recall test are shown in Table A7. We find that entrepreneurs who had a low recall at baseline (the number of digits recalled was below the sample mean) benefit the most from the heuristic training. Specifically, the heuristic training has positive and statically significant impacts on some of the variables for entrepreneurs with low recall but not for entrepreneurs with high recall. Meanwhile, the estimates for the traditional training were not statistically distinguishable from zero—either for low recall or high recall entrepreneurs (though the point estimates were larger for low recall entrepreneurs).

Table A8 focuses on the treatment effects of the heuristic training only, and shows that low recall entrepreneurs were more influenced to adopt the best practices encouraged by that training than high recall entrepreneurs. Similarly, positive treatment effects from the heuristic training on sales and profits are visible for low recall entrepreneurs, but not for high recall entrepreneurs. Again, we cannot rule out similar impacts for low and high recall entrepreneurs on most measures (with the exception of best practices in general and best practices related with organization and record keeping), but the point estimates consistently show larger effects for low recall entrepreneurs.

Although we cannot draw definite conclusions here, our results do suggest that cognitively demanding activities can tax entrepreneurs and influence the effectiveness of business training. Furthermore, they suggest that simpler training, built on rules of thumb rather than excess information provision, may be an effective method of training for cognitively taxed entrepreneurs.

7 Cost-Benefit Analysis

The baseline monthly average sales for participants in the control group was US$6,022, while the monthly average profits was US$1,272 (based on data from sales and profits on regular days). Based on the results in Table 4, the average impact of the heuristic training for participants on sales on a regular day was 7.36 percent, while the average impact on profits on a regular day was 8.14 percent. Based on these numbers, the heuristic training is estimated to generate US$1,243 in extra profits per year for an average participant based on data from regular days, compared to a control of not receiving the heuristic training.[21]

The cost of implementing the heuristic training is US$78 per participant, while the cost of implementing the traditional training is US$44.[22] These costs do not include the design cost, which is higher for the heuristic training at US$193 per participant compared to US$5 per participant for the traditional training. However, note that these costs decrease significantly with larger numbers of participants in the programs. Furthermore, now that it has been created, scaling the heuristic training to other contexts would not require a design cost of similar magnitude.

Using the cost of the intervention and the data from our experiment, we estimate the

[21] These figures are US$2,505 in extra profits per year based on data from good days, and US$0 in extra profits per year based on data from bad days, since the effect on bad days is positive but not statistically different from zero (see table A3).

[22] We use implementation reports created by Banco Pichincha and approved by IDB Lab to calculate these costs. It includes the cost of spaces rented for the training, the time of the trainers, travel expenses, materials, and refreshments.

internal rate of return for the heuristic training is about 133 percent—or 37 percent if we include the design cost—assuming (conservatively) that the beneficial effects of the training disappear completely after one year. To calculate these rates, we estimate the weighted average of the extra profits per month generated by the program, assuming that 10 percent of days are bad, 80 percent of days are regular, and 10 percent of days are good, for a weighted average of extra profits per month of US$104.

8 Conclusion

We implemented a randomized experiment that provided two different business training programs for microentrepreneurs in Ecuador: a traditional training and a heuristic training. Both trainings covered the same topics (recording and consolidating revenues and expenses, inventory management, savings plans, credit, etc.), but their content and methods were different. The heuristic training was designed to minimize the level of effort and cognitive engagement required from participating entrepreneurs. Furthermore it was "tailor-made" based on best practices already in use by real entrepreneurs in our field context, and developed by our partner consulting firm, GRID Impact, using a positive deviance approach.

While the traditional training had no impact on the adoption of best practices or on sales and profits, the heuristic training had statistically significant and economically meaningful impacts on the adoption of best practices (an increase of 0.208 standard deviations relative to the control group), sales (an increase of 0.0616 standard deviations relative to the control group, equivalent to an increase in sales of 7.3 percent), and profits (an increase of 0.0801 standard deviations relative to the control group, equivalent to an increase in profits of 8.2 percent). Importantly, the cost of implementing and adapting the traditional training was lower (US$49 per participant) than the cost of the heuristic training (US$271 per participant). However, the heuristic training has a positive rate of return (37 percent when considering the cost of design and assuming conservatively that the training's effects disappear after one year), which was not the case for the traditional training.

Furthermore, we find evidence that the increases in sales and profits from the heuristic training come not from the acquisition of new clients, but from microentrepreneurs adopting best practices and better managing and controlling their inventories. That is, the heuristic training seemed to encourage microentrepreneurs to track their inventory more closely, and to choose better products to sell (that is, ones that sell the most, instead of ones promoted by suppliers, etc.).

These promising results for the heuristic training seem driven by women entrepreneurs, who were more likely to adopt the best practices from the training than men, and consequently experienced larger gains in sales and profits. Arguably, this is because women in the sample were "behind" their male counterparts ex-ante, in terms of business experience and practices, so there was more room for them to catch up. However, we also find support for the view that female entrepreneurs in our sample were more cognitively taxed than men, devoting more time to household chores and the care of children and the elderly than men, despite spending similar amounts of time on their business. This may be one of the reasons why they benefited the most from the heuristic training: they were more cognitively taxed than men, and the simpler nature of the heuristic training was well-suited to their needs.

To support this interpretation, we show that entrepreneurs who had low recall at baseline (as measured by a digit span recall test) were more positively influenced by the heuristic train-

ing than entrepreneurs with high recall. These results point to how cognitive demands may interact with the efficacy of business trainings—and how trainings that focus on customized content using simple rules of thumb might be more effective for the cognitively taxed than more involved trainings.

Our findings contribute to the academic literature on business training in three important ways. First, our work can be seen as a conceptual validation of the results in Drexler, et al. (2014), further supporting the idea that heuristics-based business trainings might be a superior option to traditional training methods. Second, we are able to dig more deeply into the underlying mechanisms driving the efficacy of such trainings, by utilizing detailed data on business practices and outcomes, along with entrepreneur-level behavioral data. Specifically, we argue that heuristic training seems to work better both because it encourages best practices and improved inventory management, and because it is especially effective for those who are more cognitively taxed ex-ante. Third, we offer important insights regarding the interplay between gender and business training, showing that our heuristic training was especially effective for women. This has important implications for research on behavioral interventions and gender, and for research on bridging gender divides in entrepreneurship, particularly in the developing world.

From a practitioner perspective, these results show the need for development organizations to look at the complexity and breadth of the material covered by training programs aimed at microentrepreneurs. For many entrepreneurs, daily life can impose serious constraints on attention and cognitive bandwidth. Training programs that use a one-size-fits-all approach and prioritize the provision of extensive information may not be ideal in such environments, since they require entrepreneurs to spend a great deal of cognitive effort to understand and adapt the training content to their unique business environment. By simply accepting these attention constraints among entrepreneurs as a given, and building training programs that take them into account, development organizations and policymakers can more cost-effectively help business owners achieve their goals throughout the developing world.

References

[1] Acland, D., and M. Levy. 2015. "Naiveté, projection bias, and habit formation in gym attendance." *Management Science* 61(1):146-160.

[2] Abel, M., R. Burger, E. Carranza, and P. Piraino. 2017. "Bridging the Intention-Behavior Gap? The Effect of Plan-Making Prompts on Job Search and Employment." Policy Research Working Paper 8181, World Bank, Washington D.C.

[3] Abadie, A., S. Athey, G. Imbens, and J. Wooldridge. 2017. "When Should You Adjust Standard Errors for Clustering?" NBER Working Paper no. 24003, National Bureau of Economic Research, Cambridge, MA.

[4] Allcott, H. 2011. "Social norms and energy conservation." *Journal of Public Economics* 95: 1082-1095

[5] Arráiz, I., F. Henríquez, and R. Stucchi. 2013. "Supplier development programs and firm performance: evidence from Chile." *Small Business Economics* 41: 277-293.

[6] Barasz, K., L. John, E. Keenan, and N. Norton. 2017. "Pseudo-Set Framing." *Journal of Experimental Psychology: General* 146(10): 1460-1477

[7] Bhargava, S., and D.Manoli. 2015. "Psychological Frictions and the Incomplete Take-Up of Social Benefits: Evidence from an IRS Field Experiment." *American Economic Review* 105 (11): 3489-3529.

[8] Berge, L. I. O., K. Bjorvatn, and B. Tungodden. 2012. "Human and Financial Capital for Microenterprise Development: Short-Term and Long-Term Evidence from a Field Experiment in Tanzania." Paper. Norwegian School of Economics (NHH), Bergen, Norway.

[9] Beshears, J., J. Choi, D. Laibson, and B. Madrian. 2013. "Simplification and saving." *Journal of Economic Behavior & Organization* 95(1): 130-145.

[10] Bettinger, E., B. Terry, P. Oreopoulos, and L. Sanbonmatsu. 2012. "The role of application assistance and information in college decisions: Results from the h&r block fafsa experiment." *Quarterly Journal of Economics* 127(3): 1205-1242

[11] Blattman, C. and L. Ralston. 2015. "Generating Employment in Poor and Fragile States: Evidence from Labor Market and Entrepreneurship Programs." Available at SSRN: https://ssrn.com/abstract=2622220

[12] Bloom, N., B. Eifert, A. Mahajan, D. McKenzie, and J. Roberts. 2013. "Does Management Matter? Evidence from India." *Quarterly Journal of Economics* 128(1) February: 1-51.

[13] Bloom, N., R. Lemos, R. Sadun, D. Scur, and J. Van Reenen. 2014. "The New Empirical Economics of Management." *Journal of the European Economic Association* 12(4) August: 835-76.

[14] Bloom, N., A. Mahajan, D. McKenzie, and J. Roberts. 2010. "Why Do Firms in Developing Countries Have Low Productivity?." *American Economic Review* 100(2) May: 619-23.

[15] Bloom, N., and J. Van Reenen. 2007. "Measuring and Explaining Management Practices across Firms and Countries." *Quarterly Journal of Economics* 122(4): 1351-1408.

[16] Bloom, N., and J. Van Reenen. 2010. "Why Do Management Practices Differ across Firms and Countries?." *Journal of Economic Perspectives* 24(1) Winter: 203-24.

[17] Bruhn, M., and D. McKenzie. 2009. "In Pursuit of Balance: Randomization in Practice in Development Field Experiments." *American Economic Journal: Applied Economics* 1(4): 200-232

[18] Bruhn, M., D. Karlan, and A. Schoar. 2010. "What Capital is Missing in Developing Countries?." *American Economic Review* (May 2010): 629-633

[19] Bruhn, M., D. Karlan, and A. Schoar. 2018. "The Impact of Consulting Services on small and Medium Enterprises: Evidence from a Randomized Trial in Mexico." *Journal of Political Economy* 126(2): 635-687.

[20] Bruhn, M., and B. Zia. 2011. "Stimulating Managerial Capital in Emerging Markets: The Impact of Business and Financial Literacy for Young Entrepreneurs." Policy Research Working Paper no. 5642, World Bank, Washington, DC.

[21] Bruhn, M., D. Karlan, and A. Schoar. 2013. "The Impact of Consulting Services on Small and Medium Enterprises: Evidence from a Randomized Trial in Mexico." Policy Research Working Paper no. 6508, World Bank, Washington, DC.

[22] Busenitz, L., and J. Barney. 1997. "Differences between Entrepreneurs and Managers in Large Organizations: Biases and Heuristics in Strategic Decision-Making." *Journal of Business Venturing* 12:9-30.

[23] Calderon, G., J. M. Cunha, and G. De Giorgi. 2013. "Business Literacy and Development: Evidence from a Randomized Controlled Trial in Rural Mexico." NBER Working Paper no. 19740, National Bureau of Economic Research, Cambridge, MA.

[24] Campos, F., M. Frese, M. Goldstein, L. Iacovone, H. Johnson, D. McKenzie, and M. Mensmann. 2017. "Teaching personal initiative beats traditional training in boosting small business in West Africa." *Science, 357* (6357): 1287-1290

[25] Causse, M., J.P. Imbert, L. Giraudet, C. Jouffrais, and S. Tremblay. 2016. "The Role of Cognitive and Perceptual Loads in Inattentional Deafness." *Frontiers in Human Neuroscience* 10:344

[26] Charness, G., and U. Gneezy. 2009. "Incentives to exercise." *Econometrica* 77(3): 909-931.

[27] Cho, Y., and M. Honorati. 2014. "Entrepreneurship Programs in Developing Countries: A Meta Regression Analysis." *Labour Economics* 28(C) June: 110-30.

[28] Cho, Y., D. Robalino and S. Watson. 2016. "Supporting self-employment and small-scale entrepreneurship: potential programs to improve livelihoods for vulnerable workers." *IZA Journal of Labor Policy* 5:7

[29] Cole, S., and A. Fernando. 2016. "'Mobilizing Agricultural Advice: Technology Adoption, Diffusion and Sustainability." Working Paper 13-047, Harvard Business School, Harvard University, Cambridge, MA.

[30] Daminger, A. 2019. "The Cognitive Dimension of Household Labor." *American Sociological Review* 84(4) (August): 609-633.

[31] de Mel, S., D. McKenzie, and C. Woddruff. 2014. "Business Training and Female Enterprise Start-up, Growth, and Dynamics: Experimental Evidence from Sri Lanka." *Journal of Development Economics* 106 (January): 199-210.

[32] Drexler, A., G. Fischer, and A. Schoar. 2014. "Keeping It Simple: Financial Literacy and Rules of Thumb." *American Economic Journal: Applied Economics* 6(2) April: 1-31.

[33] Gigerenzer, G., and W. Gaissmaier. 2011. "Heuristic Decision Making." *Annual Review of Psychology* 62 (January):451-82

[34] Grimm, M., and A. L. Paffhausen. 2015. "Do Interventions Targeted at Micro-Entrepreneurs and Small and Medium-Sized Firms Create Jobs? A Systematic Review of the Evidence for Low and Middle Income Countries." *Labour Economics* 32 (January): 67-85

[35] Hussam, R., A. Rabbani, G. Reggiani, and N. Rigol. 2017. "Habit Formation and Rational Addiction: A Field Experiment in Handwashing." Working Paper 18-030, Harvard Business School, Harvard University, Cambridge, MA.

[36] Kahneman, D. 1973. *Attention and Effort*. New Jersey: Prentice-Hall.

[37] Kahneman, D. 2011. Thinking, Fast and Slow. Farrar, Staus and Giroux.

[38] Karlan, D., R. Knight, and C. Udry. 2012. "Hoping to Win, Expected to Lose: Theory and Lessons on Micro Enterprise Development." NBER Working Paper no. 18325, National Bureau of Economic Research, Cambridge, MA.

[39] Karlan, D., and M. Valdivia. 2011. "Teaching Entrepreneurship: Impact of Business Training on Microfinance Clients and Institutions." *Review of Economics and Statistics* 93(2) May: 510-27.

[40] Kling, J.R., J.B. Liebman, and L.F. Katz. 2007. "Experimental analysis of neighborhood effects." *Econometrica* 75 (1): 83-119.

[41] Lavie, N., A. Hirst, J. de Fockert, and E. Viding. 2014. "Load Theory of Selective Attention and Cognitive Control." *Journal of Experimental Psychology: General* 133(3): 339-54.

[42] Lustig, C., C. May, and L. Hasher. 2001. "Working Memory Span and the Role of Proactive Interference." *Journal of Experimental Psychology: General* 130(2): 199-207

[43] Mano, Y., A. Iddrisu, Y. Yoshino, and T. Sonobe. 2012. "How Can Micro and Small Enterprises in Sub-Saharan Africa Become More Productive? The Impacts of Experimental Basic Managerial Training." *World Development* 40(3) March: 458-68.

[44] Mani, A., S. Mullainathan, E. Shafir, and J. Zhao. 2013. "Poverty Impedes Cognitive Function." *Science* 341(6149) August: 976-80.

[45] Mata, J., P. Todd, and S. Lippke S. 2010. "When Weight Management Lasts. Lower Perceived Rule Complexity Increases Adherence." *Appetite* 54 (1): 37-43.

[46] May, C., L. Hasher, and M. Kane. 1999. "The Role of Interference in Memory Span." *Memory & Cognition* 27(5) 759-767

[47] McKenzie, D., and C. Woodruff. 2014. "What are we learning from business training and entrepreneurship evaluations around the developing world?." *World Bank Observer* 29(1), 48-82.

[48] McKenzie, D., and C. Woodruff. 2015. "Business Practices in Small Firms in Developing Countries." Policy Research Working Paper 7405, World Bank, Washington DC.

[49] Milkman, K., J. Beshears, J. Choi, D. Laibson, and B. Madrian. 2011. "Using implementation intentions prompts to enhance influenza vaccination rates." *PNAS* 108 (26): 10415-10420.

[50] OECD. 2017. "Unlocking the Potential of Youth Entrepreneurship in Developing Countries: From Subsistence to Performance, Development Centre Studies." OECD Publishing, Paris. http://dx.doi.org/10.1787/9789264277830-en

[51] Offer, S., and B. Schneider. 2011. "Revisiting the Gender Gap in Time-Use Patterns: Multitasking and Well-Being among Mothers and Fathers in Dual-Earner Families." *American Sociological Review* 76(6): 809-33.

[52] Ophir, E., C. Nass, and A. Wagner. 2009. "Cognitive Control in Media Multitaskers." *Proceedings of the National Academy of Sciences* 106(37): 15583-87.

[53] Pashler, H. 1994. "Dual-Task Interference in Simple Task: Data and Theory." *Psychological Bulletin* 116(2): 220-44.

[54] Persson, P. 2018. "Attention manipulation and information overload." *Behavioural Public Policy* 2(1): 78-106

[55] Rogers, T., K. L. Milkman, and K. G. Volpp. 2014. 'Commitment Devices: Using Initiatives to Change Behavior." *JAMA* 311 (20): 2065-2066.

[56] Schoar, A., and S. Datta. 2014. The Power of Heuristics, ideas42.

[57] Service, O., M. Hallsworth, D. Halpern, F. Algate, R. Gallagher, S. Nguyen, S. Ruda, and M. Sanders. 2014. Four simple ways to apply behavioral insights, The Behavioral Insights Team Working Paper.

[58] Sullivan, O., and J. Gershuny. 2013. "Domestic outsourcing and multitasking: How much do they really contribute?" *Social Science Research* 42(5): 1311-24.

[59] Tushabomwe-Kazooba, C. 2006. "Causes of small business failure in Uganda: a case study from Bushenyi and Mbarara towns." *African Studies Quarterly* 8(4):27

[60] Unsworth, N., and R. Engle. 2007. "On the Division of Short-Term and Working Memory: An Examination of Simple and Complex Span and Their Relation to Higher Order Abilities". *Psychological Bulletin* 133(6) 1038-1066

[61] Valdivia, M. 2011. "Training or Technical Assistance? A Field Experiment to Learn What Works to Increase Managerial Capital for Female Microentrepreneurs." CAF Working Paper no. 2011/02, Development Bank of Latin America (CAF), Caracas.

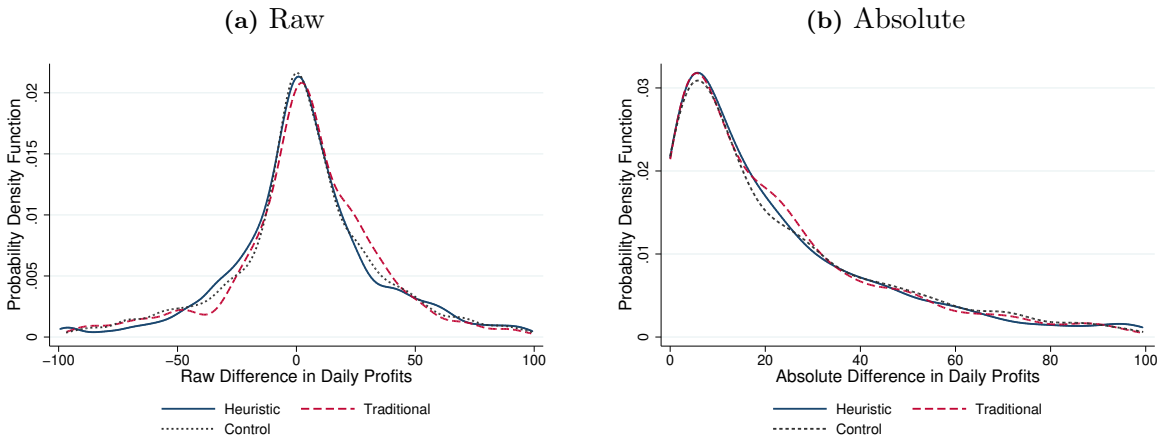
[62] Ward, A., K. Duke, A. Gneezy, and M. Bos. 2017. "Brain Drain: The Mere Presence of One's Own Smartphone Reduces Available Cognitive Capacity." *Journal of the Association for Consumer Research* 2(2) April: 140-154.

Appendices

A Reporting Quality

The baseline survey indicates that only 2 microentrepreneurs (0.08% of the sample) made errors when reporting sales, and 6 when reporting profits (0.25% of the sample). The sales figures are classified as reporting errors when (i) bad period sales are greater than average or good period sales, and (ii) average period sales are better than good period sales for daily, weekly, or monthly reported sales. The profit figures are classified as reporting errors following the same criteria. We also calculate profits based on reported sales and expenses and compare this figure to self-reported profits—via raw and absolute value differences in these two measures of profit. If entrepreneurs knew their businesses well and kept clear records, these differences should be zero. On average, self-reported profits are larger than profits calculated based on sales and expenses, although the average difference is close to zero for the treatments and the control group (see figures A1a and A1b).

Figure A1: Distribution of the raw (left) and absolute (right) differences in daily profits at baseline



Results show that none of the trainings have any impact on measures of reporting quality. Microentrepreneurs in the sample, in general, are less likely to make reporting errors at the follow up than at baseline, although the differences are not statistically different from zero. Regarding the differences in the two measures of profits (self-reported versus profits calculated based on sales and expenses), none of the treatments appear to reduce neither the raw nor the absolute difference of the measures as shown in table A1 (these differences are not statistically different from each other or from the difference in the control group). These results allow us to conclude that the impacts estimated in tables 3-6 are due to the heuristic training itself rather than to improvements in reporting thanks to the heuristic training.

Table A1: Reporting Quality

	Obs	Control	ITT Traditional	ITT Heuristics	p-value
	(1)	(2)	(3)	(4)	(5)
Reporting errors, sales	2033	0.001	-0.001	-0.001	0.177
			(0.001)	(0.001)	
Reporting errors, profits	1943	0.000	0.001	-0.001	0.259
			(0.001)	(0.001)	
Raw value difference†	1943	-18.2	0.934	-11.835	0.500
			(21.458)	(24.233)	
Absolute value difference‡	1943	126.0	-9.601	0.274	0.598
			(16.308)	(22.449)	

Coefficients reported in columns (3) and (4) come from regressions of the form described in equation (1). Robust standard errors clustered at the bank officer level in parentheses. * Denotes significance at the 10%-level, ** at the 5%-level, and *** at the 1%-level. p-values for F-test of equality of coefficients in (3-4) for traditional and heuristics effects in (5). Regressions include randomization strata. (†) The raw value difference is the difference of two profit measures: one based on sales and expenses and the other one based of self-reported profits. (‡) The absolute value difference is the absolute value of the raw difference.

B Digit Span Recall Test

Table A2: Share of explained variance of number of digits recalled

	Digit Span	% of exp. var.§	Digit Span	% of exp. var.§
	(1)	(2)	(3)	(4)
Years of Schooling	0.1042 ***	83.2%	0.1099 ***	91.4%
	(0.0084)		(0.0081)	
Ratio of children to adults in household	-0.1842 ***	12.8%		
	(0.0551)			
Time spend doing household work (log)	-0.0053 *	3.4%		
	(0.0028)			
Female			-0.2156 ***	8.6%
			(0.0612)	
Constant	5.1038 ***		5.0922 ***	
	(0.1188)		(0.1161)	
R-Squared	0.0826		0.0785	
Number of Observations	2405		2405	

Coefficients reported in columns (1) and (3) come from an OLS regressions. Standard errors in parentheses. * Denotes significance at the 10%-level, ** at the 5%-level, and *** at the 1%-level. (§) Share of explained variance, measured by R-squared, contributed by each individual variable using Owen (1977) values.

C Cost-Benefit Analysis

Table A3: Extra monthly profits thanks to the heuristic training

	Day ($)	Month ($)	Average impact†	Extra monthly profits ($)‡	Weight	Weighted extra monthly profit ($)
Profits on a good	68.63	2,087.41	10.00%	208.7	10%	20.87
Profits on a normal	41.81	1,271.73	8.14%	103.6	80%	82.86
Profits on a bad day	23.03	700.49	5.64%	0	10%	0
Weighted extra monthly profit						103.73

(†) Average impact estimated based of results from table 4 as exp(Coeff.)-1. (‡) Extra monthly profits for bad days are set to zero because coefficient is not statistically different from zero.

D Heterogeneous Effects

Table A4: Sales, profits, and number of clients indexes-Gender heterogeneous effects

	ITT		TOT	
	Male	Female	Male	Female
	(1)	(2)	(3)	(4)
Heuristic				
Sales index	0.0111	0.0833 **	0.0203	0.1420 **
	(0.0667)	(0.0373)	(0.1177)	(0.0622)
Profit index	0.0266	0.0988 *	0.0486	0.1674 *
	(0.0760)	(0.0514)	(0.1335)	(0.0879)
Number of clients index	0.0304	-0.0233	0.0527	-0.0401
	(0.0699)	(0.0673)	(0.1242)	(0.1134)
Traditional				
Sales index	-0.0218	0.0550	-0.0322	0.0783
	(0.0721)	(0.0460)	(0.1056)	(0.0653)
Profit index	-0.0503	0.0306	-0.0758	0.0456
	(0.0888)	(0.0664)	(0.1333)	(0.0945)
Number of clients index	0.1735	0.0069	0.2543	0.0099
	(0.1202)	(0.0711)	(0.1736)	(0.0990)

Coefficients reported in columns (1-2) and (3-4) come from regressions of the form described in equations (1-2). Robust standard errors clustered at the bank officer level in parentheses. * Denotes significance at the 10%-level, ** at the 5%-level, and *** at the 1%-level. Regressions include randomization strata.

Table A5: Results for the heuristic training-Gender heterogeneous effects

	ITT		TOT	
	Male	Female	Male	Female
	(1)	(2)	(3)	(4)
Sales on a bad day (in logs)	-0.0602	0.0955 *	-0.1082	0.1627 **
	(0.0861)	(0.0481)	(0.1524)	(0.0789)
Sales on a regular day (in logs)	0.0335	0.0873 **	0.0609	0.1491 **
	(0.0673)	(0.0385)	(0.1189)	(0.0656)
Sales on a good day (in logs)	0.0573	0.0898 **	0.1037	0.1529 **
	(0.0607)	(0.0378)	(0.1068)	(0.0632)
Profits on a bad day (in logs)	0.0061	0.0722	0.0115	0.1223
	(0.0722)	(0.0547)	(0.1271)	(0.0934)
Profits on a regular day (in logs)	0.0322	0.0939 *	0.0586	0.1594 **
	(0.0650)	(0.0469)	(0.1141)	(0.0801)
Profits on a good day (in logs)	0.0377	0.1173 **	0.0683	0.1985 **
	(0.0757)	(0.0463)	(0.1327)	(0.0783)
BP: All†	0.0640	0.2645 ***	0.1169	0.4585 ***
	(0.1044)	(0.0494)	(0.1836)	(0.0959)
BP: Organization	0.2071 **	0.1832 **	0.3724 ***	0.3167 ***
	(0.0832)	(0.0696)	(0.1427)	(0.1175)
BP: Record keeping	0.1755 *	0.2749 ***	0.3175 *	0.4767 ***
	(0.0927)	(0.0583)	(0.1635)	(0.1083)
BP: Credit	0.0199	0.1830 ***	0.03695	0.3172 ***
	(0.0927)	(0.0493)	(0.1636)	(0.0910)
BP: Savings	-0.0789	0.1480 ***	-0.1407	0.2563 ***
	(0.1098)	(0.0530)	(0.1957)	(0.0939)
Tracks inventory	0.0228	0.0428 **	0.0412	0.0743 **
	(0.0251)	(0.0188)	(0.0440)	(0.0306)
Buys inventory that sells	0.0701	0.0571 **	0.1270	0.0985 **
	(0.0449)	(0.0262)	(0.0815)	(0.0438)
Expenditure in inventories	15.6000	5.6909	28.0759	9.5708
	(16.3082)	(7.0196)	(28.9039)	(11.8475)
Loses sales (lack of inventory)	-0.0074	0.0082	-0.0141	0.0141
	(0.0490)	(0.0447)	(0.0867)	(0.0763)

Coefficients reported in columns (1-2) and (3-4) come from regressions of the form described in equations (1-2). Robust standard errors clustered at the bank officer level in parentheses. * Denotes significance at the 10%-level, ** at the 5%-level, and *** at the 1%-level. Regressions include randomization strata. (†) Includes all best practices common to the two trainings (excludes best practices associated to "Organization").

Table A6: Results for the traditional training-Gender heterogeneous effects

	ITT		TOT	
	Male	Female	Male	Female
	(1)	(2)	(3)	(4)
Sales on a bad day (in logs)	-0.0341	0.0679	-0.0510	0.0967
	(0.1015)	(0.0623)	(0.1485)	(0.0882)
Sales on a regular day (in logs)	-0.0313	0.0621	-0.0461	0.0884
	(0.0649)	(0.0479)	(0.0953)	(0.0683)
Sales on a good day (in logs)	-0.0050	0.0439	-0.0069	0.0624
	(0.0655)	(0.0354)	(0.0957)	(0.0503)
Profits on a bad day (in logs)	-0.0456	0.0255	-0.0684	0.0365
	(0.0914)	(0.0660)	(0.1363)	(0.0929)
Profits on a regular day (in logs)	-0.0507	0.0367	-0.0760	0.0528
	(0.0721)	(0.0598)	(0.1084)	(0.0846)
Profits on a good day (in logs)	-0.0350	0.0210	-0.0524	0.0303
	(0.0825)	(0.0584)	(0.1227)	(0.0823)
BP: All†	-0.0687	0.1200	-0.1002	0.1704
	(0.0974)	(0.0761)	(0.1409)	(0.1062)
BP: Organization	0.1465	0.0112	0.2156	0.0158
	(0.0919)	(0.0758)	(0.1326)	(0.1057)
BP: Record Keeping	0.0061	0.1333 *	0.0100	0.1893 *
	(0.1000)	(0.0730)	(0.1437)	(0.1015)
BP: Credit	-0.0545	0.0844	-0.0797	0.1199
	(0.0787)	(0.0642)	(0.1142)	(0.0900)
BP: Saving	-0.1314	0.0544	-0.1927	0.0772
	(0.0942)	(0.0695)	(0.1380)	(0.0970)
Tracks inventory	-0.0044	0.0237	-0.0064	0.0337
	(0.0275)	(0.0230)	(0.0396)	(0.0319)
Buys inventory that sales	-0.0132	-0.0074	-0.0189	-0.0106
	(0.0395)	(0.0271)	(0.0567)	(0.0378)
Expenditure in inventories	-2.1285	-7.7712	-3.0607	-11.0823
	(15.8123)	(6.7037)	(23.0430)	(9.2580)
Loses sales (lack of inventory)	0.0486	-0.0123	0.0711	-0.0176
	(0.0496)	(0.0430)	(0.0717)	(0.0600)

Coefficients reported in columns (1-2) and (3-4) come from regressions of the form described in equations (1-2). Robust standard errors clustered at the bank officer level in parentheses. * Denotes significance at the 10%-level, ** at the 5%-level, and *** at the 1%-level. Regressions include randomization strata. (†) Includes all best practices common to the two trainings (excludes best practices associated to "Organization").

Table A7: Sales, profits, and number of clients indexes-Digit span recall (DSR) heterogeneous effects

	ITT		TOT	
	High DSR	Low DSR	High DSR	Low DSR
	(1)	(2)	(4)	(5)
Heuristic				
Sales index	0.0356	0.0831 *	0.0662	0.1426 *
	(0.0497)	(0.0425)	(0.0829)	(0.0772)
Profit index	0.0612	0.0976 *	0.1060	0.1575 *
	(0.0626)	(0.0525)	(0.1012)	(0.0958)
Number of clients index	-0.0295	0.0227	-0.0517	0.0267
	(0.0655)	(0.0751)	(0.1176)	(0.1288)
Traditional				
Sales index	-0.0144	0.0717	-0.0217	0.1050
	(0.0570)	(0.0478)	(0.0762)	(0.0706)
Profit index	-0.0432	0.0478	-0.0599	0.0705
	(0.0780)	(0.0545)	(0.1030)	(0.0795)
Number of clients index	0.0497	0.0795	0.0678	0.1024
	(0.0767)	(0.1085)	(0.1058)	(0.1533)

Coefficients reported in columns (1-2) and (4-5) come from regressions of the form described in equations (1-2). Robust standard errors clustered at the bank officer level in parentheses. * Denotes significance at the 10%-level, ** at the 5%-level, and *** at the 1%-level. p-values for F-test of equality of coefficients for high and low measures in the digit span recall test in (3) and (6). Regressions include randomization strata.

Table A8: Results for the heuristic training-Digit span recall (DSR) heterogeneous effects

	ITT		TOT	
	High DSR	Low DSR	High DSR	Low DSR
	(1)	(2)	(3)	(4)
Sales on a bad day (in logs)	0.0266	0.0595	0.0464	0.1021
	(0.0728)	(0.0538)	(0.1243)	(0.0913)
Sales on a regular day (in logs)	0.0428	0.0980 **	0.0747	0.1684 **
	(0.0450)	(0.0465)	(0.0770)	(0.0822)
Sales on a good day (in logs)	0.0505	0.1078 **	0.0881	0.1848 ***
	(0.0493)	(0.0398)	(0.0843)	(0.0701)
Profits on a bad day (in logs)	0.0472	0.0590	0.0819	0.1003
	(0.0577)	(0.0541)	(0.0995)	(0.0927)
Profits on a regular day (in logs)	0.0611	0.0961 *	0.1059	0.1637 *
	(0.0518)	(0.0484)	(0.0888)	(0.0845)
Profits on a good day (in logs)	0.0755	0.1138 **	0.1312	0.1935 **
	(0.0656)	(0.0457)	(0.1114)	(0.0802)
BP: All†	0.1268 *	0.2908 ***	0.2260 *	0.5030 ***
	(0.0747)	(0.0560)	(0.1296)	(0.1067)
BP: Organization	0.0666	0.2966 ***	0.1187	0.5130 ***
	(0.0913)	(0.0601)	(0.1579)	(0.1031)
BP: Record keeping	0.1546 **	0.3579 ***	0.2753 **	0.6189 ***
	(0.0665)	(0.0641)	(0.1200)	(0.1203)
BP: Credit	0.1183	0.1585 **	0.2108	0.2742 ***
	(0.0752)	(0.0594)	(0.1293)	(0.1062)
BP: Savings	0.0078	0.1377 **	0.0139	0.2379 **
	(0.0754)	(0.0636)	(0.1317)	(0.1107)
Tracks inventory	0.0272	0.0473 **	0.0484	0.0818 **
	(0.0270)	(0.0225)	(0.0465)	(0.0369)
Buys inventory that sales	0.0579	0.0666 *	0.1032 *	0.1148 **
	(0.0352)	(0.0331)	(0.0623)	(0.0577)
Expenditure in inventories	7.4089	10.8538	13.0349	18.5077
	(7.9317)	(9.7653)	(13.6320)	(16.7945)
Loses sales (lack of inventory)	-0.0069	0.0089	-0.0121	0.0157
	(0.0291)	(0.0553)	(0.0508)	(0.0939)

Coefficients reported in columns (1-2) and (3-4) come from regressions of the form described in equations (1-2). Robust standard errors clustered at the bank officer level in parentheses. * Denotes significance at the 10%-level, ** at the 5%-level, and *** at the 1%-level. Regressions include randomization strata. (†) Includes all best practices common to the two trainings (excludes best practices associated to "Organization").

Table A9: Results for the traditional training-Digit span recall (DSR) heterogeneous effects

	ITT		TOT	
	High DSR	Low DSR	High DSR	Low DSR
	(1)	(2)	(3)	(4)
Sales on a bad day (in logs)	0.0010	0.0661	0.0015	0.0975
	(0.0778)	(0.0570)	(0.1075)	(0.0835)
Sales on a regular day (in logs)	-0.0223	0.0829	-0.0312	0.1222
	(0.0519)	(0.0507)	(0.0711)	(0.0746)
Sales on a good day (in logs)	-0.0136	0.0674	-0.0190	0.0993
	(0.0524)	(0.0467)	(0.0721)	(0.0678)
Profits on a bad day (in logs)	-0.0283	0.0307	-0.0399	0.0457
	(0.0874)	(0.0483)	(0.1216)	(0.0707)
Profits on a regular day (in logs)	-0.0370	0.0506	-0.0524	0.0753
	(0.0607)	(0.0534)	(0.0845)	(0.0785)
Profits on a good day (in logs)	-0.0423	0.0447	-0.0596	0.0664
	(0.0652)	(0.0509)	(0.0907)	(0.0747)
BP: All	0.0244	0.1095	0.0345	0.1609
	(0.0899)	(0.0834)	(0.1243)	(0.1202)
BP: Organization	-0.0072	0.1110	-0.0099	0.1630
	(0.0885)	(0.0948)	(0.1218)	(0.1364)
BP: Record Keeping	0.0717	0.1409	0.1010	0.2070
	(0.0711)	(0.0981)	(0.0992)	(0.1413)
BP: Credit	0.0113	0.0696	0.0161	0.1022
	(0.0867)	(0.0558)	(0.1196)	(0.0802)
BP: Saving	-0.0401	0.0329	-0.0563	0.0484
	(0.0845)	(0.0770)	(0.1160)	(0.1109)
Tracks inventory	0.0294	0.0092	0.0413	0.0135
	(0.0267)	(0.0274)	(0.0368)	(0.0395)
Buys inventory that sales	0.0058	-0.0206	0.0083	-0.0299
	(0.0269)	(0.0297)	(0.0370)	(0.0427)
Expenditure in inventories	-14.4536	1.7197	-20.3885	2.5413
	(14.1681)	(8.7594)	(19.3415)	(12.6423)
Loses sales (lack of inventory)	-0.0291	0.0328	-0.0410	0.0481
	(0.0478)	(0.0544)	(0.0656)	(0.0781)

Coefficients reported in columns (1-2) and (3-4) come from regressions of the form described in equations (1-2). Robust standard errors clustered at the bank officer level in parentheses. * Denotes significance at the 10%-level, ** at the 5%-level, and *** at the 1%-level. Regressions include randomization strata. (†) Includes all best practices common to the two trainings (excludes best practices associated to "Organization").