Make me believe: Self-efficacy and human capital investments among young women in Ghana

Sarah Frohnweiler
RWI - Leibniz Institute for Economic Research
University of Göttingen

17 October 2024

Latest version

Abstract
Development cooperation focuses on programs that alleviate individuals' external constraints to development such as limited access to education, credit, or social protection. However, many of such programs experience low participation, even among those eligible or initially registered. Recent theoretical frameworks suggest that internal, psychological constraints may sub-optimally influence employment and investment decisions. Can addressing both external and internal constraints improve program participation? I conducted a randomized testimonial campaign among young vulnerable women in Ghana who registered for a free training program. Women received videos and messages aimed at boosting self-efficacy – beliefs about the ability to accomplish a desired outcome – which may be an important internal constraint limiting aspirations and, thus, investment incentives. The testimonials significantly raised self-efficacy and increased training completion rates among those who started the training. Effects are driven by improved training performance and changes in the composition of individuals selecting into training start. Consistent with predictions from a model of behavioral investment traps, the effects are concentrated among women with medium education and lower self-efficacy. (JEL: C93, D83, I25)

Keywords: self-efficacy, training participation, women, experiment.

Poverty can have self-reinforcing effects that lead economically disadvantaged individuals to persistently stay in poverty. Traditional theories suggest that these poverty traps arise due to constraints that are external to the individual, e.g., a lack of opportunities for human capital development, access to credit, infrastructure, or market imperfections (Azariadis and Drazen 1990; Banerjee and Newman 1993; Dasgupta and Ray 1986; Galor and Zeira 1993). Alternative theories instead argue that internal constraints like aspirations, norms, or values can cause behavioral biases that create a culture of perpetuating poverty (e.g., Appadurai 2004; Lewis 1966).[1] More recent theories combine these two approaches, claiming that while everyone faces the same behavioral biases (internal constraints), in conditions of poverty (under external constraints), these biases result in worse outcomes (e.g., Bertrand et al. 2004; Dalton et al. 2016).

Development cooperation largely focuses on addressing external constraints. Through investments in public administration, infrastructure, social protection, transportation, education, and health, among others, governments and organizations aim to foster economic growth and reduce poverty. However, focusing solely on external constraints may not be sufficient. Many programs designed to alleviate external constraints, such as social protection and free training programs, frequently suffer from low participation rates, often falling below 50%. The generosity

---

1. Small et al. (2010) summarize the literature on culture as a potential explanation for the behavior of the poor.

and effectiveness of the particular programs make it unlikely that cost-benefit calculations can fully rationalize low participation (Bandiera et al. 2020; Banerjee et al. 2021, 2024; Bhattacharya et al. 2015; Carneiro et al. 2019; Currie 2004; Frohnweiler et al. 2024; Hardy and McCasland 2023). Interventions addressing misperceptions of the program benefits (Finkelstein and Notowidigdo 2019; Hastings et al. 2015; Jensen 2010) or reducing application costs (Banerjee et al. 2021; Carneiro et al. 2019) have been found to only partially close the take-up gap. Apart from the unrealized opportunities for individuals, low participation rates can result in unused capacity, program delays, or costly repetitions of enrollment processes.

In this study, I assess whether participation in a standard development program that addresses external constraints can be improved by incorporating an intervention targeting internal constraints. For that, I randomly assigned young vulnerable women in Ghana who registered for free vocational skills training to receive a testimonial campaign delivered through videos and text messages. The campaign aims to increase women's self-efficacy through testimonials of women with similar backgrounds who narrate how goal-setting, finding role models, building confidence, and developing resilience helped them to succeed in life. Self-efficacy is defined as an individual's belief in their ability to accomplish tasks and cope with challenges – in other words, the belief that one's actions today can influence future outcomes (Bandura 1978, 1997; Schwarzer and Jerusalem 1995). Descriptively, self-efficacy has been shown to regulate aspirations, motivations, and achievements (Bandura 1993), and is recognized as an important component of psychological empowerment (Zimmerman 2000). For adolescents in Ghana, Ansong et al. (2019) show that self-efficacy is an important correlate of educational aspirations and their actual achievements.[2] Exploiting the randomized assignment of the testimonial campaign, I study the effects on training participation using self-reported and administrative records on start, completion, and participation intensity.

In 2021, women in the Ghanaian cities of Accra, Kumasi, and Tamale could enroll in a free vocational skills training program. The training exclusively targeted women aged 16 to 24 years, and focused on the vulnerable group of head porters.[3] The design incorporated a variety of program features that previous program evaluations had found to be most beneficial to participants' subsequent labor market outcomes (Agarwal and Mani forthcoming; Carranza and McKenzie 2023; Kluve et al. 2017, 2019). Moreover, a comprehensive registration process, which included career and counselling services to screen interested women, and the payment of monthly stipends during the training largely minimized pre-identified external constraints to training participation. Frohnweiler et al. (2024) provide a detailed description and analysis of the program. Exploiting the randomized allocation of training spots, they show that the training increased the likelihood that individuals find employment in their field of specialization, enhanced job quality in terms of formality and access to medical benefits, and improved participants' mental health.[4] Nevertheless, only 53.2% of the invited women started the training. Anticipating this problem, the training program was combined with a testimonial campaign on self-efficacy.

The testimonial campaign consisted of two three-minute videos delivered via links embedded in text messages (or Short Message Service, SMS) and 30 follow-up SMS. The first video was sent before the training started. The second video and follow-up SMS were sent during the training. Women were randomly assigned to one out of three experimental arms. One third (N=362) received testimonials addressing self-efficacy, one third (N=362) received placebo testimonials in which alike women talked about their experience with vocational training, and another third (N=385) received no testimonials. The delivery of my completely remote testimonial campaign was successful. Treated participants are 35.0 percentage points more likely to have ever clicked on their assigned video links and 19.9 percentage points more likely to report having watched the self-efficacy videos eight months after receiving the last SMS. Notably, most participants who report having watched the videos also

---

2.   Roy et al. (2018) find similar evidence for young women in India.

3.   Section 2.2 provides a description of who head porters are and what they do.

4.   The training program was evaluated through a randomized control trial, in which only a random subset of registered and eligible women were invited to the training. The testimonial campaign was cross-randomized across training treatment assignment. In this study, I concentrate on the women who were invited to start the training.

recall their content. These rates are comparable to other SMS-based interventions (e.g., Bahety et al. 2021).

The self-efficacy testimonials significantly increased treated women's self-efficacy levels by 0.13 SD relative to untreated women, which is comparable to effect sizes found by intensive face-to-face interventions. Women's overall probability of starting and completing the training program was not affected by the testimonials, but they significantly increased the probability of completing the training among women who started it by 8.1 percentage points, which is an increase of 10.5% compared to untreated women who started the training. Descriptive evidence confirms the importance of self-efficacy for training participation. Applying a random forest with all individual-level baseline characteristics, I find self-efficacy to have the highest relative importance for predicting training start and completion.

While the self-efficacy campaign successfully boosted self-efficacy levels, other psychological outcomes remained unchanged. Treated and untreated women do not significantly differ in terms of life satisfaction, mental health, self-esteem, conscientiousness, or aspirations. Aside the group of women who received the self-efficacy testimonials and the group of women who did not receive any testimonials, a third group received placebo testimonials. In the placebo testimonials, women talked about their experience with vocational skills training and the content mostly reiterated information that had already been shared with all participants during the registration process. The placebo group received the same number of videos and SMS, and their delivery was equally successful. Consistent with a placebo interpretation, I find no effect of these testimonials on women's self-efficacy or their perceptions of the benefits of vocational training. Most importantly, the placebo testimonials did not significantly affect training participation rates which indicates that the effect of the self-efficacy testimonials cannot be explained by a simple reminder mechanism.

Instead, the effect seems to be driven by a more motivated participation in the training. Women who received the self-efficacy testimonials report a higher perceived usefulness of the training, are more likely to be selected for participation in an assessment for national skills certification, and more likely to be offered a job placement upon training completion. Moreover, compositional analyses suggest that the self-efficacy testimonials changed who started the training. Employed women, working fewer hours, with higher education, stronger present bias, higher levels of depression, and lower stress levels were more likely to start the training in response to the self-efficacy testimonials.

To rationalize the findings and guide the analysis of treatment effect heterogeneity, I build on the theoretical framework for behavioral poverty traps of Dalton et al. (2016), and transfer it to the present context of human capital investment decisions. The intuition behind a behavioral trap is that individuals might remain at lower human capital levels not (only) because of their low initial levels, but because they set low aspirations. The lower aspirations result in lower investment incentives, e.g., a lower probability of starting training or a less intensive participation, which perpetuate due to the feedback generated by investments on aspirations. Given the strong interplay between self-efficacy and aspirations, I expect that an increase in self-efficacy, i.e., the belief that today's actions can affect future outcomes, will lead individuals' to set higher aspirations and ultimately positively affect their decision to participate in training. The theoretical framework suggests that the impact of the campaign on individuals' participation decisions depends not only on their baseline self-efficacy levels but also on their initial levels of human capital. Consistent with these predictions, I find that the effects on training completion and attendance are concentrated among women with lower self-efficacy levels and medium levels of baseline education. The effects are also stronger among women who might have faced higher external constraints for example due to marital obligations, childcare, lower household wealth, or linguistic barriers.

The study stands out from previous literature in three main ways. First, I add to the literature on the role of internal constraints for the behavior of the poor. The recent theoretical literature on poverty traps argues that, in addition to the long-standing focus on external constraints, individuals also face internal constraints that might perpetuate poverty (Dalton et al. 2016; Genicot and Ray 2017; La Ferrara 2019). An increasing number of empirical studies confirms that interventions targeting, aspirations (Bernard et al. 2023), personal initiative (Campos et al. 2017), hope (Rojas Valdes et al. 2022), patience (Alan and Ertac 2018; Blattman et al. 2017), grit (Alan et al. 2019), and mental health (Baranov et al. 2020) can affect behavior in terms of labor

market performance, future-oriented investments, and saving behavior, among others. However, all of these studies exclusively address internal constraints. Orkin et al. (2023) is, to the best of my knowledge, the only other study that jointly addresses external and internal constraints by combining an unconditional cash transfer with a workshop about aspirations and long-term planning in Kenya. My campaign's design allows me to study the relevance of self-efficacy as one component of internal constraints for training participation in a setting where external constraints are reduced as much as possible. The campaign is implemented exclusively among women who already registered to participate in a training program and the training is free and provides monthly stipends. The results confirm the importance of self-efficacy for training participation and validate the predictions of the theoretical framework that addressing internal constraints will affect investment decisions only for a subset of individuals.

Second, I contribute to the scarce knowledge on determinants of low participation in post-secondary training. Extensive literature exists on the effectiveness of vocational training in both developed and developing countries (Adoho et al. 2014; Alzúa et al. 2021; Attanasio et al. 2011; Bandiera and Goldstein 2010; Bandiera et al. 2020; Carranza and McKenzie 2024; Chakravarty et al. 2019; Frohnweiler et al. 2024; McKenzie 2017). Even though many of these training programs continue to report low take-up rates, little is known about determinants of training participation and knowledge is especially limited for developing countries. The few evaluations considering determinants of participation in low-income countries are limited to external participation constraints like unanticipated adverse shocks or alternative opportunities (Ambler et al. 2021; Cho et al. 2013). Interventions trying to increase participation are rare and rather concentrate on the recruitment process (Ambler et al. 2021; Osman and Speer 2024). This is despite the fact that results from Bandiera et al. (2020) suggest that the effects of an empowerment program for young women in Uganda might be most impactful for those who are least likely to take up the program. My contribution is twofold. First, I use machine learning to identify the relative importance of a rich individual-level dataset covering internal and external components for training participation. And second, I design an intervention aimed at alleviating internal constraints to participation.

Third, I add to the scarce evidence on the effect of self-efficacy on individuals' lives. Aside from multiple descriptive studies (Ansong et al. 2019; Bandura 1993; Zimmerman 2000; Roy et al. 2018), causal evidence on the relevance of self-efficacy for individuals' decision making is scarce. Interventions that rigorously evaluate the effects of self-efficacy are mostly limited to intensive and costly face-to-face sessions. In India, McKelway (2024) shows that a 7.5-hour psychosocial intervention spread over nine sessions was able to increase women's self-efficacy and translated into an increased employment probability. Eden and Aviram (1993) targeted self-efficacy among a small sample of 66 unemployed vocational workers in Israel and show that increased self-efficacy raised job search activity and reemployment among participants with low initial self-efficacy. With a slightly less intensive intervention of two in-person sessions, John and Orkin (2022) were able to increase self-efficacy and subsequently increase preventive health investment among young women in rural Kenya. Because of persistent gender gaps in educational attainment (Bentaouet Kattan et al. 2023; Encinas-Martín and Cherian 2023), aspirations (Molina and Usui 2023), earnings expectations (Reuben et al. 2024), as well as job search behavior and earnings (Cortés et al. 2023) women, and often young women, are the usual target group for interventions that address self-efficacy or related psychological outcomes. The present testimonial campaign was delivered entirely remotely through videos and text messages, and my results show that such a low-cost and scalable intervention format can be effective in increasing self-efficacy.

The remainder of the paper is organized as follows: Section 1 provides the theoretical framework motivating the intervention and subsequent analysis. Section 2 describes the study setting, intervention design, randomization, and sample characteristics. Section 3 explains the measurement of self-efficacy and shows descriptively which individual-level baseline characteristics determine training participation. Section 4 outlines the empirical specification and reports the impact of the testimonials on training participation. Section 5 discusses the potential effect mechanisms, and Section 6 concludes.

1. Theoretical framework

As for other decisions, educational investment decisions depend on the associated costs and benefits. Individuals have different levels of human capital and have the option to invest in additional human capital, for example through training participation. According to human capital theory, a rational agent will only invest if the benefits of the final human capital level acquired through training, for example in terms of employment probability and employment quality, outweigh the costs, comprising aspects like training fees, transportation, and opportunity costs (Becker 1962).

For any given initial level of human capital k_0, a rational agent's utility u will thus only depend on the benefits $b(\cdot)$ derived from reaching a final human capital level k and the costs $c(\cdot)$ of training participation t. This individual utility function can be described as

$$u(t|k_0) = b(k) - c(t) \tag{1}$$

$$\text{with } k = (1+t)k_0.$$

Following Dalton et al. (2016), I make the following assumptions on the components' functional form. [5] First, the benefits of the final human capital level $b(\cdot)$ are continuously differentiable, strictly increasing and strictly concave with $b(0) = 0$. Second, individuals' risk aversion with respect to changes in human capital $r(k) = kb''(k)/b'(k)$ must be smaller than one. And third, the costs of training participation $c(\cdot)$ are strictly increasing with $c(0) = 0$, convex and continuously differentiable.

The production function of k generates a complementarity between investments and initial human capital levels resulting in a lower productivity of investments at lower initial human capital levels. At the same time, the concavity and strictly increasing function of $b(\cdot)$ stated in the first assumption implies that the benefit from marginal increases in investments are higher at lower human capital levels. Finally, the second assumption ensures that the first assumption never dominates the complementarity. The impact evaluation of the training program for which participants of this study registered and got access to confirms that program benefits were more pronounced for individuals with higher educational levels at baseline (Frohnweiler et al. 2024).

Individuals choose their human capital investments such that they maximize utility. Under the three assumptions one can show that for each initial human capital level there exists a unique rational solution. One can further show that there exists a level of initial human capital k^* such that for all $k_0 > k^*$ the unique utility maximizing solution is to invest in training and have high aspirations. In contrast, whenever $k_0 < k^*$ the unique rational solution is to not invest and have low expectations. Figure 1 illustrates this maximization process for simplicity relaxing the assumptions of concavity and convexity and instead assuming a linear form of the utility function and investments being binary with $t \in \{0, 1\}$. The utility function reduces to $b(k)$, if rational agents choose not to invest, i.e., $t = 0$. If rational agents choose to invest the utility function is $b(k) - c(t)$. Given the functional form of k the slope is higher for $t \neq 0$. Then, k^* is the level of initial human capital at which a rational agent will shift from the low investment-aspiration pair to the high investment-aspiration pair, indicated by the green dashed line. For all $k_0 < k^*$, agents are trapped at low educational levels caused by initial low human capital levels.

---

5. Dalton et al. (2016) provides a detailed description of the more comprehensive assumptions which are however not necessary for my broader motivation of aspirational failures.
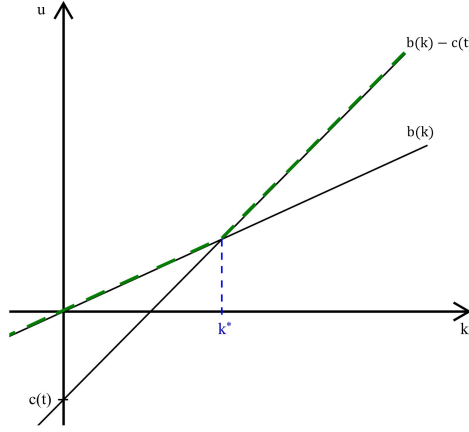
FIGURE 1. Decision of rational agents.
Notes: The graph describes the utility maximization process of rational agents at different initial human capital levels. The green dashed line indicates rational agents' unique utility maximizing investment-aspiration pair.

However, apart from the costs and benefits associated with educational investments that are largely external to, i.e., cannot be influenced by, the individual, behavioral theory suggests that economic decisions are also influenced by aspirations. Some behavioral economic models integrate aspirations into formal decision-making models related to poverty and show that misaligned aspirations can culminate in an aspirational failure that enlarges the standard poverty trap (e.g., Dalton et al. 2016; Genicot and Ray 2017; La Ferrara 2019). The underlying idea is that individuals possess different aspirational levels, shaped by their individual experience and the social environment, that work as reference points. The difference between an individual's aspired future achievement level and their current circumstances, called "aspirations gap" (Ray 2006), affects how much an individual will invest. Easterlin (2001) shows that people do not anticipate that their aspirations grow along with their income, also known as *Easterlin Paradox*. Instead, they expect their aspiration to be fixed. As a consequence, individuals might remain trapped at low achievement levels not (only) because of their initial low, e.g., human capital levels but because of their low aspirations. At the same time this implies that for a certain range of initial achievement levels, it is possible to break this trap by addressing aspirations – or in my setting self-efficacy – alone.

This expands the above utility function to be

$$u(t, a | k_0) = b(k) - c(t) + v\left(\frac{k - a}{k}\right) \tag{2}$$

where $v(\cdot)$ relates to the utility derived from reaching a certain human capital level relative to an aspired human capital level a which can also be understood as a "milestone utility" or a loss function for unmet aspirations due to misaligned investment-aspiration pairs. Again following Dalton et al. (2016), I assume $v(\cdot)$ to be continuously differentiable with $v'(0) > 0$ and fulfills $v'(x) - v''(x)(1 - x) \geq 0$ for all feasible values of x. This ensures that $\partial^2 u(t, a, k_0)/\partial t \partial a \geq 0$ such that aspirations and investments are complements and implies that individuals prefer to overachieve rather than underachieve relative to their aspired levels of final human capital.[6] Empirical evidence confirms that higher aspirations generate changes in individuals' financial and educational investment decisions (e.g., Field et al. 2010; Carlana et al. 2022).

For behavioral agents one can show that there exist k_l and k_h such that if $k_0 > k_h$ the unique behavioral solution is to invest and have high aspirations. Instead, if $k_0 < k_l$, the unique behavioral solution entails no investments and low aspirations. However, for all $k_l \leq k_0 \leq k_h$, two investment–aspirations pairs are behavioral solutions and the decision depends on agents' initial aspirations. Behavioral agents with low initial aspirations would chose to not invest, whereas agents with high initial aspirations would invest. This implies that for behavioral agents the risk of ending

---

6. This is shown in the proofs provided by Dalton et al. (2016).

up in a low investment trap exists not only for $k_0 < k^*$ but expands by an aspirational failure to all $k^* < k_0 < k_h$. Aspirational failure causes behavioral agents to choose the sub-optimal low investment levels not because of a lack of initial human capital but only because of their lower initial aspirations which are influenced by (i) the lower productivity of investments at lower initial human capital levels, i.e., the complementarity between investments and human capital and (ii) the delayed feedback from investments to aspirations. Figure 2 presents the decision process graphically for two types of behavioral agents: one has low initial aspirations (orange dashed line), one has high initial aspirations (violet dashed line). I again assume utility to have a linear form and investments and aspirations to be binary.
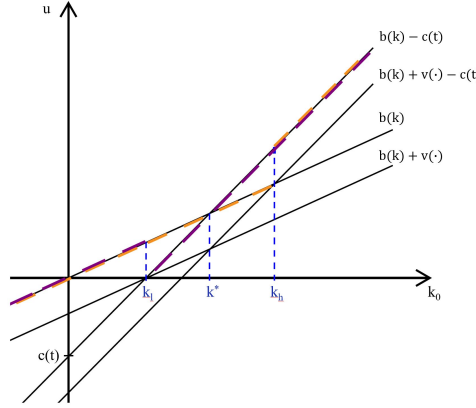

FIGURE 2. Decision of behavioral agents.

Notes: The graph describes the utility maximization process of behavioral agents at different initial human capital levels. The orange line indicates behavioral agents' utility maximizing investment-aspiration pairs if they started with low aspirations after allowing for aspirations to adjust. The violet line indicates behavioral agents' utility maximizing investment-aspiration pairs if they started with high aspirations after allowing for aspirations to adjust.

Integrating aspirations into the theoretical decision-making framework shows that policy interventions can target educational investments decisions through (1) reducing the costs involved with training investments or (2) addressing individuals' human capital aspirations. Section 2.2 provides a detailed description of the testimonial campaign's content and how it speaks to these two components. The theory further reveals that the effect of changing aspirations on investment decisions and utility is unclear a priori and depends on individuals' initial human capital level. For individuals with $k_0 < k_l$ or $k_0 > k_h$, raising aspirations will neither change the investment decision nor utility in equilibrium. For individuals with $k_l < k_0 < k^*$, raising aspirations will increase investments but decrease utility. Only for individuals with $k^* < k_0 < k_h$, raising aspirations will increase educational investments and utility.

2. Setting and experimental design

2.1. Vocational training and the N4G program

Vocational training programs are one of the most frequently implemented labor market interventions within development cooperation. Global stakeholders like the World Bank, ILO, and UNESCO promote well-functioning technical and vocational education and training (TVET) systems as a promising format to combat the high levels of youth un(der)employment, high rates of informality, skills shortages, and the associated low quality of jobs in Sub-Saharan Africa (ILO 2022; World Bank 2012, 2019; World Bank et al. 2023). The fourth Sustainable Development Goal advocates for broader and more equitable access to TVET (United Nations and Development 2015) and Africa's Development Dynamics 2024 report lists improved access to TVET as one of three political priorities to address skills shortages and changing skills demand in African countries (AUC and OECD 2024).

In Ghana, two main types of vocational training exist: formal Technical and Vocational Education and Training (TVET) and informal apprenticeships. Only 10-20% of vocational training takes place in formal TVET institutes. Programs follow a school-based approach but institutes differ regarding ownership, accreditation, duration, and costs. Government-owned institutes are nationally accredited, offering programs that typically last around three years and are free of tuition, though students must cover costs for exams, uniforms, and materials. These institutes are frequently criticized for their weak alignment with industry demands and the low quality of instruction (CTVET 2020; Dadzie et al. 2020; AUC and OECD 2024). Programs at private institutes are often conducted by establishments in the specific occupation, tend to be shorter, and charge high fees. Informal apprenticeships are the most common form of vocational training, accounting for the remaining 80-90% of basic skills training in Ghana. Irrespective of the type of vocational training, everyone can sign up for examinations with the National Vocational Training Institute (NVTI). The NVTI exams have a fee starting at around GHS 180 (approx. USD 20), evaluate only practical skills, and provide nationally recognized occupation-specific certificates at different proficiency levels (CTVET 2020).

From 2021 to 2023, the German Agency for International Cooperation (GIZ) Ghana, in collaboration with the Ghanaian non-profit organization Samira Empowerment and Humanitarian Projects (SEHP), ran a tuition-free vocational skills training program called N4G.[7] The design of N4G incorporated a multitude of program elements that previous evaluations identified as most effective in benefiting participants (Agarwal and Mani forthcoming; Carranza and McKenzie 2023; Kluve et al. 2017). It stands out from other training opportunities in Ghana by combining the hands-on, practical focus of informal apprenticeships with the structured, formalized approach of institutionalized training programs, all delivered in a highly condensed format. N4G offered training in three occupations within the fashion industry – Dressmaking, Hairdressing, and Beauty Therapy – spanning the cities of Accra, Kumasi, and Tamale, with program durations ranging from two and six months. The training was delivered by different providers, depending on the occupation and location (see Frohnweiler et al. 2024, for a more detailed program description).

Eligible women could sign up at community events held between April and November 2021 for a chance of receiving access to N4G.[8] Communities were selected based on the project partners' local knowledge of where most head porters – the program's main target group – live and work. In total, 1,575 eligible women registered, out of which 1,109 were randomly selected and invited to participate in N4G. The remaining 466 women were not invited and are excluded from the subsequent analysis.

A rigorous impact evaluation of the N4G training showed that while N4G had only muted overall effects on employment and income, it led to occupational sorting, substantially increased job quality, and positively affected quality of life. Women invited to the N4G training are more than twice as likely to work in their field of specialization, more likely to have a written labor contract (7.4 pp) and medical benefits (5.4 pp), reduced anxiety (3.4 pp) and stress (0.9 pp), delayed marriage (8.0 pp), and increased access to a bank account (6.8 pp) (Frohnweiler et al. 2024) .

This unique setting reduces the sample to women who are serious about training participation to begin with. It further minimizes classic external costs of training participation as much as possible through free training provision and monthly stipends, which will allow for a more isolated assessment of the relevance of internal constraints for training participation.

---

7.   N4G is the abbreviation for *Network for Enterprise Development Learning through Sewing for Girls*.

8.   Only women aged 16 to 24 years with at most a completed senior high school degree, no prior training participation within the fashion industry, and no childcare responsibilities were eligible. These eligibility criteria were defined by GIZ Ghana and SEHP. Upon registration, study participants were asked for their written consent to participate in the survey, allow their contact details be used for follow-up interviews, and permit the use of anonymized data for research purposes. Everyone who registered was informed that only a random subset will get access to the N4G training program.

2.2. The testimonial campaign

The testimonial campaign contained two videos and up to 30 follow-up text messages (or Short Message Service, SMS) that were sent before the training started and during the training period. Study participants were randomly assigned into three groups. The first group, my treatment group, received videos and messages in which women talked about aspects related to self-efficacy. A second group, the pure control group, did not receive any video or text message. The third group, serving as a placebo or neutral treatment group, received videos and messages in which women repeated the information provided during the registration process about the potential benefits of vocational training.

All videos had a duration of three minutes and were designed as comparable as possible. They featured different Ghanaian women of similar socioeconomic background as the women who registered for N4G. The self-efficacy videos presented two women: one a welder and one a business owner for organic-beauty products. The women describe how perseverance, role models, and setting small goals helped them in accomplishing their bigger dreams. They clarify that everyone sometimes faces setbacks, anxiety, or worries, but that they can be overcome and that it can help to ask others for advice. The neutral videos narrated the experience of four women who completed vocational training and are now working as a fashion designer, baker, hairdresser, and car sprayer. The women talked about their decision to start a vocational skills training and that the training provided them with manual skills and a certificate which helped them to find employment or start their own business. This content very closely mirrors the information that was shared with all women during the N4G registration process. I therefore refer to this arm as the neutral testimonials. The follow-up messages repeated or expanded on the content of the respective topic, and some shared again the personalized video links. The videos were recorded in basic English, Dagbani, and Twi. Participants received the video in the language that best matched their language knowledge reported during the registration process. The text messages addressed participants by their first name and were written in basic English. Appendix I shows screenshots of the videos and some exemplary text messages of the self-efficacy and neutral testimonial campaign.

Individuals of the two testimonial groups received the videos through text messages containing a short introduction to the video and a personalized link leading to a private YouTube channel.[9] To ease access to the videos, individuals received a mobile money transfer of GHS 2 shortly after the messages containing the links to cover the expenses for mobile data.[10] The first video was sent after participants had registered for the N4G program, but before the training started. The second video was sent in the first weeks of training. Since the registration times varied across individuals, the gap between receiving the first video and the scheduled training start ranged from two weeks to six months (median: 72 days) and the gap between the first and second video spanned from five weeks to five months (median: 82 days). Between one and two weeks after the second video, the follow-up messages were sent. Treated individuals received a minimum of two and a maximum of 30 follow-up messages (median: 26), which were sent at 6am on three days per week (Wednesdays, Fridays, and Sundays). Appendix Figure A.I.3 displays the exact timing of the campaign's steps for each study participant.

---

9.   Videos could only be accessed with a personalized link and could not be accessed through the search function.

10.   Money was transferred in form of airtime for individuals who reported to have a smartphone and in form of phone credit for individuals without smartphone. Even though the control group did not receive any videos, they also received the two money transfers.
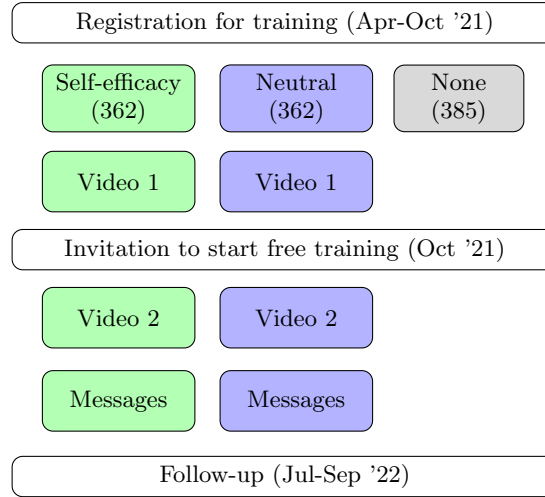
FIGURE 3. Intervention timeline

I expect my sample to be well-suited for a self-efficacy campaign. As done by other self-efficacy interventions and given that, especially in low-income countries, women continue to have lower educational attainment then men (Bentaouet Kattan et al. 2023) and because women tend to have lower aspirations (Molina and Usui 2023), and earnings expectations (Reuben et al. 2024), I target a sample of young women. More specifically, the N4G training focused on young women initially working as head porters, in Ghana, commonly referred to as "Kayayei". They work in marketplaces, carrying goods for traders and shoppers using buckets or baskets balanced on their heads, often for a minimal fee. Head porters frequently endure harsh and unstable working and living conditions, with limited access to basic needs such as education, shelter, and health care and are often targets of exploitation and violence. Many of them (temporarily) migrated from more rural areas to the cities to accumulate savings to enable a living at home, and they are commonly perceived as a vulnerable group.

2.3. Randomization and sample characteristics

All 1,109 women invited to participate in the N4G training program were randomly assigned to one of the three experimental arms. Randomization was stratified by baseline characteristics, including the registration city, selected training occupation, employment, education, self-efficacy, and access to a smartphone. For the analysis, the sample is limited to subjects that were interviewed at baseline and follow-up, resulting in a final study sample of 1,009 observations (see Table 1).[11]

TABLE 1. Intervention sample across treatment arms and survey waves.

| | Testimonials | | | |
	Self-efficacy (1)	Neutral (2)	None (3)	Total (4)
Baseline (2021)	362	362	385	1,109
Follow-up (2022)	328	332	349	1,009

Note: Table shows the distribution of study participants across treatment arms and data collections.

The decision to concentrate on study participants who received access to the N4G training program is based on two interlinked arguments. First, due to the mechanically induced difference in access to training programs the intervention's effects on participation in vocational training

---

11.   In Section 4.5, I discuss the results of an attrition analysis.

programs cannot be assessed jointly for participants who received access to N4G and those who did not. Only 31 women (7.5%) of the control group without N4G access started another training program (and only 4 (1.0%) completed it). Second, the substantially lower sample size of those who were not invited to N4G does not provide sufficient variation for the main outcome variables on training participation.

Appendix Table A.II.1 shows that all three experimental arms are balanced for key demographic characteristics, personality traits, outcomes measured prior to treatment, and training-related information. The program's restriction to women aged between 16 to 24 years was strictly enforced, and the average age in the sample is 20.6 years. At baseline, 39% of the participants were married and 19% had at least one child. The majority had either completed junior high school (30%) or senior high school (46%). Most study participants were not formally employed (78%) resulting in a low average monthly income of 8.59 USD and 10.6 working hours per week across all study participants. The majority of participants are located in Accra (63%) and most registered for the training in Dressmaking (48%).

3. Descriptive analysis

Take-up of the N4G training was low. Appendix Figure A.II.1 shows that among invited women, only 49.0% started the N4G training and 40.0% completed it. Very few study participants started another vocational training program (2.7%) and even fewer completed one (0.4%). The majority of participants that discontinued, did so within the first 10 days of training (Appendix Figure A.II.2). The most common response from participants for why they dropped out of the program and the second most frequent response for why they did not start the N4G training was that they were no longer available. Instead of participating in the training, they started a job, enrolled in further formal education, or pursued family commitments (Appendix Figure A.II.3).[12]

The low take-up rates and reasons for drop-out could suggest that some women did not start or complete the N4G training because better alternatives became available. However, the results of the rigorous impact evaluation of the N4G program described in detail by Frohnweiler et al. (2024) and summarized in Section 2.1 revealed that participating in the N4G training appears to have been a welfare-improving decision. Also, women hold extremely positive perceptions about vocational training and their benefits and low perceived benefits do not seem to be the bottleneck in the present setting. Upon registration, women expect large monetary gains of completing a vocational training (+USD 34 in monthly income, median), 94.8% belief that it increases a person's social status, and 93.7% belief that it increases a person's social status. Thus, it is crucial to understand what best predicts individuals' training participation.

The decision to participate in a training program may be influenced by a multitude of interlinked factors. Rigorous impact evaluations often dispose of rich, yet often smaller, datasets on individuals' baseline characteristics with strong inter-dependencies between variables and potential interactions in the relation of these variables with the outcome. Linear models are unlikely to provide a good fit for such data. While machine learning (ML) techniques cannot identify the relevance of single parameters, they are recognized as a powerful tool to flexibly investigate relationships based on data with complex interactions by showing the relative importance of variables (Mullainathan and Spiess 2017; Baiardi and Naghi 2024). Furthermore, in settings where a large number of covariates is available for a relatively small sample size, ML models can be more appropriate than traditional methods because ML models use regularization methods to uncover the most predictive covariates (Baiardi and Naghi 2024).[13]

---

12.   Logistic difficulties in terms of women not knowing about their invitation to the N4G program were the most frequent response for why women invited to the N4G training did not start. Women were informed about their invitation via SMS and follow-up calls by training providers.

13.   Existing studies apply ML to household and individual-level data to predict poverty (McBride and Nichols 2015), labor market performance (Yamada and Otchia 2022; McKenzie and Sansone 2019), optimal labor hiring (Chalfin et al. 2016), or high school dropout (Sansone 2019).

I apply the *random forest* algorithm, introduced by Breiman (2001), to identify the most important predictors of training participation. Random forest employs "parallel ensembling," meaning it fits multiple decision trees simultaneously. Each decision tree is constructed using a separate bootstrap (or training) sample drawn from the original data using feature bagging with replacement to ensure low correlation between trees. One third of each bootstrap sample is set aside as test data, also called the out-of-bag sample. For classification tasks, i.e., for categorical outcomes, random forest uses majority voting for the prediction. In the final step, cross-validation based on the out-of-bag sample is used to finalize the prediction. Thereby, random forest minimizes over-fitting problems and increases prediction accuracy. As covariates, I include all individual baseline characteristics, and impute zero for missing values together with a missingness indicator.

Figure 4 shows the prediction results. The importance measure indicates how much more accurate the prediction of training start and completion becomes with the inclusion of each individual baseline variable. The variable that receives the highest importance value for explaining individuals' decision to both start and complete the training is baseline self-efficacy. Ex-post, this provides descriptive evidence for the relevance of self-efficacy for individuals' decision to invest in post-secondary training. Moreover, other covariates that may also reflect individuals' internal constraints, such as risk tolerance and patience, also receive a relative high ranking in explaining training participation.
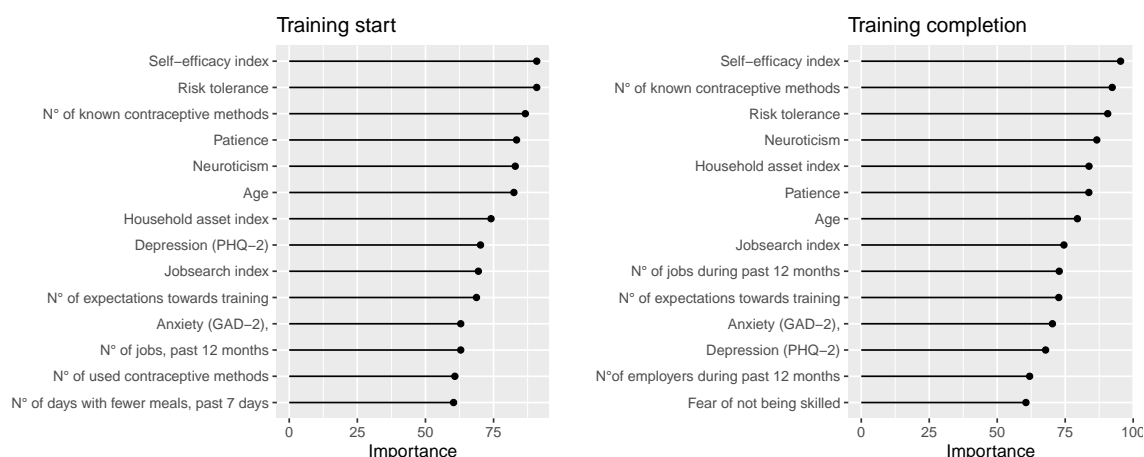
FIGURE 4. Determinants of training participation.
Notes: The figure shows the relative importance of baseline characteristics of study participants in explaining the decision to start (left) and to complete the N4G training (right) identified through random forest.

I use the 14 most important variables identified by random forest in an OLS regression to predict the probability of starting (Appendix Table A.II.2) and completing (Appendix Table A.II.3) the N4G training. Aside random forest (column 1), I also use four alternative approaches to select the explanatory variables and to compare the performance of random forest to other common methods used in the literature to identify the determinants of training participation. Column (2) uses a logit adaptive lasso estimation over all baseline characteristics. Column (3) applies a logit elastic net estimation using cross-validation to obtain the optimal α and λ. Column (4) uses external constraints to training participation that so far have been considered in the existing literature. Column (5) combines the baseline variables selected by all four approaches.

Adaptive Lasso and Elastic Net only select three variables each. Self-efficacy as well as other psychological and personality baseline outcomes are only considered by random forest. A one standard deviation increase in the self-efficacy index is associated with an increased probability of starting the training of 4.1 percentage points which equals an increase by 8.4% relative to the overall N4G take-up rate of 49%. The other baseline variables that have a significant correlation with training start are age, risk preferences, self-esteem, and expectations towards the N4G training which only partly overlap with the relative importance detected by the random forest. The models have only a limited explanatory power for training participation. Combining the explanatory variables

of all three models in column (5) explains only 12.5% of the variance in self-reported training start. I further compare the prediction accurateness of random forest, adaptive lasso, and elastic net in Appendix Table A.II.4. The predicted probabilities of training start (Panel A) and training completion (Panel B) obtained by random forest (column 1) are more more precisely estimates and have higher explanatory power than the ones obtained by adaptive lasso (column 2) and elastic net (column 3).

4. Effects of the testimonials

In light of the theoretical framework outlined in Section 1 and the literature showing the strong linkage between self-efficacy and aspirations (Ansong et al. 2019; Bandura 1993; Bandura et al. 2001; Roy et al. 2018), the design of the testimonial campaign and subsequent analysis is based on the following theory of change. First, I expect the self-efficacy testimonials to increase treated women's self-efficacy level. Second, I expect the higher self-efficacy levels to translate into an increased aspiration of women to invest in their human capital, which I expect to materialize in an increased participation in the N4G training. However, I only expect effects on participation for a subsample of the treated women. For women with very low or very high initial human capital levels, the theoretical framework predicts unique behavioral solutions which cannot be altered by a boost in aspirations. Instead, for women in the middle of the human capital distribution, the framework predicts that the increased aspirational level will lift them out of an aspirational trap and induce more women to opt for the high investment-aspiration pair, i.e., to participate in the training. The analysis will disentangle whose investment decisions changed in response to the testimonials and whose not, but will not be able to assess welfare implications.

4.1. Empirical specification

I estimate the intent-to-treat (ITT) effects of the testimonials on training participation, employment, and quality-of-life outcomes using the following ANCOVA specification:

$$Y_{i,1} = \beta T_i + \gamma Y_{i,0} + \delta_{r(i),o(i)} + \varepsilon_i, \tag{3}$$

where $Y_{i,1}$ is the outcome of individual i at post-intervention time $t = 1$ and T_i is an indicator for whether the individual was assigned to the testimonials on self-efficacy or the control group. I always control for region-occupation fixed effects $\delta_{r(i),o(i)}$ and, if available, the baseline outcome $Y_{i,0}$.[14] For each hypothesis test, I report robust standard errors and the p-value from a standard Wald test.[15]

Treatment delivery relies on treated participants reading the text messages, clicking on the links, and watching the video. In addition, treated participants might have told their peers about the content of the videos and messages, causing control participants to also receive the treatment. To address imperfect compliance with treatment assignment, I use an instrumental variables approach to estimate complier average causal effects (CACE). In the follow-up survey, participants self-reported whether they received messages with video links, watched the videos, and remembered the content of the videos. For the CACE estimations, I instrument the latter indicator with treatment assignment

The main outcome variables are self-efficacy and training participation. I measure self-efficacy using the four-point Generalized Self-Efficacy (GSE) scale introduced by Schwarzer and Jerusalem (1995) and using individual survey items to create an index that varies between zero and one.[16] The

---

14.   Whether or not the baseline outcome is included, is reported in the bottom row of each regression table.

15.   The pre-analysis plan registered clustered standard errors at the location level. However, in the end the training was only implemented in three different regions and across seven different providers. Due to the very limited number of clusters, I use robust standard errors instead.

16.   Schwarzer and Jerusalem (1995) define generalized self-efficacy as an individual's general belief in their ability to "respond to and control environmental demands and challenges".

follow-up survey included four items referring to the following statements for which respondents had to indicate their level of (dis-)agreement: (1) I can always manage to solve difficult problems if I try hard enough, (2) When I am confronted with a problem, I can usually find several solutions, (3) It is easy for me to stick to my aims and accomplish my goals, and (4) I am confident that I could deal efficiently with unexpected events.

The GSE scale is frequently used to measure self-efficacy, including in developing country contexts (e.g., John and Orkin 2022; McKelway 2024; Roy et al. 2018, in India and Kenya). For training participation, I rely on a set of indicators based on self-reported and administrative data. The self-reported data was collected in a follow-up survey six months after the N4G training ended. Participants were asked whether they started and completed the N4G training or any other training program. They further responded to questions about the usefulness of the training, their manual and soft skills, participation in a NVTI examination, whether they received and accepted a placement offer by the training provider, their employment status and job search efforts during the past 12 months, and aspects of their mental health. The administrative data is drawn from attendance sheets submitted by training providers, where participants confirmed their daily attendance by signing.

I pre-registered the full experiment through the AEA RCT Registry (AEARCTR-0007968), which specified the implementation of the intervention, the outcome categories, potential mechanisms, and the OLS and CACE estimations. I deviate from the pre-analysis plan by excluding women who registered for the N4G program but were not invited to participate due to the reasons outlined above. Additionally, the neutral testimonials were registered as a separate treatment arm. At the time of the pre-registration it was not yet clear that the registration procedure for N4G would provide that much detail on potential benefits of vocational training.

4.2. Success of testimonial delivery

Table 2 assesses the take-up of the self-efficacy testimonial campaign.[17] Column (1) examines the effect on the probability of ever clicking on one of the sent video links, column (2) shows the effect on the number of clicks, and columns (3) and (4) examine participants' responses regarding whether they watched and remembered at least two content components of the self-efficacy videos, respectively. Columns (5) and (6) focus on the number of follow-up SMS as reported by the participants and recorded in our system, respectively.

The intervention was successfully delivered. Tracking the clicks of the individualized video links shows that 35.0% of the treated women ever clicked on one of the videos. On average, each individualized link was used 0.78 times. Women assigned to the self-efficacy testimonial group are 19.9 percentage points more likely to report having watched the videos and almost everyone who indicated to have watched the videos also remembered their content even eight months later. While the self-reported take-up of the campaign is comparable to other SMS-based interventions (Bahety et al. 2021), the click-through-rate is substantially larger than for other interventions that delivered videos via SMS. A campaign in India provided individuals with SMS containing links to short video clips and reports viewing rates of only 1.14% (Banerjee et al. 2020). The delivery of the neutral testimonials was equally successful (Appendix Table A.III.1).

Among the control group, a small share of individuals also indicated to have watched the self-efficacy videos (5.4%). The share reduces to 1.7% when looking at those who remembered the content. Similarly, some participants of the self-efficacy treatment arm indicated to have watched the neutral testimonials (6.7%) and remembered the content (1.5%). However, these shares are very small and were anticipated given that some of the study participants knew each other already at the time of registration, some live in the same communities, and some were assigned to the same training providers. To check for potential spillovers arising from treated participants in the same training program, I compare the treatment saturation for each region-occupation combination to region-occupation specific spillovers. I measure spillovers using the share of women who indicated

---

17. The regressions compare outcomes of women assigned to the self-efficacy testimonials to outcomes of women assigned to the control group. Women assigned to the neutral treatment are excluded from the regressions.

TABLE 2. Effect of treatment assignment on receiving the self-efficacy testimonials.

	Video click		Self-efficacy video		N° of SMS	
	Ever (1)	N° (2)	Watched (3)	Remembered (4)	Self-reported (5)	Sent (6)
SE testimonials (assigned)	0.350***	0.788***	0.199***	0.185***	7.602***	27.711***
	(0.025)	(0.088)	(0.027)	(0.023)	(0.434)	(0.161)
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Observations	747	747	677	677	651	747
Control mean	0.000	0.000	0.054	0.017	0.000	0.000
Baseline outcome						

Note: Results from OLS estimations. The outcome variables indicate if respondents ever clicked on any of the individualized links (column 1), the number of recorded clicks for the individualized links (column 2), if respondents reported to have watched the videos or remembered at least two content components (columns 3 and 4), and self-reported and actual number of received follow-up SMS (columns 5 and 6). Estimations include region-occupation FE. Robust standard errors are displayed in parentheses (* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$).

to have watched or to remember the content of the videos among untreated women or women assigned to the other testimonial group (Appendix Figure A.II.4). Assuming that the same person will only watch the same video a limited number of times, I can also use the number of recorded clicks per individualized video link as proxy for spillovers (Appendix Figure A.II.5). For none of the spillover measures I observe consistently higher spillovers in region-occupation combinations with higher treatment saturation.

4.3. Main results

To test whether the self-efficacy testimonials were effective in boosting self-efficacy, Table 3 shows results for their effect on self-efficacy and other psychological outcomes measured approximately six months after the end of the training and eight months after receiving the last SMS. Panel A shows OLS estimations, i.e., the average treatment effect for women assigned to receive the self-efficacy testimonials. Panel B shows CACE estimations to account for imperfect treatment compliance, i.e., the average treatment effect among women who remembered at least two content components of the self-efficacy videos. For the interpretation, I will concentrate on the more conservative OLS estimates because they reflect the key challenge of such campaigns which is the (mis-)success of reaching the targeted population.

The testimonials resulted in a significant increase in the reported levels of self-efficacy while other psychological outcomes remained unaffected. Column (1) shows that treated women's self-efficacy index is 0.14 standard deviations higher than that of women in the control group.[18] The effect size is very similar to effects reported by other interventions addressing self-efficacy through intensive in-person interventions. McKelway (2024) report an effect of 0.12 standard deviations of an intervention among women in India with several in-person sessions and a similar – if anything, shorter – time gap between the intervention and post-treatment outcome measurement.[19] John and Orkin (2022) conducted a two-session intervention with young women in Kenya and report an increase in self-efficacy between 0.11 and 0.15 standard deviations ten weeks later.

The self-efficacy testimonials might have also affected life satisfaction or mental health, for example, due to a better handling of stress. However, columns (2) to (6) of Table 3 show no significant differences for any of the additional psychological dimensions. I do not observe significant differences between women assigned to the self-efficacy testimonials and untreated women in terms

---

18.   Appendix Table A.III.2 disentangles the self-efficacy index into its separate items. The treatment coefficients are positive for all items, but the self-efficacy testimonials seem to have especially affected women's belief in being able to solve problems.

19.   McKelway (2024) measured self-efficacy five weeks, seven weeks, five months, and 13 months after baseline and she pools data across all follow-up surveys. Her intervention finished five-weeks after the baseline.

of their mental health index, any of the individuals mental health components (anxiety, depression, and stress), self-esteem, conscientiousness, or general life satisfaction.

TABLE 3. Effect of the self-efficacy testimonials on psychological outcomes.

| | Self-efficacy index | Mental health | | | | Self-esteem | Conscien-tiousness | Life satisfaction |
		Index	Anxiety	Depression	Stress			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
[A] OLS estimations								
SE testimonials (assigned)	0.137*	-0.010	-0.024	-0.002	-0.004	-0.012	0.029	-0.003
	(0.072)	(0.013)	(0.022)	(0.020)	(0.004)	(0.010)	(0.023)	(0.018)
	[0.058]	[0.421]	[0.260]	[0.902]	[0.304]	[0.239]	[0.201]	[0.855]
[B] CACE estimations								
SE testimonials (remembered)	0.741*	-0.052	-0.122	-0.013	-0.022	-0.062	0.158	-0.018
	(0.398)	(0.066)	(0.111)	(0.101)	(0.022)	(0.053)	(0.125)	(0.098)
	[0.063]	[0.427]	[0.274]	[0.901]	[0.307]	[0.238]	[0.207]	[0.855]
1st stage F-stat	65.588	68.005	67.781	67.424	69.106	65.864	65.360	65.998
Observations	677	633	633	633	633	677	677	677
Control mean	-0.010	0.219	0.327	0.271	0.060	0.952	0.845	0.516
Baseline outcome	✓	✓	✓	✓	✓	✓	✓	

Note: Panel A shows results from OLS estimations. Panel B shows results from IV estimations using the random treatment assignment as instrument for remembering at least two content components of the videos. The outcome variable in column (1) is standardized with mean zero and standard deviation one, variables in columns (2) to (8) vary between zero and one. Estimations include region-occupation FE. Robust standard errors are displayed in parentheses (* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$).

Next, I assess the effect of the self-efficacy testimonials on individuals' decision to participate in the N4G training, examining both the extensive and intensive margins. Table 4 summarizes the results, with columns (1) to (3) showing effects on women's self-reported participation in N4G, and columns (4) and (5) presenting effects on participation as recorded in the attendance sheets.

Receiving the self-efficacy testimonials did not significantly affect women's overall probability of starting or completing the N4G training. This holds true for both self-reported and administrative measures of training participation. However, among women who started the N4G training (columns (3) and (5)), the self-efficacy testimonials significantly increased the probability to complete the training by 8.1 percentage points, an increase of 10.5% compared to the control mean. Women who started the training and received the self-efficacy testimonials also attended 3.6 more training days than untreated women, but the difference is not statistically significant.

Since the testimonials did not significantly affect training start, restrict the sample to women who started N4G in columns (3) and (5) is unlikely to introduce sample selection bias. Still, I assess whether results remain robust when I instead restrict the sample based on women's predicted probability to start the N4G training and repeat the regressions on training completion and number of attended training days in Appendix Table A.III.3.[20] The positive effect found for completion increases in its magnitude and the coefficient for attended training days becomes significant.

I run the same regressions for the neutral testimonials that speak about other women's experience with vocational training. They had no significant effect on women's participation in any dimension, also not among women who started the training. In Section 5 I discuss the analysis and results in more detail.

4.4. Heterogeneous treatment effects

The results in Table 4 show the average effects of the testimonial campaign. However, the theoretical framework suggests that changes in self-efficacy should only affect the participation decisions of a specific subset of individuals – namely, women with medium baseline human capital and low baseline aspirations. Therefore, I also assess potential treatment effect heterogeneities by conducting subsample analyses based on women's initial human capital and self-efficacy levels.

---

20.   In the subsample of women who did not receive any testimonials, I train a random forest based on all baseline individual characteristics and use it to predict N4G training start in the total sample.

TABLE 4. Effect on training participation.

	Self-reported			Attendance sheets	
	Started (1)	Completed (2)	Completed if started (3)	Started (4)	N° of days (5)
[A] OLS estimations					
SE testimonials (assigned)	-0.027	0.024	0.081**	-0.039	3.573
	(0.037)	(0.036)	(0.040)	(0.033)	(2.638)
	[0.463]	[0.501]	[0.043]	[0.227]	[0.176]
[B] CACE estimations					
SE testimonials (remembered)	-0.146	0.132	0.365*	-0.213	21.205
	(0.201)	(0.196)	(0.186)	(0.187)	(13.715)
	[0.467]	[0.501]	[0.051]	[0.255]	[0.123]
1st stage F-stat	65.998	65.998	47.550	65.998	41.648
Observations	677	677	370	677	361
Control mean	0.559	0.433	0.774	0.547	49.387
Baseline outcome					

Note: Panel A shows results from OLS estimations. Panel B shows results from IV estimations using the random treatment assignment as instrument for remembering at least two content components of the videos. The outcome variables in columns (1) to (4) are binary. Training start in the admin data equals one if a study participants is listed at least once in the attendance sheets. The outcome in column (5) is integer. Columns (3) and (5) reduce the sample to women who started the training. Estimations include region-occupation FEs. Robust standard errors are displayed in parentheses and p-values in squared brackets (* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$).

I start by differentiating between women's baseline education levels, categorizing them into three subgroups: (1) no formal education or only primary education, (2) junior high school (JHS), and (3) senior high school (SHS). I then re-estimate the effect of the testimonials on training participation for each group. Figure 5 displays the ITT coefficients and their 90% confidence intervals for the different outcomes and subsamples. The positive effect of the self-efficacy testimonials on completion among women who started the N4G training is only significant for women who started or completed JHS, i.e., those with medium initial human capital. For this subgroup, I also observe a significant increase in attended training days as recorded by the attendance sheets. For women who started or completed SHS, the coefficients are close to zero across all outcomes, while for women with no formal education or only primary education, the effects on conditional completion and training days are positive but not significant.
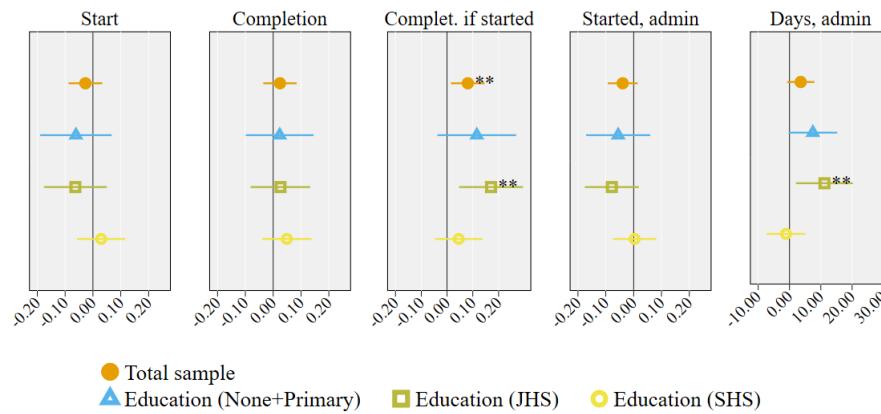

FIGURE 5. Effect on participation by baseline education.
Notes: The figure displays the ITT coefficients and their 90% confidence interval for the effect of the self-efficacy testimonials on N4G training participation by women's baseline education. The subgraphs refer to the different indicators of training participation and the different colors represent the different subsamples.

To also capture other dimensions of human capital apart from education, I construct a human capital index integrating the dimensions of women's educational attainment, work experience, and personality traits at baseline. Educational attainment reflects the achieved formal educational level (none or primary, junior high school, and senior high school). Work experience distinguishes between women who are employed or not. The personality dimension captures respondents' self-assessment in terms of self-esteem, conscientiousness, neuroticism, anxiety, and fear of not being skilled enough. Each dimension is assigned assigned equal weights of one third and the index is normalized to range between zero and one.[21] Again, I split women into terciles and run separate regressions for each human capital tercile (Appendix Figure A.III.1). The positive effect on completion and training attendance is concentrated among women in the lowest human capital tercile. Based on the theoretical framework, one would intuitively expect that the effects are concentrated among women in the middle tercile. But, one has to keep in mind that the study sample is not representative for the entire population. Women self-selected into registering for the N4G training and therefore, it is plausible to expect that women with very low human capital levels did not even register to begin with and are therefore not included in the study sample.

The theoretical framework further suggests that changes in participation decisions should only happen among women with initially lower aspirational levels. As a proxy for their initial aspirations, I split women into terciles based on their reported self-efficacy levels at the time of registering for N4G and Appendix Figure A.III.2 plots the results. As expected, only women with low initial self-efficacy levels are positively affected by the campaign in terms of completing the training and number of attended training days. No significant effects are found for women with higher initial self-efficacy levels.

Lastly, the more recent theoretical literature understands internal constraints as common behavioral biases, "except that in poverty (...) the same behaviors (...) can lead to worse outcomes" (Bertrand et al. 2004, p. 1). The design of the N4G training minimized the most common external constraints and the strict eligibility criteria resulted in a relatively homogeneous study sample. Nevertheless, some minor differences regarding external constraints might still exist. Based on the baseline information, I construct an index of individuals' external constraints consisting of having children, being married or in a relationship, having a relatively lower household asset index, not speaking English, and having raised a relatively higher number of concerns related to the N4G training. Appendix Figure A.III.3 compares the treatment effects of women with lower and higher external constraints. I find that the self-efficacy testimonials are only beneficial in terms of training take-up for women who faced higher external constraints at the time of registering for the training, which is consistent with the prediction that alleviating internal constraints becomes more important under higher external constraints.

4.5. Robustness checks

I conduct several robustness checks to corroborate the main findings. The results are shown in Appendix Table A.III.6. First, I evaluate the robustness of the findings to selective attrition. Sample attrition in the follow-up survey is balanced across treatment assignment (Appendix Table A.III.7) but significantly related to several baseline characteristics (Appendix Table A.III.8).[22] To account for selective attrition, I apply inverse probability weights and the findings remain unchanged.[23] Second, I investigate whether inference is sensitive to alternative assignments of treatment status. The p-values remain similar when I use the Fisher's permutation-based randomization inference test.[24] Third,

---

21.   An alternative index construction circumventing the limitations of interpreting cardinal responses would be to index the individual personality traits to an outcome with a clear cardinal interpretation like income (e.g., Cohen et al. 2023). However, in my setting this is not possible given that 78% of the sample is unemployed at baseline.

22.   Women who left the sample are younger, more likely to have children, less educated, have lower self-efficacy and higher anxiety levels, more likely to be self-employed, and have higher monthly incomes.

23.   I predict participation in the six-months follow-up with treatment assignment and the same individual baseline characteristics as used for the balance checks.

24.   I use the Stata command `ritest` with 1,000 replications from Heß (2017).

I control for additional baseline characteristics selected based on the post-double selection Lasso (PDS Lasso) method Alexandre Belloni (2014) and treatment coefficients and significance levels remain unchanged. Lastly, I correct for multiple hypothesis testing using the approaches suggested by Benjamini et al. (2006) to control for the false discovery rate. As a result, the coefficient for completion conditional on having started loses its significance.

5. Mechanisms and downstream outcomes

The results presented so far suggest that the self-efficacy testimonials increased the probability to complete the N4G training among women who started it, with the effects concentrated among those in the middle of the human capital distribution, with lower initial levels of self-efficacy, and with relatively higher external constraints. In the following, I seek to shed light on the mechanisms through which the testimonial campaign affected women's participation decisions.

First, the testimonial campaign could have affected participation through a simple reminder effect of receiving multiple SMS. To assess this, I compare the effects of the self-efficacy testimonials to those of the neutral testimonials. Both testimonial sets consisted of the same number of video and follow-up messages and their delivery was equally successful. If the effects on participation observed among women who received the self-efficacy testimonials could solely be attributed to the fact that women received multiple SMS which reminded them of the N4G training, one would expect to see the same effect among women who received the neutral testimonials even though they had no effect on women's perceptions about vocational training. However, I find that the the neutral testimonials had no significant effect on participation in the N4G training, neither at the extensive nor the intensive margin (Appendix Table A.III.4. Confirming the placebo interpretation, women who received the neutral testimonials do not associate higher monetary gains, higher employment probabilities, or higher social status with the completion of vocational training than women who did not receive any testimonials and do not differ in terms of their self-efficacy levels or any other of the psychological outcomes (Appendix Table A.III.5). The effects observed among women who received the self-efficacy testimonials can thus not solely be attributed to a reminder effect.

Second, the testimonials could have encouraged women to participate more actively in the training. I assess women's (i) reported usefulness of the training, (ii) participation in an NVTI assessment, (iii) and the probability of having received a placement offer by the training provider. At the end of the N4G training, women had the opportunity to participate in an NVTI examination to get a nationally accredited certificate for their manual skills. The exam fees were covered by GIZ. Moreover, as part of the N4G program training providers offered job placements to their trainees upon successful completion of the training. However, the examination and placement components were only offered to a small share of trainees who were arguably the best performing ones. Table 5 shows that women who received the self-efficacy testimonials reported higher usefulness of the training, had an increased probability of being assessed for NVTI, and were more likely to be offered a job placement by their training provider.

Third, the testimonials could have induced a compositional change in who started the N4G training. I have already shown that the effects on training attendance and completion conditional on training start strongly differ by women's baseline characteristics. Similarly the testimonials could have encouraged some women to start the training but discouraged others explaining the unchanged participation rate in the total sample. In Table 6, I compare baseline characteristics of women who received the self-efficacy testimonials and of women who did not receive any testimonial by regressing the treatment status on a set of key observable characteristics. The comparison in column (1) includes all study participants. None of the coefficients is significant and the p-value of a joint F-test at the bottom of the table indicates that at baseline both samples were jointly balanced. In column (2), I reduce the sample to women who started the N4G training. The p-value of the joint F-test at the bottom of the table indicates that the self-efficacy testimonials induced a significantly different type of women to start the training, thereby creating a compositional shift. Among women who started the training, those who received the self-efficacy testimonials had higher baseline education,

TABLE 5. Effect on training outcomes.

	Training usefulness	NVTI Certificate	Placement Offered
	(1)	(2)	(3)
SE testimonials (assigned)	0.445^{*}	0.104^{**}	0.073^{*}
	(0.234)	(0.040)	(0.039)
	[0.059]	[0.010]	[0.061]
Observations	377	377	377
Control mean	7.576	0.162	0.152
Baseline outcome			

Note: Results from OLS estimations. Outcome variable in column (1) varies between 0 and 10. Outcome variables in columns (2) to (3) are binary. Estimations include region-occupation FEs. Robust standard errors are displayed in parentheses and p-values in squared brackets.

higher levels of depression, a stronger present bias, lower stress levels, fewer working hours, and a higher likelihood of being employed compared to women who did not receive the testimonials.

An alternative approach to detect compositional differences in training start is to estimate heterogeneous treatments effects of the testimonials on training start by baseline characteristics, utilizing a fully interacted model of treatment status and baseline characteristics. Appendix Table Table A.III.9 displays the treatment and interaction coefficients which largely confirm what we have seen earlier: the effect of the self-efficacy testimonials on training start is significantly more positive for employed women working fewer hours with higher levels of depression and lower stress levels. I do no longer observe significant differences regarding education but the interaction with self-efficacy shows that, in line with previous results, the effect of the self-efficacy on training start is significantly more positive for women with lower baseline self-efficacy levels.

I can further examine whether the implementation of the testimonial campaign matters for the magnitude of the effects. Effects are concentrated among women who received a larger number of follow-up SMS (Appendix Figure A.III.4). Moreover, women who had a smaller gap between registering and training start, and therefore a smaller gap between receiving the first video and the training start, see more positive effects of the testimonials (Appendix Figure A.III.5).

Lastly, I assess several downstream effects of the improved training participation. Women who received the self-efficacy testimonials report higher levels of manual skills in the occupation in which they received the training in, while no effects are found for soft-skills (Appendix Table A.III.10). Moreover, the testimonials did not significantly affect the probability to be employed (Appendix Table A.III.11), job quality (Appendix Table A.III.12), job search behavior (Appendix Table A.III.13), or living conditions (Appendix Table A.III.14).

6. Conclusion

In 2021 women aged between 16 and 24 living in deprived communities in the Ghanaian cities Accra, Kumasi, and Tamale could register for a vocational skills training program in the fashion industry. Through a detailed registration process that included career and counselling services, no tuition fees, monthly stipends, and a focus on women without childcare responsibilities the training minimized common external constraints to participation. Nevertheless, only 49.0% of the registered women started the training. I designed a video- and message-based testimonial campaign in which women narrate how they were able to overcome poverty, societal expectations, and personal fears through resilience, determination, goal-setting, perseverance, and self-belief to achieve their dreams. A random subset of the Women who registered received these testimonials before the training started and for the initial duration of the training, others did not receive any testimonials, and a third group received a neutral treatment.

TABLE 6. Prediction of testimonial status in total sample and among women who started the training.

	Self-efficacy testimonials	
	Total sample (1)	Started (2)
Age	-0.004	-0.020
	(0.011)	(0.017)
Married	-0.006	0.036
	(0.041)	(0.056)
Has children	-0.016	0.026
	(0.053)	(0.076)
Education: Primary	0.118	0.303**
	(0.097)	(0.133)
Education: JHS	0.041	0.235*
	(0.092)	(0.124)
Education: SHS	0.038	0.224*
	(0.090)	(0.122)
Self-efficacy, 1st tercile	-0.007	0.054
	(0.051)	(0.070)
Self-efficacy, 2nd tercile	0.013	0.029
	(0.052)	(0.072)
Depression (PHQ-2)	0.046	0.233*
	(0.087)	(0.119)
Stress level	-0.608	-1.177**
	(0.422)	(0.587)
Anxiety (GAD-2)	-0.038	-0.008
	(0.089)	(0.127)
Present bias	0.059	0.153***
	(0.039)	(0.055)
Any employment	0.059	0.260**
	(0.103)	(0.132)
Monthly income (among all)	0.000	0.001
	(0.001)	(0.001)
Weekly working hours (among all)	-0.001	-0.005*
	(0.002)	(0.002)
Observations	678	341
Joint F-stat (p-val)	0.895	0.003

Note: Results from OLS estimations predicting treatment assignment based on baseline characteristics in the total sample (column (1)) and the subsample of women who started the training (column (2)). Robust standard errors are displayed in parentheses (* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$).

While the testimonials did not change overall participation rates, they led to a compositional change and higher completion rates among women who started. Further, women who started and received the testimonials report higher usefulness of the training and are more likely to participate in a nationally accredited skill examination and be offered a job placement upon the completion of their program, both indicators for high training performance. More recent theoretical frameworks argue that while all individuals face the same behavioral biases, in poverty, they can lead to worse outcomes and that policies addressing such behavioral biases can enhance welfare. I can show that the testimonials increased treated women's reported self-efficacy levels while other psychological factors remained unaffected and that, in line with theory, the testimonials' effects are concentrated among women with medium educational levels, low human capital, low self-efficacy, and higher external constraints at the time of registration.

Overall, this shows that standard development programs addressing external constraints, e.g. human capital development, can benefit from partially improved participation when combined with an intervention addressing self-efficacy as one component of individuals' internal constraints. Although effect sizes are not large, such easily implementable and scalable as well as relatively cheap behavioral interventions might be a beneficial add-on within welfare programs and development cooperation. However, important questions for example regarding the effectiveness of such interventions by gender and a better understanding of which content components are particularly influential remain to be explored in more detail. Therefore, I argue that (1) program evaluations should assess internal and external constraints to individuals' participation, and – based on these

insights – (2) program designs should be adjusted to co-consider internal and external constraints to welfare improvement. Recent developments on the political agenda sound promising. In its Global Framework on core skills for life and work in the 21st century ILO (2021) proposes the integration of core skills encompassing key aspects of self-efficacy like self-awareness and problem solving in education and training programs. The same framework got incorporated into the Vocational Education and Training Toolbox which guides the program design of the development cooperation agencies of Belgium, France, Germany, Luxembourg, and United Kingdom (GIZ 2019).

References

Adoho, Franck, Shubha Chakravarty, Dala T. Korkoyah, Mattias Lundberg, and Afia Tasneem (2014). *The Impact of an Adolescent Girls Employment Program: The EPAG Project in Liberia*. Policy Research Working Papers, The World Bank, URL http://elibrary.worldbank.org/doi/book/10.1596/1813-9450-6832.

Agarwal, Neha and Subha Mani (forthcoming). "New Evidence on Vocational and Apprenticeship Training Programs in Developing Countries." In *Handbook of Experimental Development Economics*, edited by Utteeyo Dasgupta and Pushkar Maitra. URL https://www.ssrn.com/abstract=4851428.

Alan, Sule and Seda Ertac (2018). "Fostering Patience in the Classroom: Results from Randomized Educational Intervention." *Journal of Political Economy*, 126(5), 1865–1911.

Alan, Sule, Teodora Boneva, and Seda Ertac (2019). "Ever Failed, Try Again, Succeed Better: Results from a Randomized Educational Intervention on Grit*." *The Quarterly Journal of Economics*, 134(3), 1121–1162.

Alexandre Belloni, Christian Hansen, Victor Chernozhukov (2014). "Inference on Treatment Effects after Selection among High-Dimensional Controls." *The Review of Economic Studies*, (2), 608–650.

Alzúa, María Laura, Soyolmaa Batbekh, Altantsetseg Batchuluun, Bayarmaa Dalkhjavd, and José Galdo (2021). "Demand-driven youth training programs: Experimental evidence from Mongolia." *The World Bank Economic Review*, 35(3).

Ambler, Kate, Kelly Jones, and Michael O'Sullivan (2021). "Facilitating women's access to an economic empowerment initiative: Evidence from Uganda." *World Development*, 138, 105224.

Ansong, David, Sarah R. Eisensmith, Moses Okumu, and Gina A. Chowa (2019). "The importance of self-efficacy and educational aspirations for academic achievement in resource-limited countries: Evidence from Ghana." *Journal of Adolescence*, 70(1), 13–23.

Appadurai, Arjun (2004). "The capacity to aspire." In *Culture and Public Action, The International Bank for Reconstruction and Development*, edited by Vijayendra Rao and Michael Walton, pp. 59–84. Washington, DC: The World Bank.

Attanasio, Orazio, Adriana Kugler, and Costas Meghir (2011). "Subsidizing Vocational Training for Disadvantaged Youth in Colombia: Evidence from a Randomized Trial." *American Economic Journal: Applied Economics*, 3(3), 188–220.

AUC and OECD (2024). *Africa's Development Dynamics 2024: Skills, Jobs and Productivity*. Africa's Development Dynamics, OECD, AUC, Addis Ababa/OECD Publishing, Paris, URL https://www.oecd-ilibrary.org/development/africa-s-development-dynamics-2024_df06c7a4-en.

Azariadis, Costas and Allan Drazen (1990). "Threshold Externalities in Economic Development." *The Quarterly Journal of Economics*, 105(2), 501.

Bahety, Girija, Sebastian Bauhoff, Dev Patel, and James Potter (2021). "Texts don't nudge: An adaptive trial to prevent the spread of COVID-19 in India." *Journal of Development Economics*, 153, 102747.

Baiardi, Anna and Andrea A Naghi (2024). "The value added of machine learning to causal inference: evidence from revisited studies." *The Econometrics Journal*, 27(2), 213–234.

Bandiera, Oriana and Markus Goldstein (2010). "Intentions to Participate in Adolescent Training Programs: Evidence from Uganda." *Journal of the European Economic Association*, 8(2-3), 548–560.

Bandiera, Oriana, Niklas Buehren, Robin Burgess, Markus Goldstein, Selim Gulesci, Imran Rasul, and Munshi Sulaiman (2020). "Women's Empowerment in Action: Evidence from a Randomized Control Trial in Africa." *American Economic Journal: Applied Economics*, 12(1), 210–259.

Bandura, Albert, Claudio Barbaranelli, Gian Vittorio Caprara, and Concetta Pastorelli (2001). "Self-Efficacy Beliefs as Shapers of Children's Aspirations and Career Trajectories." *Child Development*, 72(1), 187–206.

Bandura, Albert (1978). "Self-efficacy: Toward a unifying theory of behavioral change." *Psychological Review*, 84(2), 191–215.

Bandura, Albert (1993). "Perceived Self-Efficacy in Cognitive Development and Functioning." *Educational Psychologist*, 28(2), 117–148.

Bandura, Albert (1997). *Self efficacy: the exercise of control*. W. H. Freeman, New York (N.Y.).

Banerjee, Abhijit V. and Andrew F. Newman (1993). "Occupational Choice and the Process of Development." *Journal of Political Economy*, 101(2), 274–298.

Banerjee, Abhijit, Marcella Alsan, Emily Breza, Arun Chandrasekhar, Abhijit Chowdhury, Esther Duflo, Paul Goldsmith-Pinkham, and Benjamin Olken (2020). "Messages on COVID-19 Prevention in India Increased Symptoms Reporting and Adherence to Preventive Behaviors Among 25 Million Recipients with Similar Effects on Non-recipient Members of Their Communities." Tech. Rep. w27496, National Bureau of Economic Research, Cambridge, MA, URL http://www.nber.org/papers/w27496.pdf.

Banerjee, Abhijit, Amy Finkelstein, Rema Hanna, Benjamin A. Olken, Arianna Ornaghi, and Sudarno Sumarto (2021). "The Challenges of Universal Health Insurance in Developing Countries: Experimental Evidence from Indonesia's National Health Insurance." *American Economic Review*, 111(9), 3035–3063.

Banerjee, Abhijit, Rema Hanna, Benjamin A Olken, and Diana Sverdlin Lisker (2024). "Social Protection in the Developing World." *NBER Working Paper*, 32382.

Baranov, Victoria, Sonia Bhalotra, Pietro Biroli, and Joanna Maselko (2020). "Maternal Depression, Women's Empowerment, and Parental Investment: Evidence from a Randomized Controlled Trial." *American Economic Review*, 110(3), 824–859.

Becker, Gary S. (1962). "Investment in Human Capital: A Theoretical Analysis." *Journal of Political Economy*, 70(5, Part 2), 9–49.

Benjamini, Yoav, Abba Krieger, and Daniel Yekutieli (2006). "Adaptive linear step-up false discovery rate controlling procedures." *Biometrika*, 93, 491–507.

Bentaouet Kattan, Raja, Myra Murad Khan, and Melissa Merchant (2023). *Achieving Gender Equality in Education: Examining Progress and Constraints*. World Bank Gender Thematic Policy Notes Series, Washington, DC: World Bank, URL https://hdl.handle.net/10986/40595.

Bernard, Tanguy, Stefan Dercon, Kate Orkin, Giulio Schinaia, and Alemayehu Seyoum Taffesse (2023). "The Future in Mind: Aspirations and Long-term Outcomes in Rural Ethiopia." *CSAE Working Paper*, WPS/2023-10.

Bertrand, Marianne, Sendhil Mullainathan, and Eldar Shafir (2004). "A Behavioral-Economics View of Poverty." *American Economic Review*, 94(2), 419–423.

Bhattacharya, Shrayana, Maria Mini Jos, Soumya Kapoor Mehta, and Rinku Murgai (2015). "From Policy to Practice: How Should Social Pensions Be Scaled Up?" *Economic and Political Weekly*, 50(14), 60–67.

Blattman, Christopher, Julian C. Jamison, and Margaret Sheridan (2017). "Reducing Crime and Violence: Experimental Evidence from Cognitive Behavioral Therapy in Liberia." *American Economic Review*, 107(4), 1165–1206.

Breiman, Leo (2001). "Random Forests." *Machine Learning*, 45(1), 5–32.

Campos, Francisco, Michael Frese, Markus Goldstein, Leonardo Iacovone, Hillary C Johnson, David McKenzie, and Mona Mensmann (2017). "Teaching personal initiative beats traditional training in boosting small business in West Africa." *Science*, 357(6357), 1287–1290.

Carlana, Michela, Eliana La Ferrara, and Paolo Pinotti (2022). "Goals and Gaps: Educational Careers of Immigrant Children." *Econometrica*, 90(1), 1–29.

Carneiro, Pedro, Emanuela Galasso, and Rita Ginja (2019). "Tackling Social Exclusion: Evidence from Chile." *The Economic Journal*, 129, 172–208.

Carranza, Eliana and David McKenzie (2023). "Reproducibility package for Job Training and Job Search Assistance Policies in Developing Countries." *Policy Research Working Paper*, (10576). Publisher: World Bank.

Carranza, Eliana and David McKenzie (2024). "Job Training and Job Search Assistance Policies in Developing Countries." *Journal of Economic Perspectives*, 38(1), 221–44.

Chakravarty, Shubha, Mattias Lundberg, Plamen Nikolov, and Juliane Zenker (2019). "Vocational training programs and youth labor market outcomes: Evidence from Nepal." *Journal of Development Economics*, 136, 71–110.

Chalfin, Aaron, Oren Danieli, Andrew Hillis, Zubin Jelveh, Michael Luca, Jens Ludwig, and Sendhil Mullainathan (2016). "Productivity and Selection of Human Capital with Machine Learning." *American Economic Review*, 106(5), 124–127.

Cho, Yoonyoung, Davie Kalomba, Ahmed Mushfiq Mobarak, and Victor Orozco (2013). *Gender Differences in the Effects of Vocational Training. Constraints on Women and Drop-Out Behavior*. Policy Research Working Papers 6545, World Bank.

Cohen, Jonathan P., Andrew C. Johnston, and Attila S. Lindner (2023). "Skill depreciation during unemployment: Evidence from panel data." *NBER Working Paper*, 31120.

Cortés, Patricia, Jessica Pan, Laura Pilossoph, Ernesto Reuben, and Basit Zafar (2023). "Gender Differences in Job Search and the Earnings Gap: Evidence from the Field and Lab." *The Quarterly Journal of Economics*, 138(4), 2069–2126.

CTVET (2020). "National Apprenticeship Policy." Tech. rep., CTVET, URL https://ctvet.gov.gh/national-apprenticeship-policy/.

Currie, Janet (2004). "The take up of social benefits.pdf." *NBER Working Paper*, 10488.

Dadzie, Christabel, Mawuko Fumey, and Suleiman Namara (2020). *Youth Employment Programs in Ghana: Options for Effective Policy Making and Implementation*. International Development in Focus, The World Bank, Washington, DC, URL http://elibrary.worldbank.org/doi/book/10.1596/978-1-4648-1579-9.

Dalton, Patricio S., Sayantan Ghosal, and Anandi Mani (2016). en"Poverty and Aspirations Failure." *The Economic Journal*, 126(590), 165–188.

Dasgupta, Partha and Debraj Ray (1986). en"Inequality as a Determinant of Malnutrition and Unemployment: Theory." *The Economic Journal*, 96(384), 1011.

Easterlin, Richard A (2001). "Income and Happiness: Towards a Unified Theory." *The Economic Journal*, 111(473), 465–484.

Eden, Dov and Arie Aviram (1993). "Self-efficacy training to speed reemployment: Helping people to help themselves." *Journal of Applied Psychology*, 78(3), 352–360.

Encinas-Martín, Marta and Michelle Cherian (2023). *Gender, Education and Skills: The Persistence of Gender Gaps in Education and Skills*. OECD Skills Studies, OECD Publishing, Paris, URL https://www.oecd-ilibrary.org/education/gender-education-and-skills_34680dd5-en.

Field, Erica, Seema Jayachandran, and Rohini Pande (2010). "Do Traditional Institutions Constrain Female Entrepreneurship? A Field Experiment on Business Training in India." *American Economic Review*, 100(2), 125–129.

Finkelstein, Amy and Matthew J Notowidigdo (2019). "Take-Up and Targeting: Experimental Evidence from SNAP." *The Quarterly Journal of Economics*, 134(3), 1505–1556.

Frohnweiler, Sarah, Charles Atanga Adongo, Bernd Beber, Tabea Lakemann, Jan Priebe, and Jann Lay (2024). "Effects of skills training on employment and livelihood outcomes: A randomized controlled trial with young women in Ghana." 1095.

Galor, Oded and Joseph Zeira (1993). "Income Distribution and Macroeconomics." *The Review of Economic Studies*, 60(1), 35.

Genicot, Garance and Debraj Ray (2017). "Aspirations and Inequality." *Econometrica*, 85(2), 489–519.

GIZ (2019). "Life skills and work readiness in VET." URL https://vettoolbox.eu/wp-content/uploads/2022/07/Life-skills.pdf.

Hardy, Morgan and Jamie McCasland (2023). "Are Small Firms Labor Constrained? Experimental Evidence from Ghana." *American Economic Journal: Applied Economics*, 15(2), 253–284.

Hastings, Justine, Christopher Neilson, and Seth Zimmerman (2015). "The Effects of Earnings Disclosure on College Enrollment Decisions." Tech. Rep. w21300, National Bureau of Economic Research, Cambridge, MA, URL http://www.nber.org/papers/w21300.pdf.

Heß, Simon (2017). "Randomization Inference with Stata: A Guide and Software." *The Stata Journal*, 17(3), 630–651.

ILO (2021). *Global framework on core skills for life and work in the 21st century*. [1st ed.] ed., ILO, Geneva. OCLC: 1368719201.

ILO (2022). "Global Employment Trends for Youth 2022: Africa." Tech. rep., International Labour Organization.

Jensen, Robert (2010). "The (Perceived) Returns to Education and the Demand for Schooling [*]." *Quarterly Journal of Economics*, 125(2), 515–548.

John, Anett and Kate Orkin (2022). "Can Simple Psychological Interventions Increase Preventive Health Investment?" *Journal of the European Economic Association*, 20(3), 1001–1047.

Kluve, Jochen, Susana Puerto, David Robalino, Jose Manuel Romero, Friederike Rother, Jonathan Stöterau, Felix Weidenkaff, and Marc Witte (2017). "Interventions to improve the labour market outcomes of youth: A systematic review of training, entrepreneurship promotion, employment services and subsidized employment interventions." *Campbell Systematic Reviews*, 13(1).

Kluve, Jochen, Susana Puerto, David Robalino, Jose M. Romero, Friederike Rother, Jonathan Stöterau, Felix Weidenkaff, and Marc Witte (2019). "Do youth employment programs improve labor market outcomes? A quantitative review." *World Development*, 114, 237–253.

La Ferrara, Eliana (2019). en"Presidential Address: Aspirations, Social Norms, and Development." *Journal of the European Economic Association*, 17(6), 1687–1722.

Lewis, Oscar (1966). "The Culture of Poverty." *Scientific American*, 215(4), 19–25.

McBride, Linden and Austin Nichols (2015). "Retooling Poverty Targeting Using Out-of-Sample Validation and Machine Learning." *The World Bank Economic Review*, 32(3), 531–550.

McKelway, Madeline (2024). "Women's Self-Efficacy and Economic Outcomes: Evidence from a Two-Stage Experiment in India." Tech. rep., Working Paper.

McKenzie, David and Dario Sansone (2019). "Predicting entrepreneurial success is hard: Evidence from a business plan competition in Nigeria." *Journal of Development Economics*, 141, 102369.

McKenzie, David (2017). "How Effective Are Active Labor Market Policies in Developing Countries? A Critical Review of Recent Evidence." *The World Bank Research Observer*, 32(2), 127–154.

Molina, Teresa and Emiko Usui (2023). "Female labor market conditions and gender gaps in aspirations." *Journal of Economic Behavior & Organization*, 211, 165–187.

Mullainathan, Sendhil and Jann Spiess (2017). "Machine Learning: An Applied Econometric Approach." *Journal of Economic Perspectives*, 31(2), 87–106.

Orkin, Kate, Robert Garlick, Mahreen Mahmud, Richard Sedlmayr, Johannes Haushofer, and Stefan Dercon (2023). "Aspiring to a Better Future: Can a Simple Psychological Intervention Reduce Poverty?" *NBER Working Paper*, 31735.

Osman, Adam and Jamin D. Speer (2024). "Stigma and take-up of labour market assistance: Evidence from two field experiments." *Economica*, 91(361), 123–141.

Ray, Debraj (2006). "Aspirations, Poverty, and Economic Change." In *Understanding Poverty*, 1 ed., pp. 409–422. Oxford University Press, New York, URL https://academic.oup.com/book/32736/chapter/272752765.

Reuben, Ernesto, Paola Sapienza, and Luigi Zingales (2024). "Overconfidence and Preferences for Competition." *The Journal of Finance*, 79(2), 1087–1121.

Rojas Valdes, Ruben Irvin, Bruce Wydick, and Travis J Lybbert (2022). "Can hope elevate microfinance? Evidence from Oaxaca, Mexico." *Oxford Economic Papers*, 74(1), 236–264.

Roy, Sanchari, Matthew Morton, and Shrayana Bhattacharya (2018). "Hidden human capital: Self-efficacy, aspirations and achievements of adolescent and young women in India." *World Development*, 111, 161–180.

Sansone, Dario (2019). "Beyond Early Warning Indicators: High School Dropout and Machine Learning." *Oxford Bulletin of Economics and Statistics*, 81(2), 456–485.

Schwarzer, Ralf and Matthias Jerusalem (1995). "Generalized Self-Efficacy scale." In *Measures in health psychology: A user's portfolio. Causal and control beliefs*, edited by John Weinman, Stephen Wright, and

Marie Johnston, pp. 35–37. NFER-NELSON, Windsor, UK.

Small, Mario Luis, David J. Harding, and Michèle Lamont (2010). "Reconsidering Culture and Poverty." *The ANNALS of the American Academy of Political and Social Science*, 629(1), 6–27.

United Nations, Department of Economic and Social Affairs Sustainable Development (2015). "Transforming our world: the 2030 Agenda for Sustainable Development." URL https://sdgs.un.org/2030agenda.

World Bank, UNESCO, and ILO (2023). *Building Better Formal TVET Systems: Principles and Practice in Low- and Middle-Income Countries*. World Bank, URL http://elibrary.worldbank.org/doi/book/10.1596/40072.

World Bank (2012). "World Development Report 2013: Jobs." Tech. rep., World Bank.

World Bank (2019). "World Development Report 2019: The changing nature of work." Tech. rep., World Bank.

Yamada, Shoko and Christian S. Otchia (2022). "Differential effects of schooling and cognitive and non-cognitive skills on labour market outcomes: The case of the garment industry in Ethiopia." *International Journal of Training and Development*, 26(1), 145–162.

Zimmerman, Marc A. (2000). "Empowerment Theory." In *Handbook of Community Psychology*, edited by Julian Rappaport and Edward Seidman, pp. 43–63. Springer US, Boston, MA, URL http://link.springer.com/10.1007/978-1-4615-4193-6_2.

Make me believe. Self-efficacy and human capital investments among young women in Ghana

Online Appendix

Appendix I. Implementation details

(A) Video 1   (B) Video 2

FIGURE A.I.1. Screenshots of the self-efficacy videos.

(A) Video 1   (B) Video 2

FIGURE A.I.2. Screenshots of the neutral videos.

The following are examples of the SMS sent as part of the **self-efficacy testimonials** campaign.

- Hi [NAME]! It is important to set goals in life and work so you stay on track for your journey. Even reaching small goals brings you closer to success!
- Hi [NAME]! Becoming successful is not easy and YOU are doing great! You may fail a few times. Just try to learn from it and continue!
- Hi [NAME]! It is normal to get tense at times. It is a good sign. It means you do something important. You will manage your fear. Don't let it stop you.
- Hi [NAME]! Some people around you had difficult times but now are successful. Ask them and learn how they made it. They have a lot to teach from experience.
- Hi [NAME]! Nobody is perfect. So do not doubt yourself! Focus on your strength and success will come. Always believe in yourself!
- Hi [NAME]! Life is a struggle. Don't dwell about how unfair life can be. You will overcome challenges if you focus on your gifts, talents take action!

The following are examples of the SMS sent as part of the **neutral testimonials** campaign.

- Hi [NAME]! Do you want to work based on a written contract just as Lydia Elizabeth? Having a certificate from vocational training will be of great help!
- Hi [NAME]! Bintu Sylvia are happy with their job from vocational skills training want to teach you how you can get that too. Click [personalized link].
- Hi [NAME]! The skills and certification you earn from vocational training will stay with you and benefit you for the rest of your life.
- Hi [NAME]! After vocational training Bintu found a fulltime employment with good salary. Click [personalized link] to see how she made it.
- Hi [NAME]! Do you want to follow Bintu's path? Complete a vocational training to find a job and receive a payment that supports your knowledge!
- Hi [NAME]! Would you like to be as happy as Bintu Sylvia who found their passion after completing their vocational training?
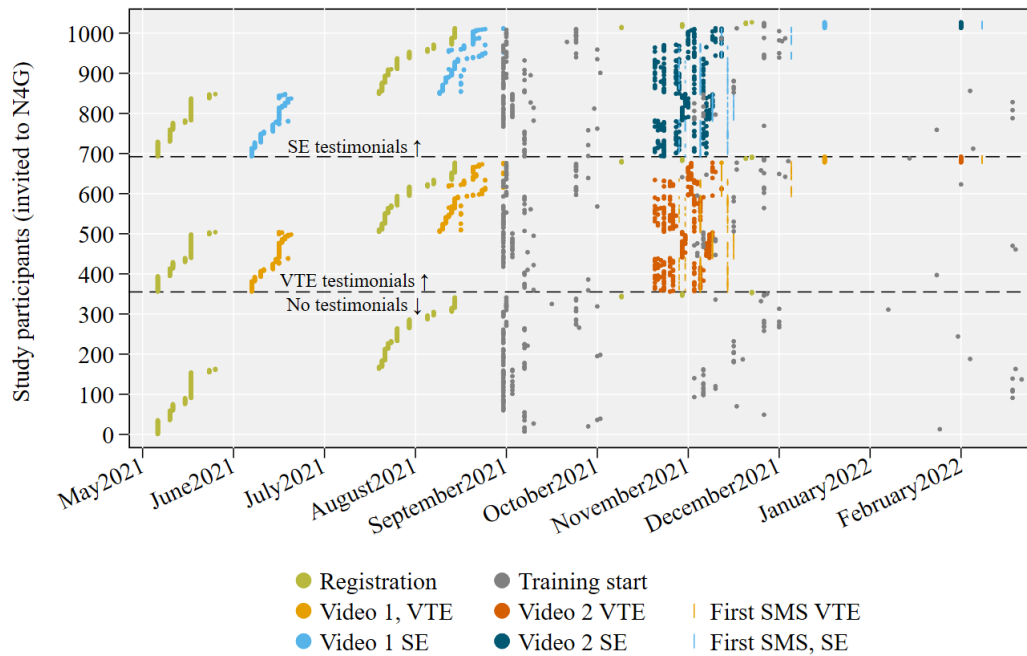
FIGURE A.I.3. Sequence of the testimonial campaign.
Notes: The figure shows the timing of the testimonial campaign for all study participants. The y-axis represents the number of study participants and the x-axis the timing of the different events, i.e., the registration for the N4G program, the delivery of the first video, the N4G training start, the delivery of the second video, and the delivery of the first follow-up SMS.

Appendix II. Additional descriptive statistics
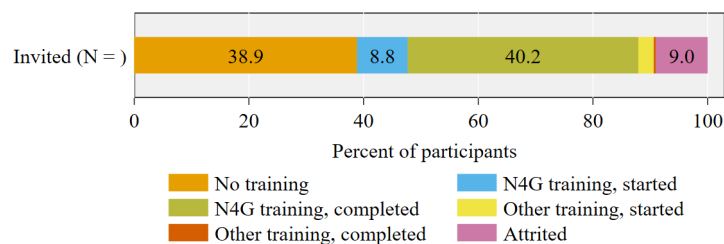
FIGURE A.II.1. Training participation.
Notes: The figure shows the share of eligible baseline study participants invited to the N4G training
that (i) did not start any training, (ii) started but did not complete the N4G training, (iii) started
and completed the N4G training, (iv) started but did not complete another training, (v) started and
completed another training, and (vi) were not re-interviewed in the follow-up.
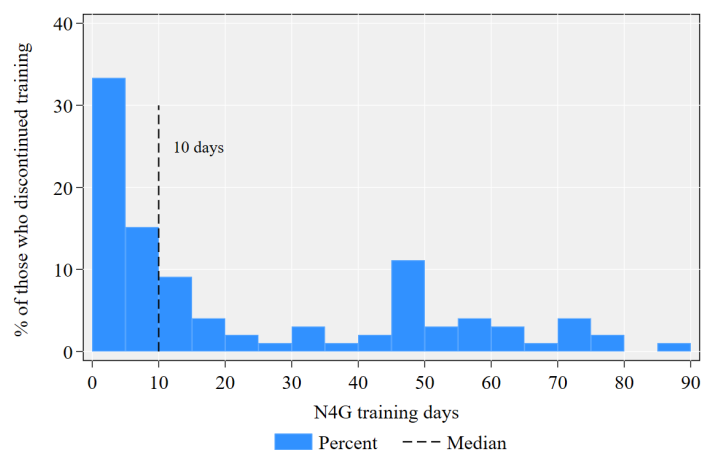
FIGURE A.II.2. Timing of drop-out.
Notes: The figure shows how many days participants attended the N4G training before they
drop-out. The dashed line indicates the median. The information is based on the information
recorded through the daily attendance sheets of training providers.

(A) Did not start   (B) Dropped out
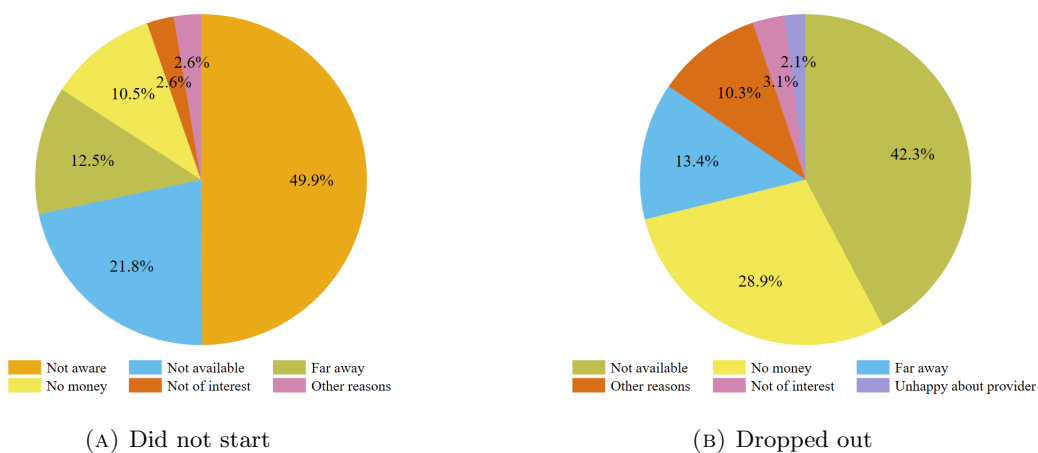
FIGURE A.II.3. Reasons for not starting and dropout.
Notes: The figures show the self-reported reasons why study participants (A) did not start
and (B) drop out from the N4G training.
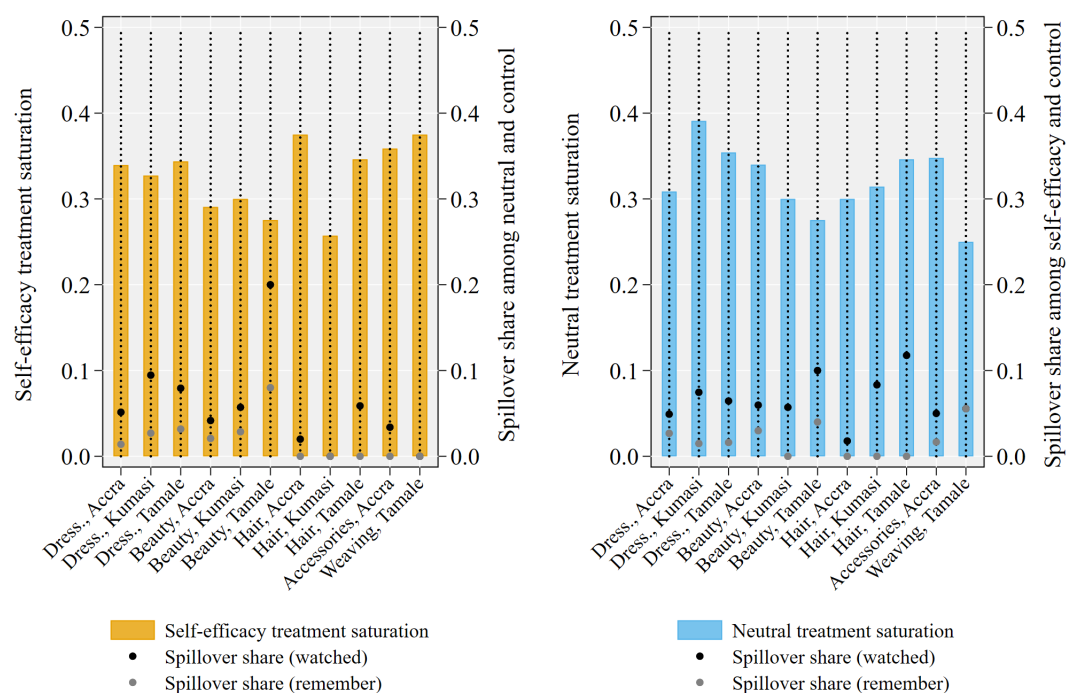
FIGURE A.II.4. Treatment saturation and number of self-reported spillovers.
Notes: The figure shows for each region-occupation combination the treatment saturation and spillover shares. The bars indicate the share of women within each region-occupation group that were assigned to the self-efficacy (left) and neutral (right) testimonials. The dots indicate the share of women who indicated to have watched (black) and remembered the content of the videos (gray) among women assigned to the neutral (left) or self-efficacy (right) testimonial group and the control group.
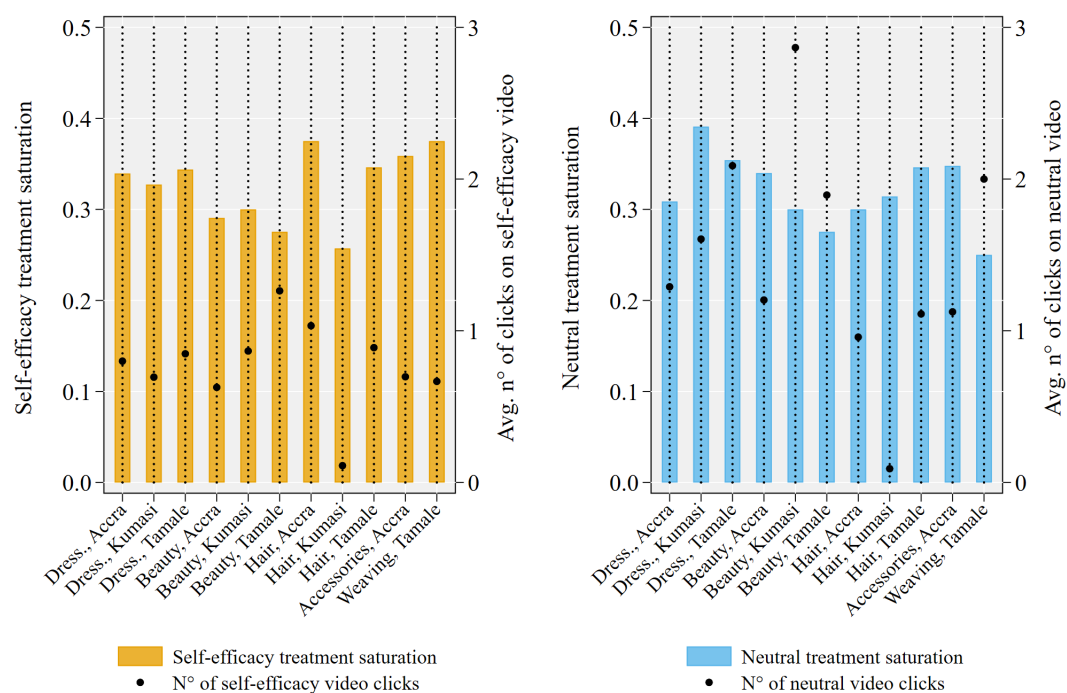
FIGURE A.II.5. Treatment saturation and video click rates.
Notes: The figure shows for each region-occupation combination the treatment saturation and the video click-rates. The bars indicate the share of women within each region-occupation group that were assigned to the self-efficacy (left) and neutral (right) testimonials. The black dots indicate the average number of clicks on each individualized video link.

TABLE A.II.1. Balance check across intervention arms at baseline.

	Self-efficacy (1)	Neutral (2)	Control (3)	Overall (4)	p-value (5)
Socioeconomic characteristics					
Age	20.61	20.52	20.65	20.60	0.65
	(0.11)	(0.11)	(0.11)	(0.06)	
Married	0.40	0.37	0.42	0.39	0.44
	(0.03)	(0.03)	(0.03)	(0.01)	
Has children	0.19	0.19	0.20	0.19	0.89
	(0.02)	(0.02)	(0.02)	(0.01)	
Education: None	0.05	0.04	0.06	0.05	0.44
	(0.01)	(0.01)	(0.01)	(0.01)	
Education: Primary	0.19	0.20	0.15	0.18	0.22
	(0.02)	(0.02)	(0.02)	(0.01)	
Education: JHS	0.30	0.30	0.31	0.30	0.90
	(0.02)	(0.02)	(0.02)	(0.01)	
Education: SHS	0.46	0.46	0.47	0.46	0.92
	(0.03)	(0.03)	(0.03)	(0.01)	
Personality					
Self-efficacy index	0.80	0.81	0.79	0.80	0.15
	(0.01)	(0.01)	(0.01)	(0.00)	
Depression (PHQ-2)	0.25	0.26	0.26	0.26	0.89
	(0.01)	(0.01)	(0.01)	(0.01)	
Stress	0.04	0.05	0.05	0.05	0.33
	(0.00)	(0.00)	(0.00)	(0.00)	
Anxiety (GAD-2)	0.23	0.24	0.25	0.24	0.47
	(0.01)	(0.01)	(0.01)	(0.01)	
Employment characteristics					
Any employment	0.21	0.22	0.22	0.22	0.95
	(0.02)	(0.02)	(0.02)	(0.01)	
Paid employment	0.19	0.19	0.19	0.19	0.96
	(0.02)	(0.02)	(0.02)	(0.01)	
Paid wage-employment	0.12	0.14	0.14	0.13	0.68
	(0.02)	(0.02)	(0.02)	(0.01)	
Paid self-employed	0.07	0.06	0.05	0.06	0.68
	(0.01)	(0.01)	(0.01)	(0.01)	
Monthly total income (among all)	9.12	8.04	8.59	8.59	0.90
	(1.62)	(1.54)	(1.80)	(0.96)	
Weekly total hours (among all)	9.83	11.40	10.58	10.60	0.65
	(1.12)	(1.27)	(1.14)	(0.68)	
Written contract (among all)	0.02	0.03	0.02	0.02	0.29
	(0.01)	(0.01)	(0.01)	(0.00)	
Distribution across program components					
Region: Accra	0.64	0.62	0.63	0.63	0.86
	(0.03)	(0.03)	(0.02)	(0.01)	
Region: Kumasi	0.17	0.19	0.17	0.18	0.65
	(0.02)	(0.02)	(0.02)	(0.01)	
Region: Tamale	0.19	0.19	0.20	0.19	0.92
	(0.02)	(0.02)	(0.02)	(0.01)	
Trade: Dressmaking	0.49	0.49	0.45	0.48	0.45
	(0.03)	(0.03)	(0.03)	(0.02)	
Trade: Hairdressing	0.13	0.12	0.13	0.13	0.91
	(0.02)	(0.02)	(0.02)	(0.01)	
Trade: Beauty therapy	0.26	0.28	0.33	0.29	0.10
	(0.02)	(0.02)	(0.02)	(0.01)	
Trade: Fashion accessories	0.09	0.09	0.07	0.08	0.52
	(0.02)	(0.01)	(0.01)	(0.01)	
Trade: Yarn weaving	0.02	0.02	0.02	0.02	0.72
	(0.01)	(0.01)	(0.01)	(0.00)	
N	362	362	385	1,109	
Joint F-stat. Self-efficacy					0.939
Joint F-stat. Neutral					0.668

Note: Table shows averages for baseline observations. The values displayed for the differences are the differences in means across control and treatment group and their standard errors in parentheses. The p-values belong to a joint orthogonality test on the treatment arms. Values displayed for F-stat are F-statistics for joint significance of all balance variables.

TABLE A.II.2. Determinants of training start.

	Prediction of training start				
	Random Forest (1)	Adaptive Lasso (2)	Elastic Net (3)	Literature (4)	All (5)
Socioeconomic characteristics					
Age	0.019**			0.016**	0.020**
	(0.008)			(0.008)	(0.009)
Married				-0.045	-0.029
				(0.032)	(0.033)
N° of children				-0.015	-0.028
				(0.032)	(0.032)
Education: Primary				0.011	-0.017
				(0.077)	(0.077)
Education: JHS				0.011	-0.015
				(0.075)	(0.075)
Education: SHS				0.105	0.050
				(0.075)	(0.077)
Household asset index	-0.001				-0.030
	(0.082)				(0.082)
Financially independent				0.026	-0.006
				(0.048)	(0.048)
Employment and jobsearch					
Employed				0.026	0.011
				(0.076)	(0.074)
Weekly total hours (among all)				0.000	0.001
				(0.001)	(0.001)
N° of job search channels	0.015				0.012
	(0.011)				(0.011)
Psychology and personality					
Self-efficacy index	0.029*				0.032*
	(0.017)				(0.017)
Risk preferences	0.017***		0.020***		0.013**
	(0.006)		(0.006)		(0.006)
Level of (im)patience	-0.012				-0.012
	(0.008)				(0.008)
Neuroticism	-0.016				-0.010
	(0.063)				(0.063)
Depression (PHQ-2)	-0.061				-0.049
	(0.060)				(0.060)
Self esteem	0.186**				0.154**
	(0.080)				(0.078)
Regional aspects and migration					
Dagbani	0.049	0.047	0.026		0.034
	(0.112)	(0.107)	(0.111)		(0.115)
Region of birth: Northern			0.055		0.077
			(0.068)		(0.072)
Internal migration, intentions				-0.014	-0.016
				(0.014)	(0.014)
International migration, intentions				-0.008	-0.001
				(0.015)	(0.015)
N° of known contraception methods	-0.002				-0.008
	(0.007)				(0.007)
N° of used contraception methods	-0.011				-0.006
	(0.012)				(0.013)
Perceptions about training					
Expected returns to VT	0.001*				0.000
	(0.000)				(0.000)
N° of expectations towards N4G	-0.004				0.007
	(0.013)				(0.014)
Training expectations: Employment		-0.088**			-0.107***
		(0.035)			(0.040)
Training expectations: Skills		0.112***			0.080**
		(0.031)			(0.033)
Observations	1,009	1,009	1,009	1,009	1,009
Adj. R^2	0.114	0.109	0.100	0.105	0.128

Note: Results from OLS estimations. The outcome variable is N4G training start and the explanatory variables are baseline characteristics selected by random forest in column (1), by adaptive Lasso in column (2), by elastic net in column (3), and by previous studies in column (4). Column (5) combines all explanatory variables. All estimations include region-occupation FEs. Robust standard errors are displayed in parentheses (* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$).

TABLE A.II.3. Determinants of training completion.

	Prediction of training completion				
	Random Forest (1)	Adaptive Lasso (2)	Elastic Net (3)	Literature (4)	All (5)
Socioeconomic characteristics					
Age	0.016**			0.017**	0.016**
	(0.008)			(0.008)	(0.008)
Married				-0.023	-0.014
				(0.032)	(0.032)
N° of children				-0.033	-0.041
				(0.031)	(0.031)
Education: Primary				0.018	-0.012
				(0.078)	(0.075)
Education: JHS				0.052	0.031
				(0.077)	(0.074)
Education: SHS				0.145*	0.105
				(0.077)	(0.076)
Household asset index	-0.011				-0.059
	(0.082)				(0.082)
Financially independent				-0.012	-0.050
				(0.047)	(0.048)
Employment and jobsearch					
Employed				0.015	0.017
				(0.075)	(0.075)
Weekly total hours (among all)				0.001	0.001
				(0.001)	(0.001)
N° of job search channels	0.011				0.010
	(0.012)				(0.012)
N° of jobs (12 months)	0.015*				0.012
	(0.009)				(0.009)
Psychology and personality					
Self-efficacy index	0.039**				0.041**
	(0.016)				(0.016)
Risk preferences	0.009				0.007
	(0.006)				(0.006)
Level of (im)patience	-0.012				-0.012
	(0.008)				(0.008)
Neuroticism	-0.094				-0.088
	(0.061)				(0.061)
Anxiety (GAD-2)	-0.012				0.004
	(0.062)				(0.062)
Regional aspects and migration					
Languagae: Dagbani	0.046	0.050	0.035		0.044
	(0.109)	(0.106)	(0.107)		(0.106)
Region of birth: Northern	0.104		0.075		0.110
	(0.068)		(0.068)		(0.070)
Internal migration, intentions				-0.010	-0.010
				(0.014)	(0.014)
International migration, intentions				0.007	0.001
				(0.015)	(0.015)
National migration preparations	0.022				-0.197
	(0.106)				(0.144)
International migration preparations			0.372**		0.523***
			(0.146)		(0.202)
Other variables					
N° of known contraception methods	0.001				-0.004
	(0.007)				(0.007)
Expected returns to VT	0.000				0.000
	(0.000)				(0.000)
Observations	1,009	1,009	1,009	1,009	1,009
Adj. R^2	0.114	0.096	0.101	0.112	0.125

Note: Results from OLS estimations. The outcome variable is N4G training completion and the explanatory variables are baseline characteristics selected by random forest in column (1), by adaptive Lasso in column (2), by elastic net in column (3), and by previous studies in column (4). Column (5) combines all explanatory variables. All estimations include region-occupation FEs. Robust standard errors are displayed in parentheses (* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$).

TABLE A.II.4. Prediction accurateness for training start and completion.

	Accurateness of prediction		
	Random Forest (1)	Adapt. Lasso (2)	Elastic Net (3)
[A] Prediction of training start			
Predicted starting probability	1.287***	0.137	1.654*
	(0.039)	(0.575)	(0.864)
	[0.000]	[0.489]	[0.065]
Observations	1,009	1,009	1,009
Adj. R^2	0.359	0.092	0.096
[B] Prediction of training completion			
Predicted completion probability	1.332***	0.282	0.599
	(0.038)	(0.603)	(0.603)
	[0.000]	[0.640]	[0.377]
Observations	1,009	1,009	1,009
Adj. R^2	0.370	0.096	0.097

Note: Results from OLS estimations. The outcome variable is N4G training start and the explanatory variable is the predicted probability of training start based on random forest in column (1), adaptive Lasso in column (2), and elastic net in column (3). All estimations include region-occupation FEs. Robust standard errors are displayed in parentheses and p-values in squared brackets (* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$).

Appendix III. Additional results

FIGURE A.III.1. Effect on participation by baseline human capital index.
Notes: The figure shows the results of OLS regressions for the effect of the self-efficacy testimonials on N4G training participation by women's baseline human capital index.

FIGURE A.III.2. Effect on participation by baseline self-efficacy level.
Notes: The figure shows the results of OLS regressions for the effect of the self-efficacy testimonials on N4G training participation by women's baseline self-efficacy index.
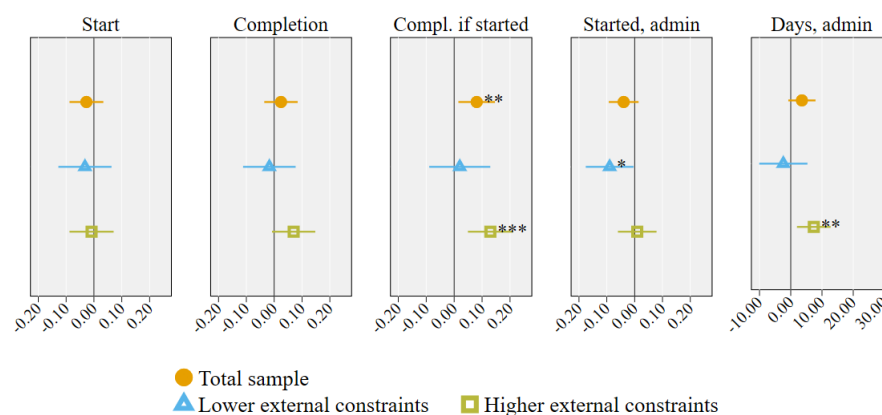
FIGURE A.III.3. Effect on participation by degree of external constraints.
Notes: The figure shows the results of OLS regressions for the effect of the self-efficacy testimonials on N4G training participation by women's baseline exposure to external constraints.
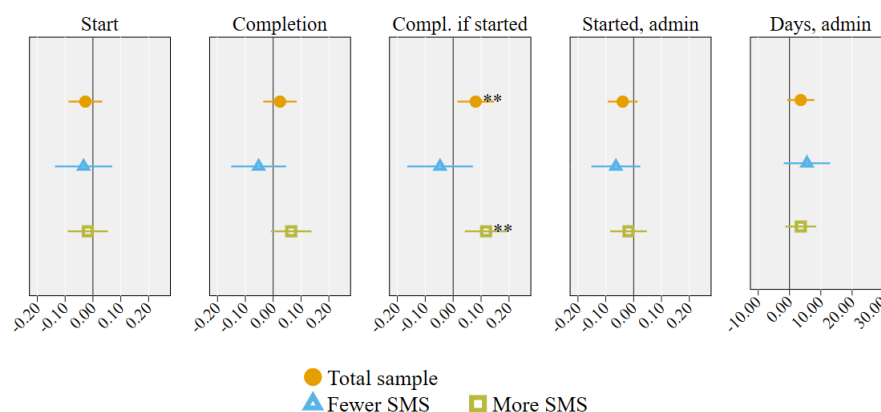
FIGURE A.III.4. Effect on participation by treatment intensity.
Notes: The figure shows the results of OLS regressions for the effect of the self-efficacy testimonials on N4G training participation by the number of follow-up SMS sent to women.
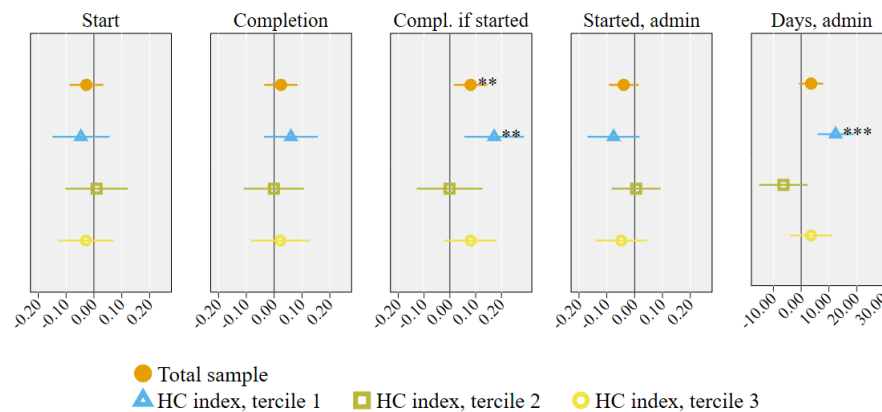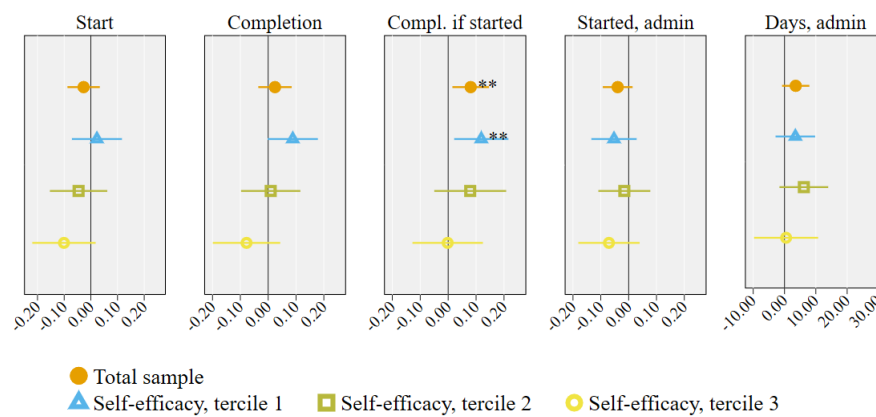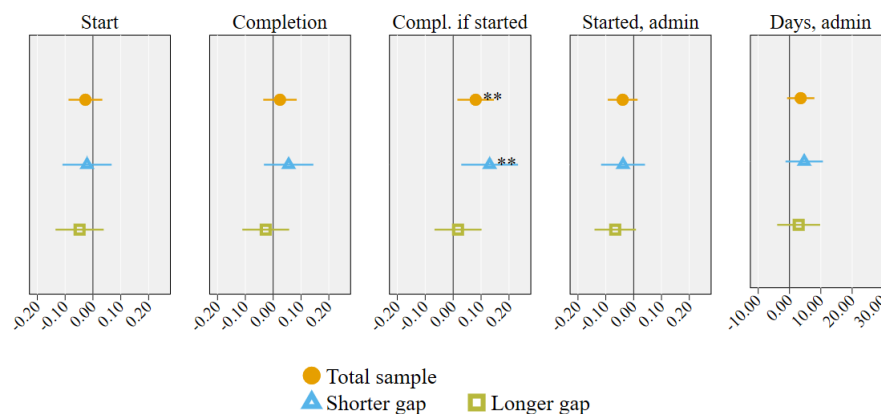

FIGURE A.III.5. Effect on participation by treatment timing.
Notes: The figure shows the results of OLS regressions for the effect of the self-efficacy testimonials on N4G training participation by the gap between the first video and training start.

TABLE A.III.1. Successful delivery of the neutral testimonials.

	Video clicks		Neutral video		N° of SMS	
	Ever	N°	Watched	Remembered	Self-reported	Sent
	(1)	(2)	(3)	(4)	(5)	(6)
Neutral testimonials (assigned)	0.451***	1.414***	0.299***	0.287***	6.370***	27.587***
	(0.026)	(0.135)	(0.029)	(0.027)	(0.383)	(0.179)
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Observations	747	747	681	681	668	747
Control mean	0.000	0.000	0.063	0.032	0.000	0.000
Baseline outcome						

Note: Results from OLS estimations. The outcome variables indicate if respondents ever clicked on any of the individualized links (column 1), the number of recorded clicks for the individualized links (column 2), if respondents reported to have watched the videos or remembered at least two content components (columns 3 and 4), and self-reported and actual number of received follow-up SMS (columns 5 and 6). Estimations include region-occupation FE. Robust standard errors are displayed in parentheses (* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$).

TABLE A.III.2. Effect of the self-efficacy testimonials on separate items of self-efficacy index.

	Separate items			
	Problem solving (1) (1)	Problem solving (2) (2)	Goal achievement (3)	Unexpected events (4)
[A] OLS estimations				
Self-efficacy (assigned)	0.051	0.127*	0.092	0.047
	(0.059)	(0.071)	(0.056)	(0.068)
	[0.388]	[0.073]	[0.100]	[0.491]
[B] CACE estimations				
SE testimonials (remembered)	0.278	0.683*	0.496	0.255
	(0.317)	(0.391)	(0.314)	(0.370)
	[0.382]	[0.081]	[0.114]	[0.491]
1st stage F-stat	64.468	66.404	66.028	65.785
Observations	676	676	677	677
Control mean	3.480	3.138	3.547	3.209
Baseline outcome	✓	✓	✓	✓

Note: Panel A shows results from OLS estimations. Panel B shows results from IV estimations using the random treatment assignment as instrument for remembering at least two content components of the videos. The outcome variables are the separate index items varying between one and four. Estimations include region-occupation FE. Robust standard errors are displayed in parentheses (* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$).

TABLE A.III.3. Effect of the self-efficacy testimonials on training completion conditional on predicted training start.

	Among women with predicted start	
	Completed (1)	N° of days (2)
SE testimonials (assigned)	0.358***	18.920***
	(0.045)	(2.960)
	[0.000]	[0.000]
Observations	267	267
Control mean	0.000	2.149
Baseline outcome		

Note: Results from OLS estimations. The outcome variable in column (1) is binary and an integer in column (2). The sample is reduced to women for whom a random forest using all baseline characteristics and trained on women who did not receive any testimonials predicted that they would start the N4G training. Estimations include region-occupation FEs. Robust standard errors are displayed in parentheses and p-values in squared brackets (* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$).

TABLE A.III.4. Effect of the neutral testimonials on training participation.

	Self-reported			Attendance sheets	
	Started (1)	Completed (2)	Completed if started (3)	Started (4)	N° of days (5)
Neutral testimonials (assigned)	-0.033	0.006	0.056	-0.047	3.395
	(0.036)	(0.036)	(0.041)	(0.032)	(2.524)
	[0.368]	[0.877]	[0.172]	[0.143]	[0.179]
Observations	681	681	370	747	377
Control mean	0.559	0.433	0.774	0.519	49.440
Baseline outcome					

Note: Results from OLS estimations. Number of training days are only reported for those who started. Training start in the admin data is equal to one if a study participants is listed at least once in the attendance sheets. Estimations include region-occupation FEs. Robust standard errors are displayed in parentheses and p-values in squared brackets.

TABLE A.III.5. Effect of the neutral testimonials on perceptions and psychological outcomes.

	Benefits of VT			Psychological outcomes				
	Income (1)	Employment (2)	Social status (3)	Self-efficacy index (4)	Mental health index (5)	Self-esteem (6)	Conscien-tiousness (7)	Life satisfaction (8)
[A] OLS estimations								
Neutral testimonials (assigned)	1.166	0.011	0.022	-0.046	0.001	-0.002	0.030	0.021
	(5.297)	(0.016)	(0.017)	(0.076)	(0.012)	(0.009)	(0.023)	(0.018)
	[0.826]	[0.490]	[0.196]	[0.542]	[0.954]	[0.865]	[0.187]	[0.239]
[B] CACE estimations								
Neutral testimonials (remembered)	4.011	0.038	0.076	-0.163	0.002	-0.005	0.105	0.072
	(18.288)	(0.055)	(0.059)	(0.269)	(0.042)	(0.032)	(0.080)	(0.062)
	[0.826]	[0.488]	[0.197]	[0.544]	[0.954]	[0.864]	[0.188]	[0.241]
1st stage F-stat	113.499	114.557	114.557	111.706	108.248	115.128	116.629	114.557
Observations	666	681	681	681	632	681	681	681
Control mean	47.494	0.948	0.937	-0.010	0.219	0.952	0.845	0.516
Baseline outcome	✓			✓	✓	✓	✓	

Note: Panel A shows results from OLS estimations. Panel B shows results from IV estimations using the random treatment assignment as instrument for remembering at least two content components of the videos. In column (1) the outcome is the expected monthly income difference (USD) for having completed vocational training. In columns (2) and (3) the binary outcome variables indicate if individuals agreed to the statement. Ouctomes in columns (4) to (8) vary between zero and one. Estimations include region-occupation FE. Robust standard errors are displayed in parentheses and p-values in squared brackets (* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$).

TABLE A.III.6. Robustness of effects of the self-efficacy testimonials to alternative specifications.

	P-value of SE treatment assignment				
	Model (1)	RI test (2)	IPW (3)	PDS Lasso (4)	BKY (5)
Training start	0.463	0.465	0.924	0.408	0.608
Training completion	0.501	0.502	0.163	0.526	0.608
Training completion among started	0.043	0.036	0.027	0.045	0.271
Training start, admin.	0.227	0.201	0.719	0.228	0.434
Training days, admin	0.176	0.160	0.830	0.830	0.434

Note: The first column indicates the dependent variable and the explanatory variable is random assignment of the self-efficacy testimonial. Estimations include region-occupation FEs and robust standard errors. Column (1) reports p-values of the main OLS specification. Column (2) reports p-values when applying the Fisher's permutation-based randomization inference (RI) test with 1,000 replications implemented with `ritest` (Hess, 2017). Column (3) reports p-values from OLS regressions with inverse probability weights. Column (4) reports p-values from OLS regressions that additionally control for PDS-Lasso selected baseline characteristics. Column (5) reports p-values from regressions controlling for the false discovery rate (Benjamini et al. 2006).

TABLE A.III.7. Sample attrition by treatment status.

	Attrition		
	(1)	(2)	(3)
[A] Self-efficacy testimonials			
SE testimonials (assigned)	0.000	0.003	0.003
	(0.021)	(0.021)	(0.021)
	[0.984]	[0.870]	[0.870]
[B] Neutral testimonials			
Neutral testimonials (assigned)	-0.011	-0.007	-0.007
	(0.021)	(0.021)	(0.021)
	[0.609]	[0.743]	[0.743]
Observations	747	747	747
Control mean	0.094	0.094	0.094
Occupation X Region FE		✓	✓
Baseline controls			✓

Note: Table shows OLS estimation results for the effect of treatment assignment on sample attrition. Panel A shows the results for the assignment of the self-efficacy testimonials and Panel B the results for the assignment of the neutral testimonials. The models of column (2) includes occupation-region FE as controls and column (3) includes occupation-region FE as well as age, marital status, employment situation, education, and household asset index at baseline as controls. Robust standard errors are displayed in parentheses (* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$).

TABLE A.III.8. Sample attrition by baseline characteristics.

	Non-attriters (1)	Attriters (2)	Absolute diff. (3)	p-value (4)
Socioeconomic characteristics				
Age	20.64	20.11	0.53	0.01
	(0.06)	(0.23)	(0.22)	
Married	0.40	0.37	0.03	0.59
	(0.02)	(0.05)	(0.05)	
Has children	0.19	0.27	-0.08	0.05
	(0.01)	(0.04)	(0.04)	
Education: None	0.05	0.10	-0.05	0.02
	(0.01)	(0.03)	(0.02)	
Education: Primary	0.17	0.29	-0.12	0.00
	(0.01)	(0.05)	(0.04)	
Education: JHS	0.30	0.32	-0.02	0.70
	(0.01)	(0.05)	(0.05)	
Education: SHS	0.48	0.29	0.19	0.00
	(0.02)	(0.05)	(0.05)	
Personality				
Self-efficacy index	0.80	0.77	0.03	0.06
	(0.00)	(0.02)	(0.02)	
Depression (PHQ-2)	0.26	0.25	0.01	0.65
	(0.01)	(0.03)	(0.03)	
Stress	0.05	0.05	-0.00	0.79
	(0.00)	(0.01)	(0.01)	
Anxiety (GAD-2)	0.24	0.29	-0.05	0.06
	(0.01)	(0.03)	(0.03)	
Employment characteristics				
Any employment	0.22	0.25	-0.03	0.42
	(0.01)	(0.04)	(0.04)	
Paid employment	0.18	0.24	-0.06	0.18
	(0.01)	(0.04)	(0.04)	
Paid wage-employment	0.13	0.14	-0.01	0.80
	(0.01)	(0.03)	(0.04)	
Paid self-employed	0.05	0.10	-0.05	0.06
	(0.01)	(0.03)	(0.02)	
Monthly total income (among all)	7.22	22.21	-14.99	0.00
	(0.77)	(7.09)	(3.31)	
Weekly total hours (among all)	10.47	11.92	-1.45	0.54
	(0.71)	(2.26)	(2.37)	
Written contract (among all)	0.02	0.03	-0.01	0.50
	(0.00)	(0.02)	(0.01)	
Distribution across program components				
Region: Accra	0.63	0.68	-0.05	0.28
	(0.02)	(0.05)	(0.05)	
Region: Kumasi	0.18	0.18	-0.00	0.91
	(0.01)	(0.04)	(0.04)	
Region: Tamale	0.20	0.14	0.06	0.15
	(0.01)	(0.03)	(0.04)	
Trade: Dressmaking	0.48	0.44	0.04	0.43
	(0.02)	(0.05)	(0.05)	
Trade: Hairdressing	0.12	0.19	-0.07	0.05
	(0.01)	(0.04)	(0.03)	
Trade: Beauty therapy	0.29	0.29	0.00	0.99
	(0.01)	(0.05)	(0.05)	
Trade: Fashion accessories	0.09	0.06	0.03	0.38
	(0.01)	(0.02)	(0.03)	
Trade: Yarn weaving	0.02	0.02	0.00	0.91
	(0.00)	(0.01)	(0.02)	
N	1009	100	1,109	
P-val of joint F-stat.				0.000

Note: Table shows averages for baseline observations. The values displayed for the differences are the differences in means across women who remained in the sample and women who attrited and their respective standard errors in parentheses. The p-values belong to a joint orthogonality test on the two groups. Values displayed for F-stat are F-statistics for joint significance of all balance variables.

TABLE A.III.9. Heterogeneous treatment effect of self-efficacy testimonials on training start.

	Start N4G
	(1)
SE testimonials (assigned)	0.238
	(0.509)
SE testimonials (assigned) $\times$ Age	-0.029
	(0.023)
SE testimonials (assigned) $\times$ Married	-0.006
	(0.084)
SE testimonials (assigned) $\times$ Has children	0.004
	(0.109)
SE testimonials (assigned) $\times$ Education: Primary	0.168
	(0.206)
SE testimonials (assigned) $\times$ Education: JHS	0.175
	(0.192)
SE testimonials (assigned) $\times$ Education: SHS	0.225
	(0.191)
SE testimonials (assigned) $\times$ Self-efficacy, 1st tercile	0.198**
	(0.098)
SE testimonials (assigned) $\times$ Self-efficacy, 2nd tercile	0.053
	(0.102)
SE testimonials (assigned) $\times$ Depression (PHQ-2)	0.321*
	(0.171)
SE testimonials (assigned) $\times$ Stress level	-2.008**
	(0.816)
SE testimonials (assigned) $\times$ Anxiety (GAD-2)	0.047
	(0.178)
SE testimonials (assigned) $\times$ Present bias	0.105
	(0.081)
SE testimonials (assigned) $\times$ Employed	0.564***
	(0.196)
SE testimonials (assigned) $\times$ Monthly income (among all)	0.001
	(0.001)
SE testimonials (assigned) $\times$ Weekly working hours (among all)	-0.010***
	(0.004)
Observations	619
Joint F-stat (p-val)	0.000

Note: Results from OLS estimations predicting training start based on randomly assigned treatment status, baseline characteristics, and their interactions. Robust standard errors are displayed in parentheses (* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$).

TABLE A.III.10. Effect of the self-efficacy testimonials on skills.

	Skills		
	Registered	Outside	Soft-skills
	(1)	(2)	(3)
SE testimonials (assigned)	0.510***	0.170	0.044
	(0.188)	(0.173)	(0.134)
	[0.007]	[0.325]	[0.740]
Observations	677	677	677
Control mean	4.735	2.327	7.718
Baseline outcome			

Note: Results from OLS estimations. Outcome variables vary between 0 and 10. Estimations include region-occupation FEs. Robust standard errors are displayed in parentheses and p-values in squared brackets.

TABLE A.III.11. Effect of the self-efficacy testimonials on employment and income.

	Employment				Income
	Any	Paid wage	Paid self	Unpaid	monthly
	(1)	(2)	(3)	(4)	(5)
SE testimonials (assigned)	-0.005	-0.028	0.029	-0.010	2.531
	(0.038)	(0.034)	(0.024)	(0.026)	(2.269)
	[0.888]	[0.407]	[0.229]	[0.691]	[0.265]
Observations	677	677	677	677	665
Control mean	0.533	0.289	0.103	0.140	14.428
Baseline outcome	✓	✓	✓	✓	✓

Note: Results from OLS estimations. Outcome variables in columns (1) to (4) are dummy variables. Outcome variable in column (5) is measured in USD. Estimations include region-occupation FEs. Robust standard errors are displayed in parentheses and p-values in squared brackets (* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$).

TABLE A.III.12. Effect of the self-efficacy testimonials on job attributes among employed.

	Hourly income	if inc.>0	Weekly hours (1hr)	Tenure (months)	Written contract	Medical benefits	Pension	Paid days off	Job satisfaction
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
SE testimonials (assigned)	0.038	0.065	-2.193	2.619*	-0.000	0.042	0.017	-0.065	-0.015
	(0.038)	(0.050)	(2.214)	(1.412)	(0.053)	(0.041)	(0.034)	(0.049)	(0.027)
	[0.311]	[0.195]	[0.323]	[0.065]	[0.996]	[0.311]	[0.614]	[0.190]	[0.582]
Observations	362	258	362	344	278	282	282	282	362
Control mean	0.186	0.256	51.444	10.601	0.273	0.113	0.080	0.253	0.406
Baseline outcome				✓	✓				

Note: Results from OLS estimations. Estimations include region-occupation FEs. Robust standard errors are displayed in parentheses and p-values in squared brackets (* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$).

TABLE A.III.13. Effect of the self-efficacy testimonials on job search.

	Jobsearch	N° of (past 6 months)			
	channels	Employers	Jobs	Interviews	Offers
SE testimonials (assigned)	0.111	-0.038	0.194	0.029	-0.128
	(0.095)	(0.120)	(0.160)	(0.077)	(0.098)
	[0.243]	[0.749]	[0.226]	[0.702]	[0.191]
Observations	677	676	675	677	677
Control mean	2.163	0.989	1.310	0.567	0.742
Baseline outcome	✓	✓	✓	✓	✓

Note: Results from OLS estimations. Estimations include region-occupation FEs. Robust standard errors are displayed in parentheses and p-values in squared brackets (* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$).

TABLE A.III.14. Effect of the self-efficacy testimonials on family and financial situation.

	Family			Finances		
	Married	Pregnant	Has children	Bank account	Mobile money	Saving scheme
	(1)	(2)	(3)	(4)	(5)	(6)
SE testimonials (assigned)	0.011	-0.003	0.023	0.039	-0.019	0.031
	(0.036)	(0.017)	(0.019)	(0.031)	(0.024)	(0.033)
	[0.765]	[0.857]	[0.235]	[0.216]	[0.430]	[0.347]
Observations	677	677	677	677	677	677
Control mean	0.458	0.052	0.229	0.295	0.854	0.272
Baseline outcome	✓	✓	✓	✓	✓	✓

Note: Results from OLS estimations. Estimations include region-occupation FEs. Robust standard errors are displayed in parentheses and p-values in squared brackets (* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$).