Evaluating the Impact of Entrepreneurship Edutainment in Egypt:

An experimental approach with peer effects

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Abstract

We measure the impact of an edutainment program specifically designed to promote entrepreneurship among young adult viewers in Egypt. We implemented a randomized controlled trial following a non-symmetric encouragement design to measure the impact of the intervention, as well as the importance of peer effects. We find that the show had some impact on viewers' general attitudes toward self-employment and, in particular, on gender-related beliefs. Its impact is otherwise limited. We also find evidence of complex peer effects within groups of friends, alternately amplifying and mitigating the impact of the show.

I.   Introduction

Television is a powerful instrument of communication all around the world and is especially important in many developing countries where access to other means of communication, such as newspapers or the Internet, remains more limited. In 2015, 92% of households in the world owned a television set, while only 43.9% of the world population used the Internet according to the World Bank.[1]

In fact, television and, especially, mainstream programs have been shown to be important vectors of societal changes in various settings (see DellaVigna and La Ferrara (2015) for a review on the topic). Indeed, recent studies have shown that television or radio programs can have crucial long-term impacts on societies and, in particular, on gender-related norms. For instance, Jensen and Oster (2009) showed that the introduction of cable television in India was associated with an increase in women empowerment, materialized by a decrease in the reported acceptability of domestic violence towards women, an increase in women's autonomy, and a reduction in son preference. Similarly, Chong and La Ferrara (2009) found that the introduction of television increased the proportion of women who were either separated or divorced in Brazil. In the same context, La Ferrara et al. (2012) showed that it also induced a decrease in the fertility rate and provided evidence that this effect was partly driven by an increased exposure to telenovelas.[2]

Therefore, television and, in particular, mainstream programs have been increasingly seen as potential public policy tools (La Ferrara, 2015). Hence, governments and non-profit organizations have tried to use the huge popularity of these programs to achieve goals of public policy interest by embedding educational content into entertaining programs, thus creating so-called "edutainment" programs (Singhal et al., 2003). The impact of these programs on viewers is believed to materialize through different but potentially concomitant channels, of which La Ferrara (2015) suggests there are three types. First, these shows can have an impact on viewers through the *information* they deliver; second, they can have an impact on the *preferences* of viewers through their observation of the behaviors of characters they can relate to;[3] third, they can have an impact on viewers by changing their *time*

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[1] World Development Indicators' information society data for the year 2015.

[2] Although less evidence exists on Egypt, television is also believed to have influenced or accompanied societal changes in the country. See for instance Abu-Lughod (1993).

[3] This falls in with Bandura's Social Learning Theory (1977) according to which viewers are influenced by observing the behaviors of models and the consequences of their actions.

allocation and, more specifically, by increasing the time they dedicate to watching TV and reducing the time they allocate to carrying out other activities (which, in turn, can have an impact on their information set and preferences).[4]

However, evidence on the impact of media programs specifically designed to reach a goal of public policy interest remain limited. In particular, there is little evidence on the impact of media programs in the field of entrepreneurship, where they have been used in the past years as a way to familiarize a wide range of viewers with entrepreneurial culture and entrepreneurship-related knowledge. These media programs recently emerged as alternatives to the traditional interventions designed to foster entrepreneurship – which were generally shown to have limited impact (McKenzie and Woodruff, 2013; Banerjee et al., 2015).[5] Among the few existing studies on the topic, Bernard et al. (2014) studied the impact of inspirational documentaries showcasing the stories of people who had successfully started their own small business, and found that they had an important impact on aspiration-related outcomes when broadcast in rural communities in Ethiopia. In Tanzania, Bjorvatn et al. (2015) evaluated the impact of an edutainment entrepreneurship program targeting high school students and found that it increased interest in entrepreneurship in the short run, business creation in the long run, but reduced school investments.[6]

More broadly, despite the importance of the influence of television programs on social norms, evidence remains lacking on the role of social interactions in explaining how these programs manage (or not) to shift outcomes that are at least partly determined at the group of peers level (rather than entirely shaped at the individual level). Knowing more about the nature of peer effects is crucial as they have proven to be extremely important in different contexts in either mitigating or amplifying programs' uptake as well as overall impact.[7] Indeed, social networks may affect behaviors through

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[4] DellaVigna and Gentzkow (2010) see the first two channels as being part of a broader category of "persuasion effects", which can be further fostered when shows appeal to viewers' emotions (Lewin, 1951).

[5] For a long time, these interventions primarily aimed at alleviating traditional financial and human capital constraints, deemed critical for a firm to operate in a sustainable manner. However, more recent works have also highlighted the importance of modifying less tangible input factors, such as entrepreneurship-related perceptions, aspirations, and social norms, which are believed to have a great influence on individuals' decision to start a business or not. Evidence also suggested that programs targeting some of the less tangible input factors mentioned above may be more effective than programs targeting traditional financial and human capital constraints (Campos et al., 2017).

[6] In a different field of research, Berg and Zia (2013) found that, in South Africa, the delivery of educational messages on debt management embedded into the popular soap opera *Scandal!* increased viewers' knowledge on the subject and modified their borrowing behaviors. Kearney and Levine (2015) studied the impact of *Sesame Street*, an edutainment program introduced in 1969 in the US with the explicit goal of preparing preschool-age children for school entry, and found that it improved school readiness. In Nigeria, Banerjee et al. (2018) evaluated the effects of an edutainment program *MTV Shuga* focusing on HIV/AIDS prevention and showed that it had important effects on HIV/AIDS-related knowledge, as well as on sexual behaviors.

[7] See, among others, Miguel and Kremer (2007), Epple and Romano (2011) for a review on education, Glaeser et al. (1996) for a review on crime. On a topic closely related to this paper, Nanda and Sørensen (2010) found that an individual is more likely to become an entrepreneur in Denmark if his or her coworkers have been entrepreneurs before.

several concomitant channels. Among other things, an individual's behavior may be influenced by the information spread through the social network, a change in social norm, or the benefits of observing their peers' actions and, in particular, those of specific strategic individuals in their community (see Breza (2016) and Taylor and Eckles (2017) for reviews). In order to identify the strength of these different channels, recent papers have developed specific experimental strategies. For instance, Cai et al. (2015) studied the influence of social networks on weather insurance adoption in China and found that weather insurance adoption was affected by the diffusion of insurance knowledge among peers – rather than by their actual purchase decisions. In Malawi, Ben Yishay and Mobarak (2017) studied the importance of the identity of the peers disseminating information about a new technology on the probability for farmers to adopt it, and showed that farmers found communicators who faced agricultural conditions and constraints most comparable to themselves to be the most persuasive – provided communicators received a small financial incentive.

This paper presents new evidence on the effects of media programs and the associated spillover effects through the evaluation of a large-scale edutainment program specifically designed to promote entrepreneurship to young individuals in Egypt by changing both their information set and preferences related to entrepreneurship. The show consisted in 13 episodes involving 14 contestants, each episode putting contestants in front of a new challenge testing their entrepreneurial skills. It was broadcast on one of the country's most watched television channel for a period of three months starting in December 2013. In order to reach its goals, educational content was disseminated in every episode amidst entertaining content, and contestants were recruited from various subgroups of the Egyptian population to ensure that viewers could relate with at least one of the contestants they could observe. Noticeably, female contestants performed particularly well throughout the show, the best of them ranking first and second. In turn, this allows us to investigate the impact of the show on viewers' opinions related to female entrepreneurs.

Egypt is particularly well suited to the objectives of the edutainment program and, combined with some of the country's characteristics, it provides a perfect setting where to gather additional evidence on some of the questions raised above. First, as in many developing countries, the place of television is particularly important in Egypt: according to the World Bank,[8] 97% of Egyptian households owned at least one television set in 2011 and 40% watched television more than four hours a day (PwC,

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[8] World Development Indicators' information society data for the year 2014.

2012).[9,10] Second, despite a high youth unemployment rate,[11] the share of entrepreneurs is remarkably small, around 4% (Roushdy and Sieverding, 2015). While this puzzling fact pinpoints the existence of traditional regulatory, financial, and human capital barriers, it also underlines the importance of cultural barriers, such as negative perceptions and expectations related to self-employment.[12,13] Finally, Egypt also exhibits large gender inequalities which are particularly visible on the labor market where the unemployment rate among young female actives aged between 15 and 24 years peaked at 61.3% in 2013, when it leveled at 33.7% for males (ILO, 2013).

In order to measure the impact of the program and provide new evidence on the more general questions discussed above, we carried out a randomized controlled trial using an encouragement design where respondents included in our sample were randomly selected to receive an encouragement to watch the show. Our design exhibits three interesting features, which contrast with what has frequently been done until now in the literature on the impact of media programs. First, our sample is constituted of a representative subset of a very large population of young individuals (between 18 and 35 years old) in Egypt who have some interest in entrepreneurship, while previous experimental studies have focused on limited subsets of the population of interest.[14] Second, this is also the first time a mainstream television program purposely designed to have an impact of public policy interest is evaluated through a large-scale randomized controlled trial relying on an easily replicable and scalable set of encouragements. Indeed, treatment respondents were reminded to gain exposure to the program via the sending of simple text messages.[15] Third, we did not provide the control group with any incentive to watch another show. This allows us not to artificially hold

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[9] This observation is more generally true for the entire MENA region (as well as for other regions), where the share of households owning a television set is close to 100% in many countries: for instance, in 2013, it was at 98% in Algeria, 98% in Iraq, 98% in Lebanon, and 100% in Morocco (World Development Indicators, information society data). Also, the average number of hours spent watching television was calculated to be 3.11 hours every day in 17 MENA countries (PwC, 2012).

[10] This trend was also favored by the development of an important television industry in Egypt producing hugely popular mainstream television programs, including talent, reality, and game shows, which have become a major source of entertainment over the past decades.

[11] Peaking at 40.1% in 2013 according to the International Labour Organization (ILO), a pattern also shared by many developing countries, especially in the MENA region:

[12] More specifically, they materialize into strong preferences in favor of public sector employment over alternative options – especially among young educated individuals (Said, 2011; Barsoum, 2014; Barsoum, 2016).

[13] Survey data suggests that these barriers often lead young individuals to reconsider entrepreneurship as either a supplemental income-generating activity or as a career option they could pursue later in life once they have established themselves financially or professionally, rather than as a conceivable main career option (Sieverding, 2012).

[14] For instance, Bjorvatn et al. (2015) and Bernard et al. (2014) chose to focus on specific subgroups: high school students and rural villagers respectively.

[15] Until now, experimental studies investigating the impact of media programs have relied on two types of encouragements: a) financial incentives (Berg and Zia, 2013; Bjorvatn et al., 2015), and b) the organization of broadcasting events (Paluck and Green, 2009; Bernard et al., 2014), which raise the additional problem that these evaluations capture the impact of the content of a media program in a controlled setting (along with any potential interaction effect between this content and these broadcasting events), rather than the impact of a media program in real life conditions.

constant the number of hours spent watching television across treatment and control individuals.[16] We are thus able to capture the possible negative impact of a change in respondents' time allocation (Olken, 2009) and measure the impact of the show in a more realistic manner.

Moreover, we tailored our design so as to be able to study the role of social interactions on the effects of the program. Indeed, a subset of respondents' friends meeting the same inclusion criteria (i.e. young and interested in self-employment) was included in our sample and a random subset of this group of friends was also randomly selected to receive the same encouragements. This induced an exogenous variation in their own and their friends' exposure to the intervention depending on whether or not they, their friend(s), or both received the encouragements. This design allows us to identify both the *direct* causal impact of the intervention on a policy-relevant set of viewers, as well as any *indirect* causal impact arising from peer effects within groups of friends. More, we are capable of measuring two different types of spillover effects: a *dissemination effect* arising when respondents are not treated but at least one of their friends is, and an *interaction effect* arising when respondents are treated together with at least one of their friends.

We collected data on the impact of the intervention 13 to 21 months after the end of the show and find that the program had an important impact on respondents' general beliefs associated with self-employment and, in particular, gender-related ones. Indeed, in line with previous evidence on the impact of television programs, our results show that women role models (as portrayed in a TV show) can have an impact on individuals' gender-related opinions associated with self-employment. However, we cannot establish that the show had any impact on respondents' aspirations towards entrepreneurship, knowledge about the business environment, or on the likelihood that respondents took any steps towards the creation of a business. Investigating potential mechanisms, we find that our pattern of results is more likely to have materialized through the *information* channel rather than through the *preferences* channel. We also find evidence of the importance of social interactions for the impact of media programs. For instance, the impact of the show on individuals' gender-related opinions associated with self-employed women completely vanishes when a respondent is exposed to the show along with their friends, which we interpret as a sign that the information conveyed by the edutainment may not have been perceived as sufficiently credible by its audience. Finally, we also

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[16] It is also more relevant to policymakers interested in increasing a population's exposure to a media program.

find some evidence that the show may have distorted some of the viewers' perceptions related to gender discrimination in self-employment activities.

Our study contributes to several strands of literature. First, our study complements the burgeoning literature on the impact of the media (La Ferrara, 2015) as we provide evidence on whether or not media programs can be used in the short run to achieve goals of public policy interest and, in particular, to improve the insertion of young individuals in the labor market through entrepreneurship. Our study also suggests methodological improvements for designing field experiments in this field of research. Our results also add to the literature on the impact of entrepreneurship training programs (McKenzie and Woodruff, 2013) by measuring the impact of a particular light form of entrepreneurship training focusing primarily on the promotion of an entrepreneurial culture rather than the provision of hard skills. We also contribute to the literature on gender-related norms (Beaman et al., 2012) by presenting new evidence that showcasing successful women, even through a very light intervention, can change general perceptions a population has about women. Finally, we show the importance of peer effects in the context of media and entrepreneurship programs (Breza, 2016; Taylor and Eckles, 2017) by presenting evidence that social networks can affect the impact such programs can have on their audience. We show that social interactions can affect significantly the impact of the messages that are conveyed.

The rest of the article is organized as follows: in section II, we describe the intervention; in section III, we describe our empirical strategy; in section IV, we detail our estimation strategy; in section V, we provide a description of our data and sample; in section VI, we present our study results; in section VII, we investigate the mechanisms at play; in section VIII, we conclude.

II.   Intervention

We evaluate the impact of an edutainment program produced by Bamyan Media,[17] *El Mashroua* ("*The project*" in English), which was specifically designed to promote entrepreneurship to young individuals in Egypt and contribute to tackle their high rate of unemployment. The show primarily aimed to change viewers' preferences towards self-employment by providing viewers with successful self-employed role models and improve their entrepreneurial-related knowledge by embedding

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[17] The show was developed by Bamyan Media, a social enterprise created in 2010. Its goal is to create edutainments that "create riveting and compelling content that can spark social movements to improve lives and communities."

educational content in its reality show. As any edutainment program, the show aimed to entertain and educate viewers at the same time.[18]

The entertaining aspect of the show lied in its format, a reality TV show taking the form of a competition between 14 contestants. The show consisted in 13 one-hour episodes starting with a series of ten challenges[19] (one challenge per episode) opposing two teams of contestants, which aimed at testing contestants' entrepreneurial skills – the least performing contestant of the losing team being eliminated by a set of three judges at the end of each episode. Members of the losing team had to vote to eliminate the teammate they thought had underperformed the most and should leave. Ultimately, the decision to eliminate a contestant fell to a panel of three judges[20] based on their own opinion and the contestants' vote. In the last three episodes, the remaining three contestants presented their own business project in front of a panel of judges made up of successful entrepreneurs. Each finalist had to prove capable of applying everything they had learnt throughout the show.

In producing this TV show, Bamyan Media hoped to change the mindset of young Egyptians who exhibit a strong preference for public employment over self-employment. The show provided them with role models who consider self-employment as a desirable professional career option and are successful at it – because the show was conceived as a competition, it is important to stress that not all candidates or groups of candidates were necessarily seen as equally successful at starting their own business by the viewers. In order to ensure that viewers could relate to at least some of the characters they could observe on the show, contestants were recruited from very different backgrounds in terms of gender, socio-economic status, region of origin, ethnic and religious groups. For instance, half of the contestants were women.

Another key difference between El Mashroua and other similar reality TV show lies in the fact that the show's producers aimed to embed educational content in each of the episodes. First, each challenge aimed to provide different examples of self-employed jobs (ranging from running a food stand to organizing sightseeing tours for tourists or cultural events) and to detail different aspects of these jobs that are particularly relevant to self-employment, such as planning, negotiating input prices securing sales agreement, marketing products, etc. Second, key entrepreneurial skills were stressed

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[18] So as to "increase audience members' knowledge about an educational issue, create favorable attitudes, shift social norms, and change overt behavior" (Singhal and Rogers, 2004).

[19] As part of these challenges, two teams of contestants of equal size were opposed. The challenges varied from designing an awareness campaign to producing and selling fruit juice in the street, or by organizing a tourist trip.

[20] Two of which stayed on throughout the whole TV show, the remaining one being a celebrity guest judge who changed from episode to episode.

throughout the show (such as planning, organizational or marketing skills etc.), and core business concepts were also placed at the center of each episode (such as business plans, profits, advertising, customer satisfaction, etc.). In turn, this provided viewers with a glimpse of the intricacies of self-employment. In that respect, viewers also benefitted from judges' constructive feedback on the contestants' performance at the end of each episode.[21]

The first episode of the show aired on December 21st, 2013 and an episode aired every Saturday evening from that day on until March 29th, 2014.[22] For the purpose of this research project, it is interesting to note that female contestants performed particularly well throughout the show, the best of them ranking first and second. This allows us to test the impact the show had on gender-related beliefs and, in particular, those related to self-employment.

III. Empirical strategy

III.A Sampling strategy

Our sample is constituted of a representative subset of a very large population of young individuals (between 18 and 35 years old) in Egypt who have some interest in entrepreneurship. Indeed, a randomly generated set of mobile phone numbers[23] was called to select a sample and collect baseline information from December 30th, 2013 to January 4th, 2014. In order to have a sample that was as representative as possible of the intervention's target group, only individuals who matched the following criteria were included: a/ be aged between 18 and 35; b/ watch TV at least from time to time; c/ be interested in starting a business. A sample of 5,924 individuals was constituted.[24]

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[21] El Mashroua was particularly active on social medias, creating one of the largest digital platform dedicated to potential entrepreneurs in the MENA region. In parallel to the show, support activities were also carried out so as to create a bridge between the show and the real world, and boost business creation. Indeed, their goal was to provide viewers with the support they might need if they were to take the plunge and attempt to start a business: networking events were held in collaboration with partner organizations delivering advanced entrepreneurship training, mentorship, or financial services throughout the country, and a website was launched providing information on the show and these partner organizations.

[22] With the exception of the 6th episode, originally scheduled to air on January 21st, which was postponed to the following week due to the multiple bombings which happened on that day in Egypt and received extensive coverage from the channel on which *El-Mashroua* was broadcast.

[23] According to the Demographic and Health Survey, over 90% of Egyptian households owned a cell phone in 2014 and, according to the International Telecommunication Union's World Telecommunication/ICT Development Report and database, there were 114 mobile cellular subscriptions per 100 inhabitants in Egypt in 2014. http://data.worldbank.org/indicator/IT.CEL.SETS.P2

[24] In order to come up with this sample, 39,830 different mobile numbers were called. Out of these numbers, 27.82% were categorized as "non-working", the owners of 25.73% of these mobile were found not to meet all of the study's inclusion criteria, 15.79% refused to talk to the surveyors, and 15.66% could not be reached.

Importantly for the design of this experiment, these 5,924 respondents (referred to as "*prime respondents*" hereafter) were asked to provide the contact details of up to three of their friends meeting our inclusion criteria. 3,855 prime respondents did not share any of their friends' contact details, 1,159 shared the contact details of one of their friends, 536 of two of their friends, and 374 of three of their friends. In total, 3,353 additional respondents (referred to as "*secondary* respondents" hereafter) were added to our sample, within which clusters of friends were created.[25] This allows us to investigate the importance of peer effects in the context of media and entrepreneurship programs.[26]

In *Figure 1* below, we describe the structure of our sample.

		Prime respondents	Secondary respondents
Whole sample (9,277)	Clusters with friends (5,422)	Group 1 (with friends) 2,069 By cluster size: 2: 1,159 3: 536 4: 374	Group 3 3,353 By cluster size: 2: 1,159 3: 1,072 4: 1,122
	Clusters without friends (3,855)	Group 2 (without friends) 3,855	

Figure 1 - Sample structure

III.B Identification strategy

Set up

Measuring the impact of the intervention entails finding a comparison group mimicking what would have happened to respondents who were exposed to the intervention had they *not* been exposed to it (the counterfactual).

In the search for a comparison group, a first strategy is to find an exogenous source of variation in the probability for individuals to be exposed to mass media programs. The comparison group is then

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[25] Survey data shows that the probability that a secondary respondents knows the other secondary respondents included in their cluster is roughly similar to the probability that they know their prime respondent: around 82% for the former and 87% for the latter.

[26] Banerjee et al. (2018) use a similar design to measure the impact of an edutainment program conveying sexual health information in Nigeria. Experiments following these sorts of designs are referred to as "randomized experiments with interactions in subpopulations" by Athey and Imbens (2017).

constituted by the individuals who could have been exposed to these programs but were not. This quasi-experimental design has recently been used quite extensively in studies aiming to measure the overall impact of access to television and/or radio programs. For instance, Jensen and Oster (2009), Olken (2009), Chong and La Ferrara (2009), La Ferrara et al. (2012), and Farré and Fasani (2013) all rely on variations in signal reception, which they argue is exogenous in the context of their studies, to identify the impact of exposure to television programs. However, studies evaluating the impact of a specific program usually cannot rely on such a natural source of exogenous variation in individuals' exposure to that program.

An alternative strategy consists in artificially creating this source of variation by encouraging some individuals but not others to gain exposure to the program (Palluck and Green, 2009; Berg and Zia, 2013; Bernard et al., 2014; Bjorvatn et al., 2015; Ravallion et al., 2015; Banerjee et al., 2018). For instance, Palluck and Green (2009) exposed Rwandan villagers to a radio program aimed at discouraging blind obedience and reliance on directions from the authorities following the genocide. They did so by sending research assistants to treatment villages where they played four 20-minute episodes on a portable stereo each month. Bernard et al. (2014), Ravallion et al. (2015), and Banerjee et al. (2018) followed similar designs as part of which screening sessions were held in villages. Alternatively, Berg and Zia (2013) relied on contracts providing financial incentives to treatment respondents to increase their exposure to the show: subject to their answering correctly a questionnaire testing their knowledge of the show, respondents would receive a cash transfer. Bjorvatn et al. (2015) followed a similar design. In such settings, the impact of the program is estimated on the set of individuals (referred to as "*compliers*" hereafter) who respond to the encouragements by gaining exposure to the program.

Study design

As the show was broadcast nation-wide on a channel available to all and there were naturally strong reasons to expect significant selection with respect to the type of individuals who would gain exposure to the intervention, we implemented a randomized controlled trial following an encouragement design to generate the counterfactual for our treatment group. Individuals were randomly allocated to either a treatment or a control group, differing only by the level of encouragement they received to gain exposure to the intervention. This design guarantees that the two groups were comparable prior to the roll-out of the intervention (or that respondents' treatment status was not correlated with their baseline

characteristics and expected outcomes) and allows us to measure unbiased causal estimates of the intervention's impact.

Our study design differs from what has been done until now in the literature on the impact of media programs in three ways. First, our sample is made of a representative subset of a very large population of young individuals (between 18 and 35 years old) in Egypt who have some interest in entrepreneurship. Previous experimental studies have historically focused on limited subsets of the population of interest. For instance, Bernard et al. (2014) and Bjorvatn et al. (2015) chose to focus on specific subgroups: high school students and rural villagers respectively. More recently, Banerjee et al. (2018) focused on 18-25 year-olds living in 80 urban and peri-urban areas located in Southern Nigeria.

Second, we opted for a *non-symmetric* encouragement design in which the control group received no encouragement whatsoever, while the above-mentioned experimental studies relied on a *symmetric* encouragement design in which the control group received some encouragements as well. For instance, control villages in Palluck and Green (2009) and control respondents in Berg and Zia (2013) also received similar incentives to respectively listen to an alternative radio program and watch an alternative TV program.[27] Unfortunately, these symmetric designs estimate the impact of a program *conditional* on the control group listening or watching an alternative program and, as such, cannot capture the (potentially negative) consequences of an increase in the amount of time allocated to watching television or listening to the radio – see Zavodny (2006) and Olken (2009) for discussions on the possible negative impact of mass media programs, and La Ferrara (2015) for a review of the evidence on the topic. Furthermore, the impact measured using a symmetric design is to some extent arbitrarily conditional on the choice of alternative program the control group is exposed to.

Third, we chose to rely on cheap and easily replicable incentives to encourage treatment respondents to gain exposure to the intervention, while the above-mentioned studies relied on strong, more salient, incentives.[28,29] However, strong encouragements may not be easy to replicate as part of a large scale program and they may also modify the set of compliers exposed to the program so that they are less representative of the group relevant to policymakers. These are important issues for the evaluation of

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[27] A practical advantage of symmetric encouragement designs lies in their greater statistical power, achieved through a reduction in the exposure of the control group to the relevant show.

[28] In Egypt, it can be frequent for mobile owners to receive several text messages containing advertising content in a given day.

[29] Strong encouragements provide another way to achieve greater statistical power, and therefore improve one's capacity to establish whether or not a program *can* have an impact.

media programs as their most salient feature precisely lies in their ability to reach a very large audience.[30,31]

Individuals included in the sample were randomized at the *individual* level after a stratification based on respondents' gender, whether they are a prime or a secondary respondent (in the latter case, whether the respondent was the first, second or third name provided was also taken into account), and whether or not an email address had been provided at baseline (a proxy for respondents' access to the Internet). In doing so, half of our respondents were selected to receive the encouragements and the other half were selected not to receive any encouragement. However, as our sample contains groups of friends, this individual-level randomization mechanically split the sample based on whether or not respondents received the encouragements and on the share of their friends who received the encouragements.

In *Figure 2* below, we describe the treatment allocation by group of respondents.

Whole sample (9,277)		*T1*	*Share of friends receiving the encouragements*
	With friends (5,422)	**Received the encouragements** 2,717 respondents (50.11%)	- 0% : 868 resp. (31.95%) - 33% : 304 resp. (11.19%) - 50% : 400 resp. (14.72%) - 67% : 264 resp. (9.72%) - 100% : 881 resp. (32.43%)
		Did not receive the encouragements 2,705 respondents (49.89%)	- 0% : 863 resp. (31.90%) - 33% : 285 resp. (10.54%) - 50% : 384 resp. (14.20%) - 67% : 304 resp. (11.24%) - 100% : 869 resp. (32.13%)
	Without friends (3,855)	**Received the encouragements** 1,928 respondents (50.01%)	
		Did not receive the encouragements 1,927 respondents (49.99 %)	

Figure 2 – Treatment allocation by group of respondents

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[30] As such, we believe that the results we obtain with our design are also more relevant to policymakers interested in increasing the exposure of a population to a given media program.

[31] However, it is unclear whether or not promoting entrepreneurship to a large population (as in the case of our intervention) is welfare-improving as compared to promoting it to more restricted subgroups (for instance, individuals responding to specific incentives or individuals targeted by specific programs). The answer essentially depends on the number of potential entrepreneurs reached as well as their types (Schoar, 2010).

Given the limited size of our clusters of friends (four people maximum), in randomizing who would receive the encouragements at the individual level, we were able to generate substantial variation in the share of friends receiving the encouragements, which we can exploit to estimate the importance of peer effects.[32]

Encouragements were provided in the form of text messages written in Arabic and sent to the phone of treatment respondents from the fifth episode[33] on January 18th, 2014 onwards. One or two text messages were sent every week to encourage *treatment* respondents to watch the TV show and browse the show's website until the 13th and final episode was broadcast on March 29th. In order to make up for the late start and further increase the differential take-up rate across the groups, we provided additional encouragements during the month following the end of the TV show: treatment respondents were all called and encouraged to watch the show's episodes online, and to take a quiz testing their knowledge of the show.[34] Advertisements in the form of text messages is common in Egypt and, as such, we do not believe the encouragements sent as part of the experiments were particularly salient to the respondents. Furthermore, as displayed in *Table A.2* placed in the appendix, the content of the encouragements merely reminded treatment respondents of the date and time of the show, and aimed to spark their interest by providing them with the main topic covered in the upcoming episode. In particular, encouragements did not contain any gender-related information. As such, we can rule out that the encouragements had any *direct* impact on the respondents – or, at least, not on the set of outcomes on which we focus on in this article.

IV.   Estimation strategy

We estimate the impact of the intervention in two steps. First, we restrict our analysis to the subset of respondents who could not have been affected by any peer effects generated as part of our experiment and estimate the *direct* impact of the intervention. Second, we measure the *direct* effect of the

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[32] Hence, we can estimate the importance of peer effects without the usual two-level randomization which generates different levels of exposure across groups – as in the theoretical framework developed by Hudgens and Halloran (2008) or in empirical studies, such as Duflo and Saez (2003) and Crépon et al. (2013).

[33] Unfortunately, the collection of the baseline survey encountered several delays and was only finalized at the beginning of January 2014, which meant that encouragements could only be sent from the fifth episode onwards.

[34] However, the number of individuals who completed the quiz being low, we do not believe that the encouragements provided after the end of the broadcasting of the show had much of an impact on respondents' rate of exposure to the show. Indeed, less than 50 individuals completed that quiz, despite the fact that it was broadly advertised on the show's social media accounts, in addition to being advertised to the individuals included in the sample.

intervention, as well as any *indirect* effect which may arise from potential spillovers across respondents within groups of friends – using all respondents included in our sample.

IV.A In the absence of potential spillover effects

In a first step, we measure the *direct* impact of the intervention and, in order to do so, we restrict the sample on which we carry out the analysis to the set of respondents who could not have been affected by spillovers generated as part of our experiment. This subset encompasses the following two groups of respondents: a) prime respondents who did not share the contact details of any of their friends at baseline; and b) prime and secondary respondents who did not have any friends receiving the encouragements.

Equation (1) presents the main equation we estimate as part of this first step to measure the *direct* impact of the encouragements on outcome (y_i):

$$y_i = aT_1 + \sum_{f=0}^{3} \mu_f S_f + \varepsilon_i \qquad \textbf{(1)}$$

In this equation, T_1 is a dummy variable indicating whether or not individual i received the encouragements her/himself and S_f are dummy variables indicating the number of friends f in the cluster individual i belongs to.

Parameter a is the parameter of interest and measures the average treatment effect among the set of respondents for whom no spillover effect was generated as part of this experiment.

IV.B In the presence of potential spillover effects

In a second step, we measure the impact of the intervention on all respondents included in our sample, including respondents who had at least one friend receiving the encouragements. The presence of possible spillover effects has some implications for the analysis of the impact of the encouragements.

Equation (2) represents the starting point for estimating both the *direct* and *indirect* impact of the encouragements on outcome (y_i):

$$y_i = aT_1 S_0 + bT_1 S_+ + cP(1 - T_1) + dPT_1 + \sum_{f=0}^{3} \mu_f S_f + \varepsilon_i \qquad \textbf{(2)}$$

In this equation, T_1 is a dummy variable indicating whether or not individual i received the encouragements her/himself and P indicates the share of individual i's friends who received the encouragements. S_0 is a dummy variable indicating when a cluster contains one single individual, S_+

is a dummy variable indicating when a cluster contains more than one single individual, and S_f are our stratum fixed effects: dummy variables indicating the number of friends f in a cluster.

Parameters a, b, c, and d are the parameters of interest. Parameter a measures the average treatment effect among the group of respondents who did not provide the contact details of any of their friends at baseline. For those who did, we are able to identify the effect of watching the show b, as well as spillover effects d and c. We are first able to measure a spillover effect capturing the impact of the encouragements on friends who did not receive them. This *dissemination* effect is captured by the parameter c. This type of spillovers can already be found in Hudgens and Halloran (2008) for instance, in which these indirect effects captured the idea that the larger the share of cured or immunized individuals the smaller the others' risk of becoming ill. There is, however, a second indirect effect which materializes through the parameter d. This second type of spillover effect, the *interaction* effect, captures the idea that being exposed to the show alone or together with some friends might yield different results because social interactions may either amplify or shrink the effects. These results are especially likely to be different in a context like ours where the intervention we evaluate attempts to shift outcomes that are at least partly determined at the group of peers level (rather than entirely shaped at the individual level).[35]

However, the estimators of the average treatment effects (a, b, c, and d) derived from the estimation of equation (2) are not consistent in the context of our experiment as the probability for a respondent to experience some form of spillover effects varies based on the number of friends belonging to their cluster (the distribution of the proportion of friends receiving the encouragements varies with the size of the cluster – as displayed in *Table A.3* placed in the appendix). In such a context, a first alternative approach to obtaining consistent estimates of the average treatment effects (a, b, c, and d) consists in estimating equation (2) for each cluster size and calculating the average treatment effects as the weighted average of within-stratum coefficients, with weights proportional solely to the share of observations within each stratum.

We opt for a second equivalent alternative, which builds on the procedure described in Imbens and Rubin (2015) for stratified experiments. As part of this approach, average treatment effects are

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[35] Following Hudgens and Halloran (2008), we could define, an average *direct* treatment effect as $b+(d-c)P$, where P is the share of respondents' friends who were randomly selected to receive the encouragements as well as an *indirect* treatment effects corresponding to a change in the probability of assignment ΔP. This last effect could be easily computed as $(b+(d-c)P)\Delta P+d\Delta P \ P+c\Delta P(1-P)=(b+c+2(d-c)P)\Delta P$. However, for the sake of simplicity, we focus on the raw parameters b, d and c in what follows.

obtained directly through the estimation of the following alternative equation using the Ordinary Least Squares method:

$$y_i = aT_1S_0$$

$$+ bT_1S_+ + b_2T_1(S_2 - q(S_2|S_+))S_+ + b_3T_1(S_3 - q(S_3|S_+))S_+$$

$$+ cP(1 - T_1) + c_2P(1 - T_1)(S_2 - q(S_2|S_+))S_+ + c_3P(1 - T_1)(S_3 - q(S_3|S_+))S_+$$

$$+ dPT_1 + d_2P(T_1)(S_2 - q(S_2|S_+))S_+ + d_3P(T_1)(S_3 - q(S_3|S_+))S_+$$

$$+ \sum_{f=0}^{3} \mu_f S_f + \varepsilon_i \tag{3}$$

In this equation, $q(S_f|S_+)$ indicates the share of respondents in stratum f out of the broader set of respondents with at least one friend in our sample.[36] The treatment variables entering equation (1) are now fully interacted with the strata dummy variables (corresponding to the clusters of friends of different size). Again, parameters a, b, c, and d are the parameters of interest but, in this case, parameters b, c, and d can directly be interpreted as the weighted average of strata-specific parameters.[37,38]

When estimating equation (3), we carry out two important statistical tests for each outcome. First, we investigate whether or not the intervention had any impact on outcome (y_i) by testing the following first joint hypothesis:

H1: $a = b = c = d = 0$

Second, we investigate the existence of spillover effects by testing the following second joint hypothesis:

H2: $c = d = 0$

In order to limit the probability of making one of more false discoveries, we adopt the following strategy which consists in limiting the number of statistical tests we carry out and/or correcting p-values. First, within family of outcomes, we gather individual outcomes into indexes using the

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[36] Those shares are recalculated for each dependent variable to account for variation in respondents' response rate across questions.
[37] The results are robust to the inclusion of the set of baseline covariates *Xi* to equation (2).
[38] The results are similar to those we obtain when estimating equation (1), as displayed in *Tables A.10* placed in the appendix.

methodology described in Anderson (2012) so as to limit further the number of statistical test we carry out.[39,40] Second, we implement the Holm-Bonferroni procedure to control for Family Wise Error Rate (FWER)[41] and provide the associated p-values adjusted at the family of outcomes level whenever regression coefficients are reported for individual outcomes – we do so both in the absence and in the presence of spillover effects. Third, when measuring the impact of the intervention while allowing for spillovers, we do not test whether or not parameters *a*, *b*, *c*, and *d* are each individually statistically significant but rather restrict ourselves to the testing of the two above-mentioned hypotheses, H1 and H2. As a consequence, the traditional stars displayed to denote the usual significance levels associated with a test are only reported for H1 and H2 in our tables.

Finally, we restrict the analysis to the estimation of the above reduced forms providing Intent-To-Treat estimates. We do not report Local Average Treatment Effects on the group of compliers (measuring the impact of watching the show and of the share of friends watching the show) due to the fact that we only have a very imperfect measure of respondents' exposure to the show. Indeed, we show further down that both the overall take-up rate and differential take-up rate across treatment and control groups decrease over time, which suggest that the information we collected on respondents' exposure to the intervention 13 to 21 months after the end of the broadcasting of the show underestimates their "true" level of exposure. Furthermore, because we were not able to survey all our respondents at endline, the "true" share of friends exposed to the show within a cluster is also measured with some error.[42]

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[39] As part of this methodology, all available information are used, individual items are also normalized, and the weight given to each outcome used in an index is proportional to the sum of its row entries in the inverted covariance matrix of the outcomes used in the construction of that index. The weight given to a specific item can vary across observations depending on the set of information available. For additional information on how these indexes are calculated, see Kling et al. (2007) and Anderson (2012).

[40] These families of outcomes are pertaining to different types of barriers to entrepreneurship (a limited access to resources, an unaccommodating economic structure, social, and impeding social norms), entrepreneurship-related knowledge, general opinions associated what successful entrepreneurs, professional aspiration, and direct steps taken towards the creation of a business.

[41] With the Holm-Bonferroni method, the adjusted p-value for the outcome with the i's smallest unadjusted p-value is given by: $\dot{p}_{(i)} = \max_{j \leq i} \{(m - j + 1)p_{(j)}\}_1$, where m is the number of outcomes in the family of outcomes considered, $p_{(j)}$ is the unadjusted p-value associated with the outcome with the j's smallest unadjusted p-values, and $\{x\}_1 \equiv \min\{x, 1\}$. Hypotheses are rejected as long as adjusted p-values remain inferior to the chosen significance level. In doing so, the Holm-Bonferroni method allows one to bound the probability of rejecting at least one true hypothesis (type 1 error rate) below 5%. See Westfall and Young (1993) for more information.

[42] That share can only be computed without error when all cluster members responded to the endline survey. Conversely, that share is measured with some error as soon as some of these cluster members did not answer the endline questionnaire. It is impossible to measure for respondents for whom none of their friends could be reached at endline – this is all the more likely in clusters with only two individuals.

V. Data collection and sample description

V.A Data collection

From December 30th, 2013 to January 4th, 2014, baseline background information was collected over the phone on each prime respondent included in the study sample. In particular, baseline information was collected on their gender, age, governorate of residence, professional occupation, and highest level of education. Asset ownership data was also collected at baseline and used to calculate an asset ownership index based on which respondents were ranked and sub-divided into quartiles. Unfortunately, secondary respondents could not be contacted prior to the roll-out of the encouragements and only their age and gender could be obtained via their prime respondent.

The endline survey was also carried out over the phone and stretched from April 30th, 2015 to January 31st, 2016 and was designed to gather different types of information.[43] First, questions were asked to identify respondents' professional aspirations and, more specifically, their preferences regarding the following career options: "working as an employee in the *private* sector," "working as an employee in the *public* sector," "working as a self-employed person," and "not working."[44] Second, respondents were asked about their perceptions of self-employment. In particular, these questions were designed to measure: a) respondents' perception of the importance of various barriers to starting a business (such as the lack of funding or appropriate skills, or the complexity of the regulations, etc.); and b) some general self-employment-related opinions and, in particular, gender-related ones. A third set of questions aimed to test respondents' knowledge of the entrepreneurial environment and a fourth to capture any steps they may have taken towards the creation of a business. A final set of questions were asked to measure respondents' exposure to the encouragements and intervention.

In total, we were able to successfully survey 60% of the 9,277 respondents included in our sample as part of the endline survey, 16 to 24 months after the completion of the baseline survey. Among the group of 5,520 respondents who could be surveyed at endline, 2,743 received the encouragements and 2,777 did not. Out of those who did not receive the encouragements, 1,606 did not have any friends receiving the encouragements either. The attrition rate appears independent of respondents' treatment status, as detailed in the first row of *Table 1*: coefficients are small and non-significant.

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[43] In total, the completion of the endline questionnaire took between 15 and 20 minutes.
[44] As a first step towards measuring their aspirations, respondents were asked to rank these options based on how frequent they were among their family in order to limit possible social desirability and/or anchoring biases (Bernard and Taffesse, 2014). As a second step, respondents were then asked to rank the same options according to what they would like best for themselves *presently*, and, finally, according to what they would like best for themselves *20 years from now*.

V.B Sample description and balance checks

In *Table 1*, we describe the average baseline characteristics of the individuals included in our sample who were also surveyed at endline (5,520 respondents, *i.e.* 59.5% of the total sample). Our sample is overwhelmingly constituted of young adult males: men represent 83.4% of the respondents reached at endline and the average age is 27 years old,[45] which may explain some of the discrepancies observed between our targeted group and the Egyptian population (as detailed in *Table A.4* in the appendix). 26.1% of the respondents included in our sample live in one of the four city governorates Cairo, Alexandria, Port Said, and Suez, although these Governorates only represent 17.7% of the total Egyptian population according to CAPMAS. As a consequence, individuals living in Lower or Upper Egypt are under-represented in our sample. In addition, our respondents appear to be more educated than the overall Egyptian population: only 3.8% of our respondents have no education at all and 33.5% have a higher education degree as their highest educational achievement (hereafter referred to as "*highly educated*" respondents), as opposed to 32.5% and 11.6% respectively in the overall population. However, asset ownership data tend to suggest that our respondents' level of wealth is comparable to that of the average Egyptian. In particular, 97.9% of respondents declared that they owned a TV set and 90.9% declared that they had access to cable television, which largely confirms that respondents are to a very large extent exposed to mass media and had the means to gain exposure to the intervention. Finally, 22.5% of respondents were already self-employed at baseline.

As expected given the design of the experiment, the characteristics of the individuals included in our sample are largely uncorrelated with whether or not they received the encouragements, as also displayed in *Table 1*. Coefficients displayed in this table are obtained by estimating equations (1) and (3) using successively each of the baseline characteristics displayed in the left column of the table as the dependent variable. We do so using all observations for which baseline information are available. The point estimates associated with the treatment variables remain small and non-significant, suggesting again that respondents' treatment status is uncorrelated with their baseline characteristics. In particular, the null hypothesis testing the joint nullity of the four coefficients (H1) cannot be rejected at the 5% threshold for any of the background characteristics, except for the share of unemployed respondents looking for a job at baseline.

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[45] Our inclusion criteria may provide a first explanation for the over-representation of men in our sample. Indeed, women appear to be less interested in entrepreneurship than men according to the 2009 Survey of Young People in Egypt. However, qualitative evidence gathered throughout the project also suggests that women were significantly more difficult to survey over the phone than men.

V.C Attitudes towards self-employment in Egypt

In order to understand the possible impact of the intervention, we now turn to the status of entrepreneurship in the Egyptian society and assess young individuals' attitudes towards self-employment, what the most hindering barriers to business creation are, as well as their professional aspirations and professional choices. In order to do so, we exploit the representativeness of our sample and investigate the level of our key outcome variables among the group of respondents who fell in the *pure control group*, *i.e.* the group of individuals who were not affected by the encouragements, neither directly nor indirectly through their friends. We report these descriptive statistics in *Table 2*.

Consistent with prior findings, we find that young Egyptians do aspire to being self-employed but generally in the long run rather than in the short run, where they prefer seeking employment in the public sector. Indeed, 38.9% of the *pure control* respondents chose "self-employment" as the professional career option they would preferably choose for themselves now, almost 10 percentage points less than the share of respondents who preferred working in the public sector (48.0%) but significantly more than the share of those who chose working in the private sector (11.0%). This result is consistent with prior evidence on the relative attractiveness of public employment over other career options – presumably, due to the stability and status it may offer (Said, 2011; Barsoum, 2014; Barsoum, 2016). Although the public sector seems more attractive *in the present*, self-employment was chosen as the preferred professional career option *20 years from now* by 54.5% of the respondents, well above any other career options. This pattern is also consistent with prior evidence on the increased attractiveness of self-employment as a future professional career option (Sieverding, 2012).

Several barriers to business creation may explain why self-employment appears relatively less attractive to young Egyptians in the short-run. First, they have a very limited knowledge of the entrepreneurial environment in Egypt and, more specifically, of the organizations supporting entrepreneurs. Only 3.3% of *pure control* respondents knew of an organization providing mentoring services, 6.5% knew of an organization providing training services, and 19.5% of them knew of an organization providing financial services (such as a loan). Second, the lack of funding appears as the most important barrier to starting a business. Complex government laws and respondents' lack of required skills are also reported to be important barriers but are only distant second. So are negative perception by society and resistance to change which are distant third. Along required skills for entrepreneurship, access to language training, and technology are also of relative importance.

Another possible barrier lies in individuals' beliefs and, more specifically, in the *perceived* probability for an entrepreneur from certain subgroups of the population to be successful: 56.7% of the *pure control* respondents strongly agreed that it is possible for women to successfully run a business. Furthermore, 61.5% strongly agreed that it is possible for individuals without a higher education to successfully run their own business and 49.6% that it is possible for individuals who do not have wealthy parents to successfully run their own business.

Finally, 36.3% of the *pure control* respondents reported having made a decision with respect to their professional career since the beginning of the broadcasting of the show, and 19.2% reported they had made a decision related to the creation of a business. Moreover, 76.3% reported to be planning to start a business in the future.

Interestingly, patterns are remarkably similar in the four subgroups we later investigate: men, women, highly educated respondents, and non-highly educated respondents. If anything, men and less educated respondents report more discriminatory beliefs against women, and less educated respondents appear to know far fewer organizations from the entrepreneurial environment than more educated respondents. We get back to these points in the next section.

VI.   Results

We evaluate the impact of the intervention on measures of respondents' exposure to the show and on three set of final outcomes: a) specific perceptions and knowledge related to entrepreneurship, b) general beliefs related to entrepreneurship, and c) professional aspirations and career choices.

For each outcome, we report the impact of the intervention using the strategy described in section IV. First, we estimate the impact of the intervention in two separate steps which consists in estimating equation (1) on the subset of respondents for whom there can be no spillover as part of this experiment (*Panel A*), and equation (3) on the entire sample so as to capture any spillover effects which may arise across respondents within groups of friends (*Panel B*). Second, variables are gathered in families of outcomes and p-values are adjusted using the Holm-Bonferroni method to control the error rate at the family of outcomes level. In *Panel B*, we only report the stars indicative of a test's significance level when testing H1 (testing the joint nullity of the coefficients *a*, *b*, *c* and *d*) and H2 (testing the joint nullity of the coefficients *c* and *d*).

We also investigate the impact of the intervention on the four subgroups of the population already studied in the previous section: males, females, highly educated individuals, and non-highly educated individuals.[48] For each of these subgroups, we measure the direct impact of the intervention estimating equation (1). In order to make up for the reduction of the sample size when carrying out subgroups analysis, we do not correct to the p-values to control for family-wise false discovery rate. As a consequence, although these results allow us to shed some interesting lights on the impact of the intervention, they should be interpreted with greater caution. These tables are reported in the appendix of the paper.

VI.A Take-up rate

We first investigate whether or not the encouragements managed to generate a differential take-up rate across individuals. In turn, this would allow us to measure the impact of the TV show on an interesting set of marginal viewers: the group of individuals that decision makers can influence at a low cost so that they gain exposure to the show.

In columns *A* to *D* of *Table 3*, we analyze the impact of the encouragements on a range of indicators describing respondents' exposure to the intervention. In *Panel A*, using the sample of respondents for whom no peer effect was generated as part of the experiment, results suggest that receiving the encouragements increased by 5.7 percentage points respondents' overall exposure rate (column *A*) – defined as the probability of a respondent having watched at least one episode, visited *El Mashroua*'s website at least once, followed one of their social media, or attended at least one of their events. This represents a 60% increase compared to the exposure rate of the control group. More, this differential overall exposure rate is almost entirely driven by the effect the encouragements had on the probability of having watched the show at least once – and not by the effect they had on the share of respondents who visited *El Mashroua*'s website at least once, followed one of their social media, or attended at least one of their events. While 8.2% of the control respondents declared that they had watched at least one episode of the show, encouragements increased this probability by 5.1 percentage points.[49]

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[48] For the purpose of this section, secondary respondents (for whom the education information could not be collected at baseline) were given the educational level of the prime respondent of their cluster.

[49] Receiving the encouragements also had an impact on the number of episodes watched across groups, however the effect is entirely driven by the fact that the encouragements led a greater share of treatment respondents to watch the show (the extensive margin). In turn, this also suggests that the show may have had some problems retaining viewers: conditional on having watched at least one episode of the show, the average number of episodes watched is 3.21, and no difference can be found across groups (the intensive margin).

While the differential exposure rate across groups appears small, it is likely to be significantly underestimated due to recall bias given the important time gap between the end of the broadcasting of the show and the moment the endline data was collected (13 to 21 months after). We investigate this issue by exploiting the fact that respondents were called following a randomly generated order, which, in turn, created an exogenous variation across respondents in the date they were first contacted by our team of surveyors. We find that the impact of the encouragements is three times larger for the half of our sample we contacted first (in the first three months of data collection) than for the other half of the sample who were contacted last (in the subsequent 7 months) (columns *F* and *G*): 8.6 vs. 3.6 percentage points. We can reasonably assume that the actual differential take-up rate would have been even larger had it been measured right when the show ended.

In *Panel B,* we allow for spillover effects (enlarging our sample to respondents with at least one friend exposed to the encouragements) and find similar results suggesting that receiving the encouragements increased respondents' exposure to the show. As a result, the hypothesis H1 (testing the joint nullity of the coefficients *a*, *b*, *c* and *d*) is rejected at the 5% level for all outcomes and the estimate associated with parameter *a* is systematically statistically significant at the 1% level.

To examine the *potential* for spillovers in relation to the intervention, we estimate the impact the encouragements had on the share of a respondent's friends who were exposed to the intervention (column *E*). In order to do so, we used our measure of overall take-up rate as a proxy for whether or not a respondent was exposed to the intervention and computed the share of a respondent's friends who were exposed to the intervention for each respondent – using the information which could be collected on the members of their group of friends at endline.[50] As expected, the share of a respondent's friends who received the encouragements increased the share of friends exposed to the intervention: increasing the share of a respondent's friends receiving the encouragements by 50 percentage points increased the share of friends exposed to the intervention by around 2 percentage points. This result holds irrespective of whether or not the individuals received the encouragements themselves.[51]

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[50] In calculating this variable, it was assumed that individuals who could not be reached at endline were not exposed to the intervention.
[51] Note that we carry out a placebo test to assess the robustness of our first-stage estimates by investigating whether the encouragements had any impact on respondents' exposure to an alternative show, and find no impact. In order to do so, respondents were asked as part of the endline survey to answer the exact same set of exposure-related questions about *El Mashroua* and another TV show ("*The Voice*"), which was broadcast around the same time as *El Mashroua* (questions were asked about the placebo show first, and then about *El Mashroua*). These questions were placed at the very end of the questionnaire in order not to influence the way respondents answered our other questions. We display the results of this placebo test in *Table A.5.b* (placed in the appendix) and find no difference between

Now, investigating *actual* spillovers in relation to respondents' exposure to the intervention, we estimate whether or not the share of a respondent's friends receiving the encouragements had any impact on his or her exposure rate. We find none irrespective of whether or not the respondent received the encouragements themselves. First, the hypothesis H2 (testing the joint nullity of the coefficients *c* and *d*) fails to be rejected at the 5% level for all outcomes. Second, the estimates associated with the variables $P*(1-T_1)$ and $P*T_1$ are systematically close to 0 (columns *A* to *D*). Third, whether or not a respondent received the encouragements had no impact on the share of their friends exposed to the intervention (column *E*). In turn, this implies that any differences we find in the impact of the intervention across individuals depending on the share of their friends receiving the encouragements can only be attributed to the fact that friends are treated together (watching together the show or discussing further its content) – and not to any differences in the intensity these two groups were exposed to the show.

Finally, we investigate the level of exposure to the show in the control group and the level of the differential take-up rate in the four subgroups of respondents we are particularly interested in: males, females, highly educated, and non-highly educated respondents (displayed in *Table A.5.a* placed in the appendix). We find some differences in the groups' counterfactual level of exposure to the show (it is particularly high for female respondents) but limited differences in the impact of the encouragements on their exposure rate.

VI.B Results

We now turn to the impact of the intervention on our sets of final outcomes.

Specific perceptions of entrepreneurship and knowledge

First, we evaluate the impact of the TV show on viewers' perceptions of the importance of various barriers to self-employment in order to understand whether the intervention modified viewers' perception of self-employment as a feasible career option. More specifically, we study respondents' perceptions of eleven barriers to self-employment, which we regroup in three families of outcomes as follows:

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treatment and control respondents' exposure to the placebo show in any of the dimensions investigated, suggesting that the observed differential exposure rate cannot be attributed to any sort of response bias.

- Lack of access to resources (*resources constraints* index): lack of required skills, lack of access to funding, lack of access to information, lack of access to foreign language training, and lack of access to technology;

- Difficult economic conditions (*economic constraints* index): complicated government laws, and rough competition among entrepreneurs;

- Societal barriers (*societal constraints* index): fear of failure, negative perception by society, resistance to change, and discrimination based on gender.

For each item, respondents were asked to assess its importance on a 1 to 10 scale (10 indicating "extremely preventive" barriers). These variables were later rescaled so that their range only goes from 0.1 to 1.

In order to test the effect of the show on *actual* constraints (as opposed to the *perceived* constraints just mentioned), we analyze whether it affected respondents' knowledge of the Egyptian entrepreneurial environment. More specifically, we look at the share of respondents who knew of any organization which could provide them with mentoring services, training, or financial support. Again, we combine these three variables into a single index.

Table 4 reports the effect of the intervention on respondents' perceived and actual barriers to self-employment. Overall, our results are mixed. In *Panel A*, using the sample of respondents for whom no peer effect was generated as part of the experiment, we cannot reject that the show had no impact on any of the four indexes, as well as on the vast majority of their components. However, looking more specifically at the impact of the show on each individual perceived barrier, we find a strong effect on respondents' perceived importance of gender discrimination as a barrier to starting a business. Indeed, being encouraged to watch the show reduced by 0.035 the perceived importance of gender discrimination as a barrier to starting a business (at the mean, this represents a 7.5% increase).[52] This result suggests that the content of the show led viewers to believe that starting a business is easier for women than initially expected.[53] We discuss further how to interpret this result in the last section of this paper.

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[52] Scaling-up the ITT coefficient by our largest estimation of take-up differential (which can still be an underestimation) would imply that those watching the show are around 40 percentage points less likely to see gender discrimination as an important barrier to start a business

[53] While the interpretation of the latter outcome may appear ambiguous, there is no reason to believe that the show had any impact on viewers' perception of the level of discrimination faced by men when attempting to start a business. Therefore, given the good performance of female contestants throughout the show, we interpret this result as an indication that the show led viewers to revise downward their perception of the level of discrimination faced by women when attempting to start a business.

In *Panel B,* we show that allowing for spillover effects (enlarging our sample to respondents with at least one friend exposed to the encouragements) yield very similar results: the H1 hypothesis (testing the joint nullity of the coefficients *a*, *b*, *c* and *d*) is rejected for all indexes, except for the *economic constraints* index for which the H2 hypothesis (testing the joint nullity of the coefficients *c* and *d*) is also rejected. More specifically, these results are driven by the impact the show had on respondents' perceptions of the roughness of the competition among entrepreneurs. Interestingly, the rejection of the H2 hypothesis is driven by the large magnitude of coefficient *d*, which suggests that spillover effects only occurred when a respondent was exposed to the intervention together with some of their friends (the coefficient *c* is close to 0). In turn, this implies that these spillovers effects only arose because the content of the show was discussed among friends who were exposed to it. More precisely, an increase in the share of a respondent's friends receiving the encouragements reduced the perceived importance of competition as a barrier to self-employment.

From a public policy perspective, it is important to note that we cannot reject the hypothesis that the intervention had no overall impact on any of the barriers that are perceived as the most hindering ones by our respondents (lack of funding, complicated regulations, and lack of required skills). In particular, we do not find that the show had any impact on respondents' perception of the importance of funding constraints as a barrier to starting a business. We do not find any impact either on respondents' perception of the importance of government laws as a barrier to starting a business. Part of the explanation for this absence of impact on *perceived* barriers may lie in the fact that we cannot find that the show had any strong impact on respondent's knowledge-related indicators (despite their limited knowledge of the entrepreneurial environment at baseline). One possible explanation for this result might be that this specific information was often provided too indirectly through either the TV show's website or its networking events, and too rarely as part of the TV show itself, which remained the core of the intervention.[54]

Finally, we investigate the heterogeneity of the intervention's impact across our four subsets of respondents and show that the average effects we measure on the entire sample are driven by specific subgroups (results are displayed in *Tables A.6.a* in the appendix). First, the impact we find on respondents' perceptions related to the functioning of the economy (*economic constraints* index) appears to be driven by the effects it had on men and non-highly educated respondents. Second, we

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[54] Unfortunately, producers were not allowed to provide viewers with the name of organizations offering different types of services to potential entrepreneurs, and this information was mostly relegated to the show's social medias.

find that the impact observed above on respondents' perception of the importance of gender discrimination as a barrier to starting a business appears again entirely driven by male respondents. Third, although we do not find any effect of the intervention on knowledge-related outcomes on the entire sample, we actually observe that the show seems to have increased the knowledge of non-highly educated respondents, the subset of respondents who had the least amount of information at baseline. In turn, this suggests that although the educational content of the show may have been weak, it was not null and the least informed subset of the population did benefit from it.

General beliefs about successful entrepreneurs

Then, we examine whether the content of the show had any impact on viewers' general beliefs related to self-employment. In order to do so, we evaluate the impact of the program on the share of respondents who strongly agreed with different statements related to their beliefs towards self-employment. The first of these statements tested respondents' beliefs in 1) women's ability to be successful at running a business, 2) the importance of being wealthy to be successful at running a business, and 3) in the importance of being highly educated to be successful at running a business. We also take advantage of the good performance of female contestants throughout the show to investigate 4) whether the intervention triggered broader changes in respondents' gender-related beliefs and 5) whether or not it reduced the share of respondents strongly supporting the idea that men might have more rights than women to a job or to receive a higher education.

As displayed in *Table 5*, we find that receiving the encouragements had a direct impact on some of viewers' beliefs and, in particular, on viewers' opinions related to whether or not women can be successful at running their own business.

In *Panel A*, using the sample of respondents for whom no peer effect was generated as part of the experiment, we find that receiving the encouragements increased by 5.3 percentage points the share of respondents who reported to strongly agree that it is possible for women to successfully run their own business (statistically significant at the 1% level), which suggests that the show had a large effect on respondents' beliefs related to women's ability to run a business (column *A*).[57] We also find that the encouragements increased by 3.4 percentage points the share of respondents who reported to strongly agree that it is possible for non-wealthy individuals to successfully run their own business

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[57] For instance, the LATE implied by both the take-up rate observed at endline for the first half of the respondents we managed to reach (8.6 ppt.) and the ITT (5.3 ppt.) is as large as 0.62. Although the associated confidence interval is large [0.23; 1.00], these results suggest that a very large proportion of the compliers strongly agreed with the assertion that women are capable of running successfully a business.

(statistically significant at the 10% level) (column *C*). However, we cannot find any statistically significant effect on the other three outcomes.

In *Panel B,* we show that, again, allowing for spillover effects (enlarging our sample to respondents with at least one friend exposed to the encouragements) yield very similar results: the H1 hypothesis (testing the joint nullity of the coefficients *a*, *b*, *c* and *d*) is rejected for the first outcome at the 5% level. While we cannot reject the H1 hypothesis at the 5% level for the next two outcomes, the corrected p-value associated with these outcomes test is close to 10% – 16.3% and 11.5% respectively. In turn, this suggests that we may have found an effect had we had more statistical power. However, again, we cannot find any impact of the encouragements on any of the last two outcomes of the table. This suggests that the show may not have had any large impact on respondents' gender-related opinions beyond self-employment.[58] Interestingly, we also find evidence of spillover effects: the H2 hypothesis (testing the joint nullity of the coefficients *c* and *d*) is also rejected at the 5% level for the first three outcomes (columns *A*, *B*, and *C*).[59] As for the spillover effects found in the previous subsection, the share of a respondent's friends receiving the encouragements only had a statistically significant impact on the outcome when the respondents received the encouragements themselves. However, a key difference lies in that the spillover effects observed in relation to the opinions mitigate the direct effects of the encouragements: the coefficient *d* is negative (when, again, *b* is positive), suggesting that the impact of the show on respondents gradually disappeared as the share of friends receiving the exposed to the show increased. We comment further on this result in the last section of this paper.

As displayed in *Table A.7* (placed in the appendix), the effects of the encouragements on gender-related outcomes appear particularly pronounced again on men and low-educated respondents – the two subsets of respondents with the most discriminatory beliefs against women – but are null on women (coefficients are closer to 0 and are not statistically significant). Similarly, the effects of the encouragements on the share of respondents strongly agreeing that non-highly educated individuals can be successful at running a business are also particularly pronounced among highly educated respondents, the subset of respondents with the most discriminatory beliefs against non-highly educated respondents, and much less on non-highly educated respondents.

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[58] In a sense, it also shows that the effect put in evidence on the first three outcomes do not capture spurious relationship between our dependent and treatment variables

[59] Qualitative work confirmed that the content of the show was discussed within groups of friends.

Impact on professional aspirations and career choices

Finally, we investigate whether the changes observed in respondents' perceptions associated with self-employment translated into changes in their professional aspirations and their career choices. In order to do so, we first measure separately the impact of the intervention on the probability for a respondent to choose "working as an employee in the *private* sector," "working as an employee in the *public* sector," and "working as a self-employed person" as their favorite professional career option in the present.[60,61] Second, we also measure the impact of the intervention on respondents' professional career-related decisions. More specifically, we measure whether or not the intervention had any impact on respondents' probability of having made any decision with respect to their professional career since January 2014 (month during which encouragements started being sent), on respondents' probability of having taken any steps towards the creation of a business, on the probability for them to still plan to start a business or a new business in the future, as well as on the probability for respondents to report "self-employment" as their primary activity at endline. Those four variables are combined into an index, on which the impact of the intervention is also reported.[62]

As displayed in *Table 6*, we do not find any impact of the encouragements on viewers' professional aspirations and, in particular, on the share of respondents picking self-employment as their favorite professional career option in the short run. As a consequence, it is not surprising that we find no overall impact of the intervention on respondents' career choices. In *Panel A*, using the sample of respondents for whom no peer effect was generated as part of the experiment, we find that none of the coefficients is statistically significant at the 5% level (although some are significant at the 10% level suggesting that the show may have discouraged viewers to start a business). In *Panel B*, allowing for spillover effects (enlarging our sample to respondents with at least one friend exposed to the encouragements), all H1 hypotheses (testing the joint nullity of the coefficients *a, b, c,* and *d*) fail to be rejected at the 5% level. In particular, no impact is found on the probability for a respondent to have made any decision with respect to their professional career or to have taken any steps towards the creation of a business since January 2014. No impact is found on the share of self-employed

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[60] Given the high number of respondents who only reported their favorite or favorite two options, we only look at the impact of the intervention on respondents' favorite professional career option. Respondents could give the same ranking to more than one option. This explains in what follows why the shares of respondents picking each of these options do not add up exactly to one.

[61] The share of respondents who chose "being unemployed" as their favorite professional career option being small (less than 5%), we decided to exclude the associated variable from the set of variables studied in this section.

[62] Again, this index was constructed using the methodology described in Anderson (2012).

respondents either. Therefore, it is not surprising that we do not find any evidence of spillover effects for this group of outcomes.

As displayed in *Table A.8* (placed in the appendix), the effects of the show on these outcomes does not appear to particularly strong either for any of our subgroups of interest: none of the coefficients displayed in the table is statistically significant at the 5% level. If anything, the negative impact the show may have had on viewers' willingness to start a business may have been driven by female viewers: the impact of the show on the probability that female viewers took any steps towards the creation of a business is large and statistically significant at the 10% level.

Overall these results suggest that, while the intervention did manage to change some of the viewers' perceptions related to self-employment, its content might have been insufficient to spark more concrete changes in respondents' aspirations and professional career.

VI.C Mechanisms

As mentioned in the introduction, the impact of television programs on viewers is believed to materialize through different but potentially concomitant channels. First, these shows can have an impact on viewers through the *information* they deliver; second, they can have an impact on the *preferences* of viewers through their observation of the behaviors of characters they can relate to; third, they can have an impact on viewers by changing their *time allocation* and, more specifically, by increasing the time they dedicate to watching TV and reducing the time they allocate to carrying out other activities (which, in turn, can have an impact on an individual's information and/or preferences).

While our design does not allow us to disentangle precisely the relative strength of the different channels, several elements suggest that the role of the information channel was more important than the preferences channel in explaining our results. First, out of the 593 respondents who declared having watched at least one episode of the show, only 18.38% declared that the contestants contributed to make them like the show and only 7.94% declared that they could relate with any of the contestant. In turn, this implies that the emotional connection between the viewers and the show's contestants on which the preferences channel builds was probably too limited to have any concrete impact – despite the show's attempt to select a set of contestants viewers could related to. Second, the pattern of results we observe is consistent with the impact a change in individuals' information set would have. For instance, the impact of the show on viewers' opinions related to whether or not

women can successfully run their own business is driven by the impact it had on men and non-highly educated respondents, the two groups which display the higher share of individuals who would not have strongly agreed to that statement had they not been exposed to the show.

Hence, although the show was not designed for that purpose, it seems that the main effect of the show was to have provided information on different subgroups of the population, which in turn led to correct some detrimental beliefs held by some subsets of the population against some other subsets of the population (men over women, and highly educated individuals over non-highly educated individuals).

VII.   Conclusion

In this article, we measure the impact of an edutainment program designed to promote entrepreneurship among young adult viewers and broadcast on a popular cable channel in Egypt using a randomized controlled trial following a non-symmetric encouragement design. We reach several conclusions.

First, we show that the program had an impact on some of our respondents' general attitudes towards self-employment (perceptions and beliefs) and, in particular, gender-related ones. More generally, we show that the content of the show managed to correct some detrimental beliefs some subsets of the population held against some other subsets of the population. In particular, this is true for male respondents who are less likely to report gender discriminatory beliefs when exposed to the intervention. In line with previous studies showing how effective media programs can be at shifting gender norms, our results suggest that television programs can be successful at fighting prejudice. Investigating potential mechanisms, we find that the impact of the show appears to be driven by a change in respondents' information set, rather than by a change in their preferences. However, we cannot establish that the show had any overall impact on respondents' aspirations towards entrepreneurship, knowledge about the business environment, or on the likelihood that respondents took any steps towards the creation of a business.

Second, we also find evidence of the importance of social interactions for the impact of media programs. Indeed, we find some evidence of spillover effects within clusters of friends in relation to respondents' perceptions and general opinions. Interestingly, spillover effects are complex and outcome-specific, alternately amplifying and mitigating the direct effect of one's exposure to the

intervention. In particular, the impact of the show on individuals' gender-related opinions associated with self-employed women completely vanishes when respondents are exposed to the show along with their friends. We interpret this result as a sign that the information conveyed by the edutainment may not have been perceived as sufficiently credible by its audience. In turn, friends discussing the content of the show may have emphasized the entertaining aspect of the show at the expense of its educational aspect. These findings open interesting avenues for future research on peer effects and the impact of media programs.

Third, we find some evidence that the show may have distorted some of viewers' perceptions related to self-employment. As described earlier, we find that the show led viewers to believe that the level of competition and gender discrimination against women is not as high as what they initially thought it would be. In retrospect, it is unclear whether or not the edutainment managed to convey a representative image of what it is like to start and run a business and, as a consequence, whether or not the shift in viewers' perceptions reflects a distortion in their representations or a convergence between viewers' prior beliefs and reality. In turn, this draws attention to the content of edutainment programs, the messages they convey and, eventually, the potential negative impact those programs may have on viewers, by combining educational and entertainment content, and blurring the line between fiction and reality.

Our conclusions do not rule out edutainment programs as a possible effective public policy tool, but rather call attention again to their content, the way their key messages are conveyed to viewers, and the way these messages can be interpreted by different subgroups of the population.

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Tables

Table 1: Sample description and balance checks

Variables	N	Mean	Sd	T1	P-value	Sig.	N	Mean	Sd	T1	T1	P(1-T1)	PT1	P-value	Sig.
	Panel A: Without spillover						*Panel B: With spillovers*								
	Sample description			*Balance checks*			*Sample description*			*Without friends*	*With friends*			*All coeff.=0*	
Attrition	5,586	0.432	0.495	0.016	0.226		9,277	0.405	0.491	0.009	0.006	0.002	0.009	0.920	
Male	3,171	0.794	0.404	-0.008	0.567		5,520	0.834	0.372	-0.004	0.009	0.008	-0.018	0.936	
Age	2,669	27.383	4.770	0.025	0.893		4,781	26.995	4.700	0.333	-0.121	0.446	0.227	0.076	*
Email address shared	2,669	0.198	0.399	-0.011	0.489		4,781	0.176	0.381	-0.014	-0.028	-0.055	0.012	0.148	
Schooling level															
Never went to school	3,171	0.029	0.167	-0.009	0.134		5,520	0.020	0.140	-0.016	0.002	0.003	0.006	0.164	
Primary school	3,171	0.110	0.313	0.012	0.296		5,520	0.081	0.273	0.020	-0.015	-0.011	0.009	0.510	
Secondary education	3,171	0.316	0.465	-0.009	0.569		5,520	0.249	0.432	-0.007	-0.008	-0.006	-0.010	0.873	
Higher education	3,171	0.220	0.414	-0.005	0.729		5,520	0.176	0.381	-0.014	0.007	0.010	0.004	0.911	
Missing	3,171	0.325	0.469	0.011	0.415		5,520	0.473	0.499	0.016	0.014	0.003	-0.009	0.859	
Location															
Urban Gov.	3,171	0.174	0.380	-0.004	0.789		5,520	0.138	0.345	-0.016	-0.012	0.001	0.000	0.679	
Lower Egypt	3,171	0.260	0.439	-0.022	0.149		5,520	0.200	0.400	-0.023	-0.013	-0.007	0.009	0.777	
Upper Egypt	3,171	0.229	0.420	0.013	0.392		5,520	0.179	0.383	0.021	0.008	0.007	0.009	0.698	
Frontier Gov.	3,171	0.013	0.113	0.000	0.933		5,520	0.011	0.105	-0.001	0.002	-0.004	-0.009	0.508	
Missing	3,171	0.324	0.468	0.013	0.342		5,520	0.472	0.499	0.019	0.014	0.003	-0.009	0.795	
Status															
Employee, private sect.	3,171	0.240	0.427	0.018	0.217		5,520	0.192	0.394	0.019	0.000	-0.012	-0.019	0.717	
Self-employed	3,171	0.153	0.360	-0.009	0.498		5,520	0.119	0.323	-0.012	0.001	0.007	0.011	0.853	
Unpaid fam. worker	3,171	0.014	0.120	0.007	0.119		5,520	0.010	0.100	0.002	0.011	0.001	-0.011	0.316	
Apprentice/intern.	3,171	0.002	0.050	-0.002	0.163		5,520	0.002	0.048	-0.001	-0.004	-0.001	0.001	0.571	
Student	3,171	0.134	0.340	-0.002	0.894		5,520	0.108	0.311	0.007	-0.007	0.027	0.017	0.220	
Unempl., looking	3,171	0.045	0.208	-0.012	0.116		5,520	0.034	0.181	-0.014	-0.008	-0.023	-0.003	0.027	**
Unempl., home duties	3,171	0.071	0.257	-0.008	0.366		5,520	0.051	0.219	-0.013	-0.001	0.001	0.012	0.519	
Unempl., not looking	3,171	0.016	0.127	-0.006	0.182		5,520	0.012	0.107	-0.007	-0.005	-0.004	-0.001	0.493	
Missing	3,171	0.324	0.468	0.013	0.342		5,520	0.472	0.499	0.019	0.014	0.003	-0.009	0.795	
Dwelling															
Apartment	3,171	0.247	0.431	-0.008	0.593		5,520	0.194	0.396	-0.006	-0.008	0.003	0.014	0.966	
House	3,171	0.423	0.494	-0.002	0.916		5,520	0.328	0.470	-0.009	-0.003	0.001	-0.006	0.975	
Other	3,171	0.006	0.079	-0.004	0.211		5,520	0.005	0.074	-0.004	-0.003	-0.006	0.001	0.380	
Missing	3,171	0.324	0.468	0.013	0.342		5,520	0.472	0.499	0.019	0.014	0.003	-0.009	0.795	
Wealth															
1st Quartile	3,171	0.159	0.366	-0.004	0.763		5,520	0.122	0.328	-0.003	-0.002	0.010	0.016	0.823	
2nd Quartile	3,171	0.190	0.392	-0.005	0.712		5,520	0.147	0.354	0.000	-0.018	-0.010	0.008	0.851	
3rd Quartile	3,171	0.154	0.362	-0.018	0.155		5,520	0.120	0.326	-0.019	-0.018	-0.010	-0.010	0.211	
4th Quartile	3,171	0.170	0.375	0.015	0.239		5,520	0.135	0.342	0.005	0.024	0.005	-0.007	0.451	
Missing	3,171	0.327	0.469	0.012	0.416		5,520	0.475	0.499	0.017	0.013	0.004	-0.007	0.851	
Assets ownership															
Television	2,142	0.981	0.137	-0.002	0.754		2,910	0.979	0.144	0.003	-0.008	-0.005	-0.009	0.771	
Satellite Dish	2,141	0.913	0.282	0.001	0.906		2,908	0.909	0.288	0.005	-0.022	-0.052	-0.012	0.575	
Personal computer	2,142	0.255	0.436	0.004	0.838		2,911	0.261	0.439	0.001	0.011	0.009	-0.029	0.971	

Notes: In the table, we provide the average characteristics of the respondents who completed the endline questionnaire and test whether the attrition induced any imbalance between groups of respondents, allowing for the existence of spillovers. In order to do so, equation (1) (*Panel A*) and equation (3) (*Panel B*) is estimated for each variable displayed in the left column. Standard errors are clustered at the group of friends level. *, **, *** denote significance at the 10, 5 and 1 percent levels respectively.

Table 2: Self-employment in Egypt

	Variables	Total N	Total Mean	Male Mean	Female Mean	High. Edu. Mean	Low Edu. Mean
Opinions	*Share of respondents strongly agreeing with the following statements*						
	In Egypt, it is possible for women to successfully run their own business.	1606	0.569	0.500	0.842	0.597	0.556
	In Egypt, it is possible for individuals without a higher education to successfully run their own business.	1606	0.608	0.601	0.637	0.597	0.620
	In Egypt, it is possible for individuals who do not have wealthy parents to successfully run their own business.	1606	0.494	0.498	0.478	0.525	0.494
	In Egypt, when jobs are scarce, men should have more rights to a job than women.	1606	0.702	0.740	0.550	0.633	0.749
	In Egypt, a university education is more important for a boy than for a girl.	1606	0.187	0.215	0.075	0.146	0.215
Perceptions of barriers	*Importance of the following barriers to self-employment on a 0 to 1 scale*						
	Lack of required skills	1568	0.624	0.624	0.622	0.636	0.619
	No access to funding	1578	0.820	0.820	0.820	0.813	0.823
	Lack of access to information	1537	0.491	0.484	0.514	0.485	0.492
	Lack of access to foreign langge traing	1510	0.513	0.508	0.533	0.512	0.518
	Lack of access to technology	1531	0.501	0.495	0.528	0.494	0.517
	Government laws	1492	0.634	0.621	0.682	0.687	0.618
	Tough Competition	1556	0.471	0.455	0.538	0.462	0.471
	Fear of failure	1572	0.601	0.594	0.626	0.628	0.592
	Negative perception by society	1513	0.586	0.576	0.630	0.596	0.589
	Resistance to change	1532	0.569	0.560	0.601	0.567	0.558
	Discrimination based on gender	1536	0.488	0.472	0.550	0.449	0.509
Knowledge	*Share of respondents knowing an organization providing:*						
	Mentoring services	1604	0.034	0.034	0.031	0.056	0.024
	Financial services	1603	0.184	0.189	0.165	0.282	0.139
	Training services	1604	0.064	0.058	0.087	0.124	0.034
	Any of these three services	1604	0.226	0.230	0.214	0.354	0.170
Aspirations	*Share of respondents choosing the following option as their favourite professional career*						
	"Being self-employment"	1572	0.384	0.399	0.325	0.378	0.383
	"Being an employee in the private sector"	1572	0.111	0.112	0.108	0.141	0.095
	"Being employee in the public sector"	1572	0.484	0.485	0.478	0.469	0.497
	"Being unemployed"	1572	0.024	0.007	0.089	0.011	0.026
	Share of respondents choosing the following option as their favourite professional career						
	"Being self-employment"	1314	0.545	0.564	0.465	0.575	0.534
	"Being an employee in the private sector"	1314	0.060	0.061	0.055	0.056	0.058
	"Being employee in the public sector"	1314	0.349	0.359	0.311	0.334	0.365
	"Being unemployed"	1314	0.046	0.014	0.173	0.037	0.042
Steps	*Share of respondents who:*						
	Made any important decisions taken with respect to their professional career?	1603	0.366	0.377	0.320	0.492	0.305
	Have taken any steps towards the creation of a business?	1603	0.194	0.203	0.162	0.195	0.189
	Plan to start a business in the future	1402	0.768	0.791	0.654	0.825	0.754
	Average sample size		1533	1228	303	430	876

Notes: In the table, we provide the mean of our different outcome variables in our pure control group (the group of respondents who were not affected in any way by our encouragements, neither directly nor indirectly, and who completed the endline questionnaire). We also report the same statistics for four subgroups of this pure control group: females, males, highly educated respondents, and non-highly educated respondents.

Table 3: Take-up rate, El Mashroua

		Exposure to El Mashroua						
		Self				Friends	Evolution of the overall take-up rate over time	
		A.	B.	C.	D.	E.	F.	G.
		Overall take-up rate	Heard of the show	Watched the show	Number of episodes watched	Share of friends exposed to the intervention	Early calls	Late calls
	Panel A: Without spillovers							
	T1	0.057***	0.162***	0.051***	0.122***	0.001	0.086***	0.036**
		(0.012)	(0.017)	(0.011)	(0.033)	(0.005)	(0.018)	(0.017)
	P-value (adj.)	0.000	0.000	0.000	0.000	0.907	0.000	0.030
	Sample size	3,167	3,166	3,166	3,078	3,167	1,449	1,408
	Panel B: With spillovers							
Without friends	T1	0.057***	0.159***	0.049***	0.138***	0.000	0.104***	0.026
		(0.014)	(0.020)	(0.014)	(0.039)	(0.000)	(0.022)	(0.020)
With friends	T1	0.053***	0.174***	0.050**	0.078	0.009	0.055*	0.052*
		(0.020)	(0.028)	(0.020)	(0.057)	(0.013)	(0.031)	(0.027)
	P*(1-T1)	-0.005	-0.008	-0.005	-0.068	0.041**	0.006	-0.004
		(0.022)	(0.031)	(0.022)	(0.064)	(0.016)	(0.034)	(0.029)
	P*T1	0.004	-0.027	-0.007	-0.057	0.035**	0.015	0.015
		(0.023)	(0.033)	(0.022)	(0.059)	(0.015)	(0.037)	(0.032)
	H1: Prob > F (adj.)	0.000	0.000	0.000	0.000	0.008	0.000	0.001
	H2: Prob > F (adj.)	1.000	1.000	1.000	1.000	0.003	1.000	1.000
	Sample size	5,512	5,511	5,511	5,360	5,512	2,520	2,470
	Strata FE	YES	YES	YES	YES	YES	YES	YES
	Add. Con.	NO	NO	NO	NO	NO	NO	NO
	Pure control mean	0.0879	0.247	0.0823	0.170	0.0205	0.0842	0.0878

Notes: In this table, we describe the average treatment effect of the encouragements on respondents' level of exposure to the intervention by treatment groups (Self columns). We also describe their impact on a respondent's share of friends exposed to the intervention in their cluster (Friends column), as well as the evolution of the overall take-up rate over time. In order to do so, we estimate equations (1) (*Panel A*) and (3) *(Panel B*) for each of the measure of exposure displayed in top row of the table. In Panel B, we test the "no impact of the encouragements hypothesis" (H1), as well as the "no spillover hypothesis" (H2) for each outcome. The p-values resulting from the former test are displayed in the "H1: Prob>F" row, while the p-values resulting from the latter are displayed in the "H2: Prob>F" row. Standard errors are clustered at the group of friends level. *, **, *** denote significance at the 10, 5 and 1 percent levels respectively.

Table 4: Impact on respondents' perceptions of various barriers to self-employment

Perceived barriers to starting a business

	Pure Control Mean & Sd	Without spillover			With spillovers					H1: Prob > F (adj.)	H2: Prob > F (adj.)
		Obs.	T1	Pv (adj.)	Obs.	Without friends T1	With friends T1	P*(1-T1)	P*T1		
Lack of required skills	0.624	3,094	.004	1.000	5,396	-.002	-.001	.015	-.016	1.000	1.000
	0.280		(.01)			(.012)	(.016)	(.018)	(.019)		
No access to funding	0.820	3,124	.013	0.630	5,446	.019	-.011	.019	.015	0.350	1.000
	0.236		(.008)			(.01)	(.013)	(.015)	(.015)		
Lack of access to information	0.491	3,034	.005	1.000	5,301	.013	-.008	.01	.013	1.000	1.000
	0.292		(.011)			(.013)	(.017)	(.019)	(.019)		
Lack of access to foreign language training	0.513	2,994	-.001	1.000	5,250	.012	-.029	-.019	.014	1.000	1.000
	0.301		(.011)			(.014)	(.017)	(.019)	(.021)		
Lack of access to technology	0.501	3,010	-.005	1.000	5,266	-.002	.003	.025	.001	1.000	1.000
	0.301		(.011)			(.014)	(.019)	(.021)	(.022)		
Resource Index	0.010	3,147	.014	0.497	5,487	.029	-.043	.038	.029	0.091*	0.430
	0.587		(.021)			(.026)	(.033)	(.036)	(.039)		
Government laws	0.634	2,955	-.005	0.653	5,141	-.002	-.001	-.018	-.021	0.772	0.421
	0.299		(.011)			(.014)	(.018)	(.021)	(.021)		
Tough Competition	0.471	3,069	-.016	0.280	5,353	-.026	.01	-.009	-.06	0.008***	0.016**
	0.296		(.011)			(.013)	(.016)	(.019)	(.019)		
Economy Index	-0.010	3,119	-.038	0.167	5,442	-.052	.013	-.044	-.142	0.015**	0.014**
	0.783		(.028)			(.035)	(.044)	(.051)	(.05)		
Fear of failure	0.601	3,098	.02	0.150	5,401	.025	.008	.016	-.013	0.837	1.000
	0.291		(.01)			(.013)	(.016)	(.019)	(.019)		
Negative perception by society	0.586	3,004	-.014	0.358	5,242	-.023	-.007	-.015	-.01	0.837	1.000
	0.277		(.01)			(.013)	(.016)	(.018)	(.019)		
Resistance to change	0.569	3,019	-.007	0.465	5,264	-.004	-.012	-.019	-.025	0.837	1.000
	0.281		(.01)			(.013)	(.016)	(.019)	(.02)		
Discrimination based on gender	0.488	3,028	-.035***	0.004	5,264	-.038	-.04	-.03	.016	0.040**	1.000
	0.299		(.011)			(.014)	(.018)	(.021)	(.021)		
Societal Index	-0.003	3,098	-.024	0.304	5,401	-.026	-.043	-.038	-.025	0.302	0.544
	0.635		(.023)			(.029)	(.036)	(.04)	(.044)		
Mentoring Org.	0.034	3,166	.007	0.822	5,512	0	.012	-.006	-.005	0.449	0.848
	0.180		(.007)			(.008)	(.012)	(.012)	(.015)		
Financial Org.	0.184	3,165	.009	1.000	5,509	.007	.015	.025	-.048	0.392	0.346
	0.388		(.014)			(.017)	(.025)	(.029)	(.029)		
Training Org.	0.064	3,166	.002	1.000	5,512	0	.028	.035	-.037	0.336	0.099*
	0.244		(.009)			(.01)	(.016)	(.019)	(.019)		
Knowledge Index (any)	0.226	3,167	.009	0.528	5,513	.004	.017	.025	-.052	0.247	0.180
	0.419		(.015)			(.018)	(.027)	(.03)	(.031)		

Notes: In this table, we describe the average treatment effect of the intervention on respondents' perceptions of the importance of several barriers to starting a business. In order to do so, we estimate equations (1) (*Panel A*) and (3) (*Panel B*) for each of the dependent variable displayed in left column of the table. Stratum fixed effects are always added in the regressions. In Panel B, we test the "no impact of the encouragements hypothesis" (H1), as well as the "no spillover hypothesis" (H2) for each outcome. The p-values resulting from the former test are displayed in the "H1: Prob>F" column, while the p-values resulting from the latter are displayed in the "H2: Prob>F" column. Standard errors are clustered at the group of friends level. P-values are corrected at the family of outcomes level using the Holm-Bonferroni method. The 1st family is constituted of the following five outcomes: lack of required skills, no access to funding, lack of access to information, lack of access to foreign language training, and lack of access to technology; the 2nd family is constituted of the following two outcomes: government laws and tough competition; the 3rd family is constituted of the following four outcomes: fear of failure, negative perception by society, resistance to change, and discrimination based on gender; and the fourth family is constituted of the following three outcomes: mentoring organization, financial organization, and training organization. *, **, *** denote significance at the 10, 5 and 1 percent levels respectively.

Table 5: Impact on respondents' opinions

Share of respondents who strongly agreed with the following statements:

	Variables	A. In Egypt, it is possible for women to successfully run their own business	B. In Egypt, it is possible for individuals without a higher education to successfully run their own business	C. In Egypt, it is possible for individuals who do not have wealthy parents to successfully run their own business	D. In Egypt, when jobs are scarce, men should have more rights to a job than women	E. In Egypt, a university education is more important for a boy than for a girl
	Panel A: Without spillovers					
	T1	0.053***	-0.003	0.034*	-0.010	-0.004
		(0.017)	(0.017)	(0.018)	(0.016)	(0.014)
	P-value (adj.)	0.006	0.841	0.120	1.000	1.000
	Sample size	3,170	3,170	3,170	3,170	3,171
	Panel B: With spillovers					
Without friends	T1	0.038*	-0.001	0.022	-0.001	0.003
		(0.021)	(0.021)	(0.022)	(0.020)	(0.017)
	T1	0.068**	0.048	0.056*	-0.010	-0.020
		(0.030)	(0.029)	(0.030)	(0.027)	(0.024)
With friends	P*(1-T1)	0.002	0.024	0.031	-0.020	-0.007
		(0.034)	(0.034)	(0.034)	(0.030)	(0.027)
	P*T1	-0.099***	-0.082**	-0.085***	-0.014	0.009
		(0.033)	(0.033)	(0.032)	(0.032)	(0.026)
	H1: Prob > F (adj.)	0.034	0.163	0.115	1.000	1.000
	H2: Prob > F (adj.)	0.038	0.039	0.038	1.000	1.000
	Sample size	5,519	5,518	5,519	5,518	5,520
	Strata FE	YES	YES	YES	YES	YES
	Add. Con.	NO	NO	NO	NO	NO
	Pure control mean	0.569	0.608	0.494	0.702	0.187

Notes: In this table, we describe the average treatment effect of the intervention on respondents' general opinions. In order to do so, we estimate equations (1) (*Panel A*) and (3) (*Panel B*) for each of the dependent variable displayed in top row of the table. In Panel B, we test the "no impact of the encouragements hypothesis" (H1), as well as the "no spillover hypothesis" (H2) for each outcome. The p-values resulting from the former test are displayed in the "H1: Prob>F" row, while the p-values resulting from the latter are displayed in the "H2: Prob>F" row. Standard errors are clustered at the group of friends level. P-values are corrected at the family of outcomes level using the Holm-Bonferroni method. The 1st family of outcomes is constituted of the three outcomes displayed in columns A., B., and C.; and the 2nd family is constituted of the two outcomes displayed in columns D. and E. *, **, *** denote significance at the 10, 5 and 1 percent levels respectively.

Table 6: Impact on respondents' aspirations and probability to have steps taken any towards the creation of a business

	Aspirations				Steps				
	Share of respondents choosing the following option as their favorite professional option for themselves now				*Steps taken towards the creation of a business (since Jan. 2014)*				
Variables	Being self-employed A.	Being a public employee B.	Being a private employee C.	P-values for transversal tests D.	Any important decisions made w.r.t. their professional career? E.	Any steps taken towards the creation of a business? F.	Plan to start a business in the future G.	Self-employed H.	Steps taken towards the creation of a business (Index) I.
Panel A: Without spillovers									
T1	0.023	-0.021	-0.005	0.5419	-0.015	-0.024*	-0.011	-0.009	-0.035*
	(0.018)	(0.018)	(0.011)		(0.017)	(0.014)	(0.016)	(0.015)	(0.020)
P-value (adj.)	0.597	0.597	0.674		1.000	0.328	1.000	1.000	
Sample size	3,110	3,110	3,110		3,166	3,166	2,799	3,158	3,171
Panel B: With spillovers									
Without friends T1	0.018	0.004	-0.019	0.512	-0.011	-0.012	-0.003	-0.003	-0.018
	(0.022)	(0.022)	(0.014)		(0.021)	(0.016)	(0.020)	(0.019)	(0.024)
T1	0.025	-0.047	0.011	0.1684	-0.016	-0.022	-0.032	-0.006	-0.043
	(0.029)	(0.029)	(0.018)		(0.030)	(0.024)	(0.026)	(0.026)	(0.034)
With friends P*(1-T1)	0.035	-0.020	-0.015	0.7032	-0.010	-0.029	-0.020	0.007	-0.029
	(0.033)	(0.033)	(0.020)		(0.035)	(0.028)	(0.029)	(0.031)	(0.038)
P*T1	0.038	0.006	-0.037*	0.228	0.026	0.012	0.034	0.043	0.067*
	(0.033)	(0.034)	(0.020)		(0.032)	(0.027)	(0.032)	(0.033)	(0.038)
Sample size	5,427	5,427	5,427		5,511	5,511	4,920	5,500	5,520
H1: Prob > F (adj.)	0.630	0.630	0.630	0.201	1.000	1.000	1.000	1.000	
H2: Prob > F (adj.)	0.586	0.827	0.426	0.439	1.000	1.000	1.000	1.000	
Strata FE	YES	YES	YES		YES	YES	YES	YES	YES
Add. Con.	NO	NO	NO		NO	NO	NO	NO	NO
Pure control mean	0.384	0.483	0.111		0.366	0.194	0.768	0.254	0.0138

Notes: In this table, we describe the average treatment effect of the intervention on respondents' aspirations and on their probability to have made any decision with respect to their professional career or the creation of a business. In order to do so, we estimate equations (1) (*Panel A*) and (3) (*Panel B*) for each of the dependent variable displayed in top row of the table. In Panel B, we test the "no impact of the encouragements hypothesis" (H1), as well as the "no spillover hypothesis" (H2) for each outcome. The p-values resulting from the former test are displayed in the "H1: Prob>F" row, while the p-values resulting from the latter are displayed in the "H2: Prob>F" row. Standard errors are clustered at the group of friends level. P-values are corrected at the family of outcomes level using the Holm-Bonferroni method. The first family of outcomes is constituted of the three aspirations-related outcomes displayed in columns A., B., and C.; and the second family is constituted of the four steps-related outcomes displayed in columns E., F., G., and H. *, **, *** denote significance at the 10, 5 and 1 percent levels respectively.

Appendix

Appendix A.1: Study timeline

Appendix A.2: List of encouragements

Appendix A.3: Treatment probabilities per stratum

Appendix A.4: Sample representativeness

Appendix A.5: Heterogeneity analysis and placebo test, take-up

Appendix A.6: Heterogeneity analysis, impact on respondents' perceptions of various barriers to self-employment

Appendix A.7: Heterogeneity analysis, impact on respondents' opinions

Appendix A.8: Heterogeneity analysis, impact on respondents' aspirations & steps towards the creation of a business

Appendix A.1: Study timeline

In figure below, we summarize the study timeline.
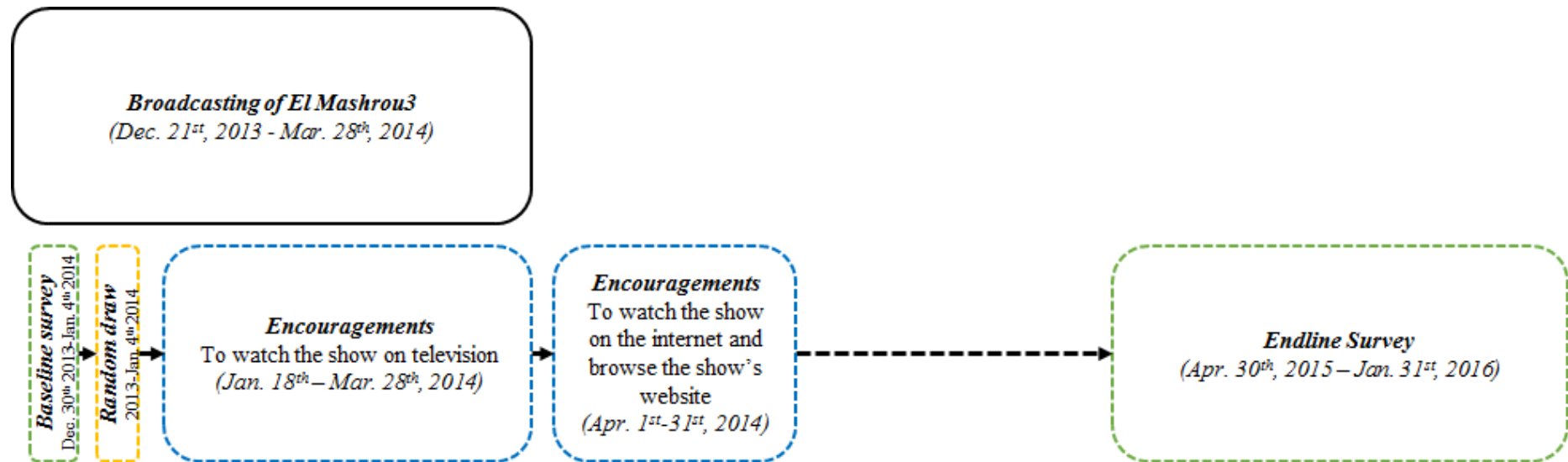
Appendix A.2: List of encouragements sent

In the following table, we list the encouragements sent to treatment respondents in the form of text messages:

#	Date	Message (ENG)	Message (AR)
5	Sat.18th, Jan.	Do you want to watch a reality TV show that has action, drama, and the necessary skills to become a successful entrepreneur? Watch "El Mashroua" on Al Nahar tonight at 11 pm	عايز تتفرج على برنامج واقعي في دراما، اكشن، والخطوات المطلوبة عشان تبقى رائد ناجح؟ شاهد "المشروع" على قناة النهار اليوم الساعة ١١ مساءً
6	Thu. 30th, Jan.	Want to learn how to start your business? Create your free account elmashrou3.tv	عايز تعرف ازاي تبدأ مشروع خاص بك؟ خش على elmashrou3.tv و إشترك ببلاش!
6	Sat. 1st, Feb.	Tonight on Al Nahar at 11, watch entrepreneurs in the kitchen on El Mashroua!	الليلة الساعة 11 على النهار في برنامج المشروع رواد الأعمال في المطبخ
7	Thu. 6th, Feb.	You have been selected to participate in a game: watch El Mashroua every week and answer a short survey testing your knowledge of the show at its end. You may win a Samsung tablet. Information: 01025117112.	تم اختيارك لتشارك في المسابقة شاهد برنامج المشروع وجاوب استطلاع لاختبار معلوماتك لتفوز بسامسونج نوت8 للمعلومات: 01025117112
7	Sat. 8th, Feb.	Tonight on Al Nahar at 11, learn how to plan business events on El Mashroua!	الليلة الساعة 11 على النهار اتعلم ازاي تخطط حفلات لعملك في المشروع
8	Thu. 13th, Feb.	You have been selected to participate in a game: watch El Mashroua every week and answer a short survey testing your knowledge of the show at its end. You may win a Samsung tablet and other gifts. Information: 01025117112.	تم اختيارك لتشارك في مسابقة شاهد برنامج المشروع وجاوب استطلاع لاختبار معلوماتك لتفوز بسامسونج نوت8 وهدايا أخرى للمعلومات: 01025117112
8	Sat. 15th, Feb.	Tonight on El Mashroua (Al Nahar, 11pm), contestants face an exciting challenge in the desert!	الليلة الساعة 11 على النهار المتسابقين في الصحراء للتحدي الجديد!
9	Sat. 22nd, Feb.	Tonight on El Mashroua (Al Nahar, 11pm), contestants learn how to advertize their business!	الليلة في المشروع (النهار الساعة 11) المتسابقين يعلنوا عن مشاريعهم!
10	Sat. 1st, Mar.	Watch El Mashroua on Al Nahar tonight (11pm), contestants organize exciting fashion shows, last challenge before the grand finale!	الليلة الساعة 11 قناة النهار المتسابقين بيحضرو عرض أزياء بديع!
11	Mon. 3rd, Mar.	Want to go beyond the show? Need advice, online courses or micro-finance loans to start your business? Create your account on elmashrou3.tv, you'll find all the information you need to start your business	عاوز أكتر من البرنامج؟ محتاج نصيحة، تدريب أونلاين أو دعم مالي محدود لتبدأ مشروعك؟ إشترك على elmashrou3.tv و هتعرف إزاي تبدأ مشروعك
11	Sat. 8th, Mar.	Watch El Mashroua on Al Nahar tonight (11pm) and see how successful entrepreneurs judge contestants' business plan!	الليلة الساعة 11 على النهار رواد أعمال ناجحين يقيمو خطة عمل المتسابقين
Quiz	Tue. 1st, Apr.	Log on elmashrou3.tv and answer our quiz before 15/4 to win a Samsung Tablet	ادخل علىelmashrou3.tv شارك في المسابقة قبل 4/15 واكسب سامسونج تابلت

Notes: in this table, we report the text messages sent (in Arabic) to treatment respondents to encourage them to watch the show.

Appendix A.3: Treatment probabilities per stratum

Variables	Stratum 1: 1 respondent per cluster	Stratum 2: 2 friends per cluster	Stratum 3: 3 friends per cluster	Stratum 4: 4 friends per cluster
Share of respondents who received the encouragements	49.62	49.30	50.15	49.95
Share of friends who received the encouragements				
0%	0.00	49.86	25.81	10.89
33%	0.00	0.00	0.00	39.78
50%	0.00	0.00	47.99	0.00
67%	0.00	0.00	0.00	38.25
100%	0.00	50.14	26.20	11.09
#Obs.	2,088	1,430	1,019	983

Notes: in this table, we display the probability to receive the encouragements and the average share of friends receiving the encouragements for each stratum.

Appendix A.4: Sample representativeness

| Variables | Sample (Baseline) | | | CAPMAS 2014 | DHS 2014 |
	N	Mean	Sd	Mean	Mean
Male	5,520	0.834	0.372		
Age	4,781	26.995	4.700		
Email address shared	4,781	0.176	0.381		
Schooling level					
Never went to school	2,908	0.038	0.192		0.247
Primary school	2,908	0.154	0.361		0.236
Secondary education	2,908	0.473	0.499		0.402
Higher education	2,908	0.335	0.472		0.116
Missing	2,908	0.000	0.000		
Location					
Urban Gov.	2,913	0.261	0.439	0.177	
Lower Egypt	2,913	0.379	0.485	0.429	
Upper Egypt	2,913	0.339	0.473	0.376	
Frontier Gov.	2,913	0.021	0.144	0.018	
Missing	2,913	0.000	0.000		
Status					
Employee, private sect.	2,913	0.365	0.481		
Self-employed	2,913	0.225	0.418		
Unpaid fam. worker	2,913	0.019	0.137		
Apprentice/intern	2,913	0.005	0.067		
Student	2,913	0.205	0.404		
Unempl., looking	2,913	0.064	0.245		
Unempl., home duties	2,913	0.096	0.294		
Unempl., not looking	2,913	0.022	0.147		
Missing	2,913	0.000	0.000		
Dwelling					
Apartment	2,913	0.368	0.482		0.385*
House	2,913	0.622	0.485		0.597*
Other	2,913	0.010	0.101		0.174*
Missing	2,913	0.000	0.000		
Asset ownership					
Television	2,910	0.979	0.144		0.975
Satellite Dish	2,908	0.909	0.288		0.966
Personal computer	2,911	0.261	0.439		0.326

Notes: In this table, we provide the average characteristics of our sample. * denotes information collected as part of the 2008 edition of the DHS

Appendix A.5.a: Take-up rate heterogeneity, El Mashroua

	Gender		Education	
	A.	B.	C.	D.
	Male	Female	Hig. educ.	Low. educ.
T1	0.054***	0.064**	0.094***	0.052***
	(0.012)	(0.031)	(0.025)	(0.015)
P-value (unadj.)	0.000	0.040	0.000	0.000
Pure control mean	0.0688	0.165	0.113	0.0804
Sample size	2,514	651	868	1,800
Strata FE	YES	YES	YES	YES
Add. Con.	NO	NO	NO	NO

Notes: In this table, we describe the average treatment effect of the encouragements on respondents' level of exposure to the intervention by sub-groups of respondents. In order to do so, we estimate equation (1) for each of the subgroups displayed in top row of the table using as a dependent variable the overall take-up variable. Standard errors are clustered at the group of friends level. *, **, *** denote significance at the 10, 5 and 1 percent levels respectively.

Appendix A.5.b: Take-up rate, The Voice (placebo test)

	Self				Friends
	A.	B.	C.	D.	E.
	Overall take-up rate	Heard of the show	Watched the show	Number of episodes watched	Share of friends exposed to the intervention
Panel A: Without spillovers					
T1	-0.012	0.005	-0.014	0.010	-0.008
	(0.016)	(0.018)	(0.016)	(0.129)	(0.008)
P-value (unadj.)	0.469	0.764	0.371	0.939	0.329
Sample size	3,167	3,167	3,167	2,979	3,167
Panel B: With spillovers					
Without friends T1	-0.005	0.016	-0.008	0.020	0.000
	(0.019)	(0.021)	(0.019)	(0.158)	(0.000)
With friends T1	-0.025	-0.016	-0.031	-0.017	-0.008
	(0.027)	(0.031)	(0.027)	(0.214)	(0.020)
P*(1-T1)	0.004	0.007	-0.009	0.018	-0.016
	(0.032)	(0.036)	(0.032)	(0.247)	(0.024)
P*T1	0.026	0.002	0.020	0.083	0.001
	(0.033)	(0.038)	(0.033)	(0.270)	(0.024)
H1: Prob > F (unadj.)	0.775	0.763	0.753	0.998	0.907
H2: Prob > F (unadj.)	0.741	0.981	0.790	0.952	0.788
Sample size	5,512	5,512	5,512	5,188	5,512
Strata FE	YES	YES	YES	YES	YES
Add. Con.	NO	NO	NO	NO	NO
Pure control mean	0.268	0.410	0.263	1.408	0.0721

Notes: In this table, we describe the average treatment effect of the encouragements on respondents' level of exposure to the intervention by treatment groups (Self columns). We also describe their impact on a respondent's share of friends exposed to the intervention in their cluster (Friends column). In order to do so, we estimate equations (1) (*Panel A*) and (3) (*Panel B*) for each of the measure of exposure displayed in top row of the table. In Panel B, we test the "no impact of the encouragements hypothesis" (H1), as well as the "no spillover hypothesis" (H2) for each outcome. The p-values resulting from the former test are displayed in the "H1: Prob>F" row, while the p-values resulting from the latter are displayed in the "H2: Prob>F" row. Standard errors are clustered at the group of friends level. *, **, *** denote significance at the 10, 5 and 1 percent levels respectively.

Appendix A.6: Impact on respondents' perceptions of various barriers to self-employment (heterogeneity)

Perceived barriers to starting a business	Male			Female			Highly educated			Non-highly educated		
	Obs.	Pure Control Mean & Sd	T1	Obs.	Pure Control Mean & Sd	T1	Obs.	Pure Control Mean & Sd	T1	Obs.	Pure Control Mean & Sd	T1
Lack of required skills	2,463	0.624	0	629	0.632	.02	857	0.637	0	1,747	0.621	.004
		0.280	(.011)		0.265	(.021)		0.263	(.018)		0.282	(.013)
No access to funding	2,487	0.825	.01	635	0.831	.021	864	0.823	.02	1,769	0.826	.005
		0.231	(.009)		0.227	(.018)		0.214	(.015)		0.237	(.011)
Lack of access to information	2,414	0.485	-.001	618	0.527	.024	862	0.484	0	1,695	0.496	.007
		0.291	(.012)		0.276	(.022)		0.289	(.02)		0.286	(.014)
Lack of access to foreign language training	2,385	0.506	-.006	607	0.540	.012	855	0.513	-.001	1,677	0.514	-.01
		0.300	(.012)		0.296	(.024)		0.294	(.02)		0.301	(.015)
Lack of access to technology	2,392	0.491	-.008	616	0.530	.001	862	0.493	.004	1,679	0.510	-.017
		0.304	(.013)		0.294	(.024)		0.301	(.021)		0.302	(.015)
Resource Index	2,505	0.003	.003	640	0.071	.049	868	0.013	.03	1,782	0.020	-.006
		0.592	(.024)		0.592	(.047)		0.551	(.038)		0.600	(.028)
Government laws	2,361	0.618	-.008	592	0.684	.005	823	0.676	-.021	1,668	0.616	-.004
		0.306	(.013)		0.270	(.022)		0.273	(.019)		0.308	(.015)
Tough Competition	2,447	0.451	-.01	620	0.515	-.045 *	856	0.450	-.023	1,736	0.468	-.005
		0.293	(.012)		0.290	(.023)		0.280	(.019)		0.299	(.014)
Economy Index	2,486	-0.072	-.03	631	0.144	-.078	861	0.023	-.067	1,768	-0.045	-.015
		0.781	(.031)		0.715	(.056)		0.726	(.05)		0.785	(.037)
Fear of failure	2,462	0.605	.02 *	634	0.636	.02	862	0.630	.001	1,750	0.601	.019
		0.294	(.012)		0.268	(.021)		0.266	(.019)		0.299	(.014)
Negative perception by society	2,394	0.563	-.027 **	608	0.645	.03	846	0.590	-.013	1,688	0.579	-.021
		0.281	(.012)		0.259	(.021)		0.274	(.019)		0.281	(.014)
Resistance to change	2,412	0.555	-.01	605	0.603	.003	851	0.569	.003	1,701	0.555	-.008
		0.278	(.011)		0.275	(.022)		0.276	(.019)		0.279	(.014)
Discrimination based on gender	2,405	0.452	-.041 ***	621	0.542	-.018	850	0.447	-.001	1,708	0.483	-.052 ***
		0.294	(.012)		0.309	(.025)		0.286	(.02)		0.305	(.015)
Societal Index	2,462	-0.058	-.04	634	0.158	.024	862	-0.004	-.007	1,750	-0.020	-.041
		0.638	(.026)		0.594	(.047)		0.596	(.041)		0.654	(.031)
Mentoring Org.	2,513	0.037	.006	651	0.038	.014	868	0.056	-.001	1,799	0.027	.008
		0.189	(.008)		0.192	(.015)		0.231	(.016)		0.163	(.008)
Financial Org.	2,513	0.199	.021	650	0.149	-.03	868	0.266	-.039	1,800	0.156	.035 **
		0.400	(.016)		0.357	(.028)		0.442	(.03)		0.363	(.017)
Training Org.	2,513	0.062	.009	651	0.074	-.025	868	0.118	-.019	1,799	0.042	.018 *
		0.242	(.01)		0.262	(.021)		0.322	(.022)		0.200	(.01)
Knowledge Index (any)	2,514	0.240	.022	651	0.197	-.033	868	0.333	-.051	1,800	0.189	.041 **
		0.427	(.017)		0.398	(.031)		0.472	(.032)		0.392	(.018)

Notes: In this table, we describe the average treatment effect of the intervention on respondents' perceptions of the importance of several barriers to starting a business. In order to do so, we estimate equation (1) for different subsets of our sample and for each of the dependent variable displayed in left column of the table. Stratum fixed effects are always added in the regressions. Standard errors are clustered at the group of friends level. *, **, *** denote significance at the 10, 5 and 1 percent levels respectively.

Appendix A.7: Impact on respondents' opinions (heterogeneity)

Subgroups	A. In Egypt, it is possible for women to successfully run their own business		B. In Egypt, it is possible for individuals without a higher education to successfully run their own business	C. In Egypt, it is possible for individuals who do not have wealthy parents to successfully run their own business		D. In Egypt, when jobs are scarce, men should have more rights to a job than women		E. In Egypt, a university education is more important for a boy than for a girl
Panel A: Male								
T1	.063	***	.006	.037	*	.008		-.004
	(.02)		(.019)	(.02)		(.018)		(.016)
Pure control mean	.533		.605	.516		.745		.213
Sample size	2517		2517	2517		2518		2518
Panel B: Female								
T1	.003		-.041	.023		-.07	*	-.004
	(.029)		(.039)	(.039)		(.039)		(.02)
Pure control mean	.843		.616	.492		.514		.074
Sample size	651		651	651		650		651
Panel C: Highly educated								
T1	.026		-.032	-.001		-.006		-.023
	(.034)		(.034)	(.034)		(.034)		(.023)
Pure control mean	.613		.582	.528		.634		.136
Sample size	869		869	868		868		869
Panel D: Non-highly educated								
T1	.059	***	-.001	.023		-.027		-.02
	(.023)		(.023)	(.024)		(.021)		(.019)
Pure control mean	.586		.62	.505		.735		.205
Sample size	1801		1801	1802		1802		1802
Strata FE	YES		YES	YES		YES		YES
Add. Con.	NO		NO	NO		NO		NO

Notes: In this table, we describe the average treatment effect of the intervention on respondents' general opinions for different subgroups of our sample. In order to do so, we estimate equation (1) for each subgroup and of the dependent variable displayed in top row of the table. *, **, *** denote significance at the 10, 5 and 1 percent levels respectively.

Appendix A.8: Impact on respondents' aspirations and steps (heterogeneity)

Subgroups	Aspirations	Steps	
	Share of respondents choosing self-employment as their favorite professional option for themselves now	Steps taken towards the creation of a business (Index)	
	A.	B.	
Panel A: Males			
T1	.033	-.02	
	(.02)	(.022)	
Pure control mean	.414	.068	
Sample size	2473	2518	
Panel B: Females			
T1	-.011	-.074	*
	(.037)	(.039)	
Pure control mean	.32	-.281	
Sample size	635	651	
Panel C: Highly educated			
T1	.026	-.045	
	(.034)	(.035)	
Pure control mean	.39	.044	
Sample size	859	869	
Panel D: Non-highly educated			
T1	.035	-.01	
	(.023)	(.026)	
Pure control mean	.4	-.006	
Sample size	1767	1802	
Strata FE	YES	YES	
Add. Con.	NO	NO	

Notes: In this table, we describe the average treatment effect of the intervention on respondents' aspirations and on their probability to have made any decision with respect to their professional career or the creation of a business for different subgroups of our sample. In order to do so, we estimate equation (1) for each subgroups and each of the dependent variable displayed in top row of the table. Standard errors are clustered at the group of friends level. *, **, *** denote significance at the 10, 5 and 1 percent levels respectively.