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Teaching Through Television: Experimental Evidence on Entrepreneurship Education in Tanzania

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Abstract. Can television be used to teach and foster entrepreneurship among youth in developing countries? We report from a randomized control field experiment of an edutainment show on entrepreneurship broadcasted over almost three months on national television in Tanzania. The field experiment involved more than 2,000 secondary school students, where the treatment group was incentivized to watch the edutainment show. We find some suggestive evidence of the edutainment show making the viewers more interested in entrepreneurship and business, particularly among females. However, our main finding is a negative effect: the edutainment show discouraged investment in schooling without convincingly replacing it with some other valuable activity. Administrative data show a strong negative treatment effect on school performance, and long-term survey data show that fewer treated students continue schooling, but we do not find much evidence of the edutainment show causing an increase in business ownership. The fact that an edutainment show for entrepreneurship caused the students to invest less in education carries a general lesson to the field experimental literature by showing the importance of taking a broad view of possible implications of a field intervention.

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1. Introduction

Edutainment shows have a long history in the developed world and are increasingly used in developing countries to educate the population in different spheres of life, including health, human rights, and financial literacy.[1] What are the effects of these shows on the viewers? Are they a source of knowledge and behavioral change, or are they largely pure entertainment? These questions are particularly important in the developing world, where poor quality and severe resource constraints in the educational sector make it pertinent to consider complementary approaches to education (Banerjee and Duflo 2011).

This paper reports from a randomized control field experiment studying an edutainment show for entrepreneurship, Ruka Juu ("Jump Up"), which was aired on national television in Tanzania during the spring of 2011. The overall aim of the edutainment show was to educate and motivate Tanzanian youth on entrepreneurship, business skills, and financial literacy to realize their potential and enable them to lift themselves out of poverty. The show responded to the lack of economic opportunities in Tanzania for a growing young labor force: 700,000–800,000 youth leave the school system every year looking for ways to earn an income, but only a small fraction obtain formal employment (Financial Sector Deepening Trust 2013, World Bank Group 2014). Self-employment is promoted by the government of Tanzania in their national development youth policies, but very little training and support have been provided to the youth to enable them to establish and manage small-scale businesses (United Republic of Tanzania 2007).[2] More widely, the fostering of entrepreneurship is perceived to be a critical part of the policy agenda in developing countries to expand employment and earning opportunities as well

as to reduce poverty, particularly for youth and women (Cho and Honorati 2014).

In our study, we randomly selected 43 secondary schools in Dar es Salaam to take part in a field experiment. We used a symmetric encouragement design, where the treatment group was incentivized to watch the edutainment show and the control group was incentivized to watch a weekend movie. To analyze the impact of the edutainment show, we rely on a broad set of data. A few weeks after the end of the show, we conducted an extensive laboratory experiment to measure impact on entrepreneurship ambitions, business knowledge, and mindset, including entrepreneurial traits, such as the willingness to take risk, patience, and competitiveness preferences. Eight months later, at the end of the school year, we collected administrative data on school performance. Furthermore, almost two years after the show ended, we conducted a long-term follow-up survey of a randomized subset of the participants to capture the impact of the edutainment show on occupational status, in particular business startups. Finally, we complemented the quantitative analysis with focus group discussions.

Our study provides some suggestive evidence of the edutainment show making the viewers more interested in entrepreneurship and business, particularly females, but no evidence of the show having an impact on the business knowledge of the viewers and only weak evidence of the show having an impact on the viewers' mindset. However, we find strong evidence of the edutainment show affecting long-term behavior, where our main finding is a negative effect: the show discouraged investment in schooling without convincingly replacing it with some other valuable activity. Administrative data show a strong negative treatment effect on school performance: there is almost a 20 percentage points reduction in the share of students who passed the final O-level examination in the treatment group; consistent with this, the long-term survey data show that fewer treated students continued schooling. At the same time, we do not find much long-term evidence of the edutainment show causing an increase in business ownership.

The fact that an edutainment show for entrepreneurship caused the students to invest less in education carries a general lesson to the field experimental literature by showing the importance of taking a broad view of possible implications of field interventions. It also raises the question of whether it is recommendable to encourage entrepreneurship among youth if this causes them to place less importance on education. We believe that it is crucial to evaluate this finding in light of the poor quality of the present secondary education in Tanzania.[3] A plausible interpretation of the finding is that formal education was largely considered irrelevant by some students, whereas the edutainment show was perceived to present perspectives that were beneficial for their future life situation, although we find only weak evidence of these perspectives actually translating into more business ownership. It is easy, however, to envision that the encouragement of entrepreneurship may work differently in a society with a high-quality formal education, where entrepreneurship ambitions may make students invest more in schooling.

This paper represents, to our knowledge, the first randomized control field experiment of an edutainment show in a developing country. The study that comes closest to our study is by Berg and Zia (2017), who evaluate the impact of incorporating financial messages in a soap opera in South Africa in 2012 on financial literacy and financial habits. They also use a symmetric encouragement design, where the treated group was encouraged to watch a soap opera containing financial messages and the control group was incentivized to watch another soap opera aired at the same time. In a follow-up study around four months after the show ended, they find evidence of behavioral change, where the treated participants are more likely to borrow from formal sources and less likely to engage in gambling. They find some evidence of increased financial literacy on topics that were prominent in the soap opera but no effect on general financial literacy. Finally, they do not find any effect on the likelihood of seeking financial advice, a topic extensively promoted in the soap opera, and they argue that this may be owing to this message being communicated by an external character who failed to connect emotionally with the viewers. The importance of emotional connections is in line with the thinking of the designers of Ruka Juu, in which a main idea was to introduce real-life individuals rather than soap opera fictional characters as role models for the viewers. In the focus group discussions, we find strong evidence of the viewers connecting to the life situation and choices of the contestants in the show, which may contribute to explaining both our short-term effects on business ambitions and why we find evidence of behavioral changes almost two years after the show ended. In particular, this may shed light on the finding that the edutainment show made students drop out of school: two of the six entrepreneurs on the show had dropped out of school and succeeded in establishing their own business. Overall, our study differs from that of Berg and Zia (2017) on a number of accounts. We consider an edutainment show, focus on the impact on entrepreneurship, consider spillover effects on education, and provide data on long-term impact two years after the program.[4]

Our paper also relates to the growing literature studying how television and radio more generally may cause behavioral change. Jensen and Oster (2009) show that the gradual expansion of cable television

in India caused decreases in the reported acceptability of son preference, domestic violence toward women, and fertility, and La Ferrara et al. (2012) find that exposure to soap operas in Brazil, which typically depict families with few children, led to a reduction in fertility, particularly among poorer women. In a very different context, Yanagizawa-Drott (2014) shows how a radio station contributed to the Rwandan genocide by significantly affecting participation in violence and killings. These findings show the power of television and radio, and our paper complements them by studying the extent to which television may initiate long-term behavioral changes among youth in entrepreneurship and schooling.

Finally, our paper contributes to the literature studying the role of human capital and entrepreneurship training in microenterprise development (McKenzie and Woodruff 2014, Blattman and Ralston 2015).[5] Governments and nongovernmental organizations have increasingly focused on providing business training programs targeted to poor people as illustrated by the International Labor Organization's Start Up and Improve Your Business program, which has been offered to at least 4.5 million people in 100 countries (Blattman and Ralston 2015, Campos et al. 2017). A growing literature has studied the impact of such business training programs on startups, profits, and the growth of businesses (Karlan and Valdivia 2011, De Mel et al. 2014, Drexler et al. 2014, Giné and Mansuri 2014, Berge et al. 2015a, Campos et al. 2017). The evidence is mixed and suggests that it is difficult to improve the conditions for women and their firms. Another challenge with the traditional business program interventions has been that they are based on classroom or personal training, which makes the scalability of such interventions an open question (Berge et al. 2012, 2015a).[6] Televised edutainment shows on entrepreneurship represent an alternative to classroom training, and in line with the effectiveness of television in causing behavioral change in other domains, this study demonstrates that such shows can make viewers more interested in entrepreneurship and can initiate more business startups. The effectiveness of edutainment shows, which clearly focus on conveying the importance of a proactive entrepreneurial mindset, is in line with the recent finding that psychology-based personal initiative training programs may be more effective than traditional business training programs in generating entrepreneurial success (Campos et al. 2017). At the same time, it is important to note that the edutainment show in our study failed at teaching complex business knowledge through television. This may suggest that such training requires a more standard classroom approach that enables direct involvement with the participants or more use of a rule-of-thumb approach that focuses on basic entrepreneurial heuristics (Drexler et al. 2014).

The outline of the paper is as follows. Section 2 provides a discussion of the background for the edutainment show and an overview of the research design. Section 3 discusses the sample, balance issues, and the experimental design in more detail. Section 4 outlines the empirical strategy. Section 5 studies whether the encouragement design caused increased exposure to the edutainment show among the treated students. Sections 6 and 7 analyze short-term and long-term effects of the show, respectively. Section 8 offers some concluding remarks, whereas additional analysis is relegated to Online Appendix A.

2. Background and Overview of the Research Design

We here provide a discussion of the background for the edutainment show and an overview of the research design.

2.1. Background

Ruka Juu is an edutainment show produced by the nongovernmental organization Femina HIP, which is a multimedia platform working with youth and communities across Tanzania. Since 1999, Femina HIP has promoted healthy lifestyles and gender equality, and in recent years, it has increasingly also promoted entrepreneurship, financial literacy, and citizen engagement.[7]

The first season of Ruka Juu was aired on national television in Tanzania from March to May 2011. The edutainment show consisted of 11 weekly episodes built up around six young entrepreneurs (three females and three males). They competed for "the opportunity of their life": to win a prize of 5 million Tsh (around U.S. $3,100 at the time of the intervention). The contestants, all running their own small-scale businesses, were recruited from semiurban areas throughout Tanzania with the aim of establishing role models for the viewers. For example, one of the contestants, Benitha, was selected, because she had managed to establish her own business despite having dropped out of secondary school because of pregnancy, a common situation for many girls in Tanzania. The audience followed each contestant through a number of challenges, engaging both the contestants and the viewers to reflect on how to plan and operate a business. Important topics were market assessment, customer care, marketing, record keeping, credit, savings, insurance, health, and appearance. The edutainment show had a particular focus on female empowerment, and one episode was specifically

assigned to gender issues. It had an estimated 3.1 million viewers (Tanzania All Media Product Survey) and was awarded the second prize in the 2013 Pan-African Awards for Entrepreneurship in Education, a competition with over 350 initiatives from 33 different countries.

2.2. Overview of the Research Design

The participants were recruited from 43 randomly selected secondary schools in Dar es Salaam.[8] The study was introduced as a research project on youth and media. Twenty-one schools were randomly assigned into the treatment group and 22 schools were randomly assigned into the control group before we had information about the distribution of background characteristics.[9] At each school and before randomization, one class from the final year of the ordinary level (O level), also known as Form IV, was selected to participate in the study.

In January 2011, before the first episode of Ruka Juu was aired, we conducted a baseline survey containing questions on socioeconomic background, media habits, current topics, business issues, and personal ambitions.[10] After the baseline survey was conducted, all students in the selected sample were invited to participate in the study. The students and their parents had to sign a contract where participants promised to watch, to the extent possible, the edutainment show (treatment group) or the weekend movie (control group). The contract also specified that the participants would receive 10,000 Tsh (approximately U.S. $7 at the time of the intervention) for participating in the study and that there would be a possibility to earn additional money in a follow-up session after the edutainment show had ended.[11] All participants selected for the study signed the contract, which means that our sample should be representative of the secondary school students in Dar es Salaam.

Midway into the edutainment show, we conducted a short survey at all of the schools to remind the participants of their contract. We asked them (among other things) to rank their favorite episode (of the edutainment show or the weekend movie), where they normally watched the program, and whether they had missed any episodes.

A few weeks after the edutainment show ended, we conducted an extensive laboratory experiment at each school to study the short-term impact, where we collected incentivized measures of the participants' knowledge of the content of the edutainment show and the weekend movie, entrepreneurship ambitions, knowledge of business concepts and practices, and measures of entrepreneurial traits. We also asked a series of nonincentivized questions. The participants were not given any feedback on their performance or earnings during the experiment, and payments were made right after the experiment in envelopes that ensured privacy.

The aim of measuring knowledge of the content of the edutainment show was to study in an incentivized manner whether the treated students actually had been more exposed to the edutainment show than the students in the control group. The intention of the measures of entrepreneurship ambitions was to establish whether the edutainment show had affected the occupational preferences of the students. The measures of business knowledge and entrepreneurial traits aimed to shed light on whether the edutainment show had affected what are typically considered to be two important factors for entrepreneurial success (Campos et al. 2017).

To study long-term effects, we collected two sets of data. First, we collected administrative data on the participants' performance on the final O-level examination in December 2011; second, we conducted a long-term survey of occupational status, including business startups, in 2013.

Finally, to supplement the main analysis, we organized focus group discussions with secondary school students at schools not taking part in this study. In the focus groups, we received feedback on how the edutainment show was perceived by the viewers, the extent to which they found it useful, and their views on entrepreneurship and self-employment in general.

To summarize, Table 1 provides a timeline for the research project.

The main methodological challenge when designing a field experiment on a nationally broadcasted television program is to establish a proper control group. We use a symmetric encouragement design, where the treatment group was incentivized to watch the edutainment show and the control group was incentivized to watch the weekend movie.[12] This feature of the design allows us to rule out that the encouragement in itself (in particular, the economic incentives offered to the students) can account for the observed treatment effects. We chose the weekend movie for the control group, because it was aired at the same time as the edutainment show, and it is hard to see that exposure to the weekend movie should have any impact on entrepreneurial variables.

3. Sample, Balance, and Attrition

We here provide a more detailed discussion of the sample, the different data sources, balance, and attrition.

3.1. Baseline: Survey Data

We have 2,132 students from 43 schools in this study. In Table 2, we present a set of core variables collected in the baseline survey and include p-values for a test of no mean difference between treatment and control groups and a test of join significance.

Table 1. Timeline of the Research Project

Period	Event
1. January 2011	Baseline study and focus group discussions
2. Spring 2011	11 Episodes of Ruka Juu aired
3. March 2011	Midterm quiz
4. June 2011	Laboratory experiment and focus group discussions
5. Spring 2012	Collection of administrative data from (December 2011) examinations
6. Spring and summer 2013	Long-term follow-up

The students are, on average, 18 years old, and there are slightly more females than males; 25.7% of the students do not live with their parents, and on average, they lean toward it being quite easy to find a place to watch television.[13] The majority of the students attend the arts stream in secondary school, whereas 36.6% attend the business stream, which is more practically oriented. At the baseline, we measured their (business) knowledge and (business) ambitions. The knowledge variable is a dummy taking the value of one if the student has answered correctly all three questions about the benefit of insurance, how to calculate annual interest on a loan, and how to understand the concept of profit. The entrepreneurship ambition variable is a dummy taking the value of one if the student has responded that he or she would like to spend a 1 million-Tsh gift on starting a business (instead of buying something nice for themselves or their family, paying for education, or spending the money otherwise). We observe that 25.8% of the students answered

Table 2. Treatment-Control Balance

		Treatment status			
	All	Control	Treated	Difference	*p*-value
Male	0.445	0.516	0.369	−0.147	0.003
	(0.027)	(0.038)	(0.033)	(0.050)	
Age	17.916	17.935	17.894	−0.041	0.735
	(0.060)	(0.077)	(0.094)	(0.120)	
Household with no parents	0.258	0.231	0.286	0.056	0.003
	(0.010)	(0.012)	(0.014)	(0.019)	
Access to television	3.405	3.350	3.463	0.113	0.266
	(0.052)	(0.087)	(0.055)	(0.102)	
Business stream	0.383	0.346	0.422	0.076	0.598
	(0.073)	(0.103)	(0.103)	(0.144)	
Business knowledge	0.257	0.289	0.223	−0.066	0.076
	(0.019)	(0.027)	(0.026)	(0.037)	
Business ambitions	0.116	0.107	0.125	0.018	0.404
	(0.011)	(0.011)	(0.019)	(0.021)	
O-level failure rate for school	0.563	0.574	0.551	−0.023	0.618
	(0.023)	(0.026)	(0.039)	(0.046)	
Number of schools	43	22	21		
Number of individuals	2,132	1,109	1,023		

Notes. The table reports means of baseline variables by treatment. *Male:* indicator variable taking the value of one if the participant is a male; *Age:* the age of the participant in years; *Household with no parents:* indicator variable taking the value of one if the participant does not live with any of the parents; *Access to television:* response to "If you want to watch your favourite TV program, how easy is it for you to find a place to watch it?" (scale from 1 (difficult) to 5 (very easy)); *Business stream:* indicator variable taking the value of one if the participant is in the business stream at school; *Business knowledge:* indicator variable taking the value of one if the participant answered correctly three questions about insurance, interest rate, and profits; *Business ambitions:* indicator variable taking the value of one if the participant chose alternative 2 on the question "What would you do if you had 1 million Tsh?" (1, use them to buy something nice for myself or my family; 2, use them to start a business; 3, use them to pay for my education; 4, other); *O-level failure rate for school:* the failure rate of the O-level examination in 2010 for the school of the participant. For two schools, we have used the 2012 failure rate, because 2010 data were not available. The *p*-values are for a test of no difference in means. The joint *p*-value of the explanatory variables in a regression predicting treatment on background variables is $p < 0.001$. Standard errors (in parentheses) are clustered on the school level.

correctly all three knowledge questions, whereas 11.6% of the students expressed business ambitions. Finally, we observe that there are on average, 49.6 students in each class and that 56.3% of the previous year's students failed O-level (Form IV) examinations in 2010, where the high failure rate reflects the poor state of the secondary education in Tanzania.[14]

We observe that the control group scores higher on the knowledge questions, is slightly less likely to live with their parents, and has more male students. In line with the suggestion of Bruhn and McKenzie (2009), we deal with these imbalances by controlling for the baseline characteristics in the subsequent analysis. Furthermore, because the edutainment show had a gender focus, we also study separately the treatment effects for males and females.[15]

3.2. Short Term: Laboratory Data

The laboratory experiment was conducted at the schools, and we reached 1,915 of the 2,132 students (89.8%). As shown in columns (1)–(4) in Table 3, attrition is higher in the treatment group than in the control group, which effectively means that treated students were less likely to attend school on the day of the experiment. We also observe that attrition is positively associated with business knowledge and business ambitions (as measured in the baseline survey).

To study how robust our findings are to attrition, we report nonparametric upper and lower bounds on the treatment effects of interest in Figures A.5–A.8 in Online Appendix A (Manski 1990, Lee 2009).

3.3. Long Term: Administrative Data

We collected administrative data about performance on O-level examinations from the National Examinations Council of Tanzania.

To have a baseline measure of school quality, we collected the failure rate in 2010 for all of the schools included in this study as reported in Table 2. The students taking part in this study took the O-level examination in December 2011, around eight months after the edutainment show ended. Their examination performance thus allows us to study how the edutainment show impacted long-term educational attainment. We managed to collect examination results for 2,039 of the 2,135 students (95.5%), and as shown in columns (5)–(8) in Table 3, attrition is not correlated with treatment for the long-term administrative data.

3.4. Long Term: Survey Data

Finally, to investigate the long-term effect of the edutainment show on occupational status and in particular, business startups, we conducted an intensive tracking survey of 430 randomly selected participants during the summer of 2013, around two years after the edutainment show had ended and 18 months after the students had finished their Form IV education. The selected subsample was identified by randomly drawing 10 participants from each of the 43 schools. Through an extensive search, we were able to reach and do a telephone interview with 286 of the 430 selected participants (66.5%). As shown in columns (9)–(12) in Table 3, attrition is not correlated with treatment for the long-term survey data.

4. Empirical Strategy

Our main strategy is to estimate average treatment effects of the encouragement to watch the edutainment show based on random assignment to treatment and control groups: hence, an intention-to-treat effect in the sense that we do not condition on actually watching the show. Our main specification is to run ordinary least square regressions of the following type:

$$y_{is} = \alpha + \delta T_s + \beta \boldsymbol{x_{is}} + \varepsilon_{is}, \quad (1)$$

where y_{is} is the outcome y measured for individual i in school s. The average treatment effect δ is estimated based on the assignment T_s of the school to either the edutainment show or the weekend movie, and $\boldsymbol{x_{is}}$ is a vector of control variables collected both at the individual level and at the school level. In addition to these average treatment effects, because the edutainment show had a strong gender component, we also estimate gender-specific treatment effects based on a regression specification with interactions between treatment and gender:

$$y_{is} = \alpha + \delta_1 T_s + \delta_2 T_s \times m_i + \gamma m_i + \beta \boldsymbol{x_{is}} + \varepsilon_{is}, \quad (2)$$

where m_i is an indicator for the individual i being male. Now, the estimated treatment effect δ_1 is the effect on female students, and $\delta_1 + \delta_2$ is the effect on male students. In the main paper, we report only the treatment effects estimated with a full set of control variables; in Online Appendix A, we provide both the full regressions that support these summary tables and the short regressions without these controls.

For both of these specifications, because treatment is assigned at the school level and because both observed and unobserved characteristics of individuals are likely to differ systematically by school, we cluster the standard errors at the school level and report standard errors using the method of Liang and Zeger (1986). We document in Figure A.4 in Online Appendix A that this approach provides standard errors that are practically the same as the (wild) bootstrap approach of Cameron et al. (2008).

For each family of outcomes (exposure to the edutainment show, business ambitions, knowledge, mindset, and long-term behavior), we present treatment effects for the set of outcome indicators that we collected in the study both overall and for each gender.

Table 3. Attrition

	The laboratory experiment				Administrative (examination 2011)				Long-term survey			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Treated (edutainment)	0.054***	0.052***	0.055***	0.053**	−0.009	−0.014	−0.009	−0.011	−0.001	0.010	0.060	0.064
	(0.019)	(0.018)	(0.026)	(0.025)	(0.013)	(0.014)	(0.019)	(0.021)	(0.066)	(0.065)	(0.079)	(0.080)
Treated × male			0.003	−0.003			−0.004	−0.007			−0.132	−0.123
			(0.037)	(0.037)			(0.019)	(0.020)			(0.105)	(0.108)
Male		0.003	0.010	0.004		−0.015	−0.008	−0.011		0.056	0.081	0.113*
		(0.018)	(0.022)	(0.023)		(0.013)	(0.015)	(0.019)		(0.057)	(0.064)	(0.066)
Age		0.003		0.002		0.007		0.007		−0.046**		−0.043*
		(0.007)		(0.007)		(0.006)		(0.006)		(0.022)		(0.023)
Household with no parents		0.009		0.009		−0.005		−0.005		−0.005		−0.005
		(0.014)		(0.014)		(0.011)		(0.011)		(0.042)		(0.042)
Access to television		−0.004		−0.004		−0.004		−0.004		−0.000		0.001
		(0.006)		(0.006)		(0.004)		(0.004)		(0.024)		(0.025)
Business stream		−0.011		−0.011		−0.003		−0.003		0.025		0.033
		(0.018)		(0.018)		(0.011)		(0.011)		(0.054)		(0.054)
Business knowledge		−0.026*		−0.026*		0.007		0.006		−0.003		−0.006
		(0.015)		(0.015)		(0.010)		(0.010)		(0.050)		(0.049)
Business ambitions		0.072***		0.072***		0.038**		0.038**		−0.006		−0.006
		(0.024)		(0.024)		(0.015)		(0.015)		(0.094)		(0.094)
O-level failure rate for school		−0.041		−0.041		−0.084		−0.084		0.256		0.234
		(0.070)		(0.070)		(0.055)		(0.055)		(0.162)		(0.156)
Constant	0.076***	0.068	0.071***	0.068	0.041***	−0.020	0.045**	−0.021	0.341***	0.982**	0.299***	0.924**
	(0.010)	(0.118)	(0.013)	(0.116)	(0.012)	(0.094)	(0.018)	(0.094)	(0.044)	(0.423)	(0.046)	(0.425)
Observations	2,132	2,113	2,132	2,113	2,132	2,113	2,132	2,113	429	426	429	426
R^2	0.008	0.017	0.008	0.017	0.001	0.012	0.001	0.012	0.000	0.015	0.005	0.019

Notes. The table reports linear regressions in which the dependent variable is an indicator for attrition in the laboratory data (columns (1)–(4)), administrative data (columns (5)–(8)), and long-term data (columns (9)–(12)). *Treated:* indicator variable for the participant being in the treatment group; *Treated × male:* interaction variable between *Treated* and *Male; Male:* indicator variable taking the value of one if the participant is a male; *Age:* the age of the participant in years; *Household with no parents:* indicator variable taking the value of one if the participant does not live with any of the parents; *Access to television:* response to "If you want to watch your favourite TV program, how easy is it for you to find a place to watch it?" (scale from 1 (difficult) to 5 (very easy)); *Business stream:* indicator variable taking the value of one if the participant is in the business stream at school; *Business knowledge:* indicator variable taking the value of one if the participant answered correctly three questions about insurance, interest rate, and profits; *Business ambitions:* indicator variable taking the value of one if the participant chose alternative 2 on the question "What would you do if you had 1 million Tsh?" (1, use them to buy something nice for myself or my family; 2, use them to start a business; 3, use them to pay for my education; 4, other); *O-level failure rate for school:* the failure rate of the O-level examination in 2010 for the school of the participant. Standard errors are clustered on schools.

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

To correct for multiple hypothesis testing, we follow three strategies. First, we test for joint significance of effects within each family of related effects based on a seemingly unrelated regression model (SUR) separately for the average effects and the gender-specific effects (within-family SUR tests). Second, we present p-value corrections for multiple testing using the method of Hommel (1988), which is known to be conservative when tests are nonnegatively correlated. Within each family, we do this separately for all average effects and all gender-specific effects (within-family Hommel tests). Third, for the analysis of the laboratory data, we construct indices summarizing the different outcomes for each family of experimental outcomes, and we report the estimated treatment effects on this summary index. For these indices, we also present Hommel-corrected p-values separately for the average effects and the gender-specific effects (across-family Hommel tests).

We address attrition in two ways: with and without invoking assumptions about the structure of attrition. First, we assume that treatment has a monotone effect on attrition, which corresponds to the intuition that attrition is a problem primarily when it is differential by treatment. Lee (2009) shows how this assumption can be used to bound the average treatment effect on the group for which attrition status depends on treatment assignment. Second, we eschew all assumptions about how attrition is determined and use the approach of Manski (1990) to establish (quite conservative) bounds. In Online Appendix A, we graphically present both sets of bounds for all of the treatment effects that we estimate in the paper (Figures A.5–A.9).

5. Did the Encouragement Design Work?

We first consider whether our encouragement design succeeded in creating an exogenous difference

Table 4. Impact on Exposure to the Edutainment Show

	Content question (incentivized, standardized)		Episodes watched (nonincentivized, standardized)	
	Edutainment	Weekend movie	Edutainment	Weekend movie
		Panel A: Overall impact		
Treated (edutainment)	1.039***†††	–0.761***†††	1.372***†††	–0.458***†††
	(0.073)	(0.074)	(0.093)	(0.059)
Observations	1,902	1,902	1,854	1,886
R^2	0.232	0.169	0.326	0.069
		Panel B: Gender-specific impact		
Treated (edutainment)	1.010***†††	–0.756***†††	1.337***†††	–0.441***†††
	(0.089)	(0.071)	(0.109)	(0.076)
Treated × male	0.068	–0.012	0.083	–0.039
	(0.121)	(0.096)	(0.127)	(0.082)
Male	–0.134*	–0.194***	–0.067	–0.020
	(0.073)	(0.071)	(0.073)	(0.071)
Treatment on males	1.078***†††	–0.768***†††	1.420***†††	–0.480***†††
	(0.101)	(0.106)	(0.116)	(0.065)
Observations	1,902	1,902	1,854	1,886
R^2	0.232	0.169	0.327	0.070
		Panel C: Statistics on dependent variable (in control group)		
Mean	0.371	0.616	0.199	0.342
Standard deviation	0.168	0.188	0.226	0.326

Notes. The table reports linear regressions in which the dependent variable is as follows: first column, the participant's number of correct answers about program content of the edutainment show (incentivized, 0–10); second column, the participant's number of correct answers about program content of the weekend movie (incentivized, 0–10); third column, number of episodes the participant watched of the edutainment show (self-reported, 0–11); and fourth column, number of episodes the participant watched of the weekend movie (self-reported, 0–11). All outcomes have been standardized with the control group means and standard deviations. *Treated:* indicator variable for the participant being in the treatment group; *Treated × male:* interaction variable between *Treated* and *Male; Male:* indicator variable taking the value of one if the participant is a male. Also included in the regressions but not reported are the other background variables reported in Table 2. Panel A reports overall impact, whereas panel B reports gender-specific impact, where *Treatment on males* is the linear combination of *Treated* and *Treated × male*. See Tables A.6 and A.7 in Online Appendix A for the corresponding full regressions, including all controls. Panel C reports statistics on the dependent variable in the control group (measured as fractions of 10 correct answers and 11 episodes). Standard errors in parentheses are clustered on schools; family-wise error–corrected treatment effects are indicated by daggers.

*$p < 0.10$; **$p < 0.05$; ***$p < 0.01$; $^{\dagger}p < 0.10$; $^{\dagger\dagger}p < 0.05$; $^{\dagger\dagger\dagger}p < 0.01$.

in exposure to the edutainment show between the treatment group and the control group. To study this question and take account of the possibility of an experimenter demand effect, we conducted incentivized tests of the participants' knowledge of the content of the edutainment show as well as that of the weekend movies. Each test consisted of 10 multiple-choice questions, and the participants earned 100 Tsh for each correct answer.

From the second and third columns in Table 4, we observe that there is a large and statistically significant difference in the number of correct answers on program content between the two groups, with the treatment group clearly knowing more about the edutainment show and less about the weekend movies than the control group. This applies to both females and males. The treatment group had almost two more correct answers on the content of the edutainment show than the control group, which amounts to approximately one standard deviation. The treatment difference in program exposure is supported by the last two columns in Table 4, which report regressions on the self-reported number of episodes watched by the treatment group and the control group, respectively. The treated students also self-report as having watched significantly more episodes of the edutainment show and significantly fewer episodes of the weekend movies than the control group students.

The treated participants, on average, watched 5.7 of the 11 episodes of the edutainment show. Two main reasons were brought forward for not watching all of the episodes. First, the students expressed difficulty in getting access to a television:

> You know, if I am sitting alone and grown-ups come and there are two of them and they are interested in soap operas. Then there are two of them against me, and they forcefully take away the freedom you have of watching. . . . So I usually just let them be.

Second, there were frequent power cuts in Dar es Salaam in the period when the edutainment show was broadcasted: "I only watched two episodes because later on we had electricity cut-down problems at our place and I couldn't find another way to watch." The fact that the students had problems fully complying with the contract thus illustrates the challenging learning environment that these students face.

To summarize, we find clear evidence of the encouragement design causing an exogenous difference between the treatment group and the control group in exposure to the edutainment show. These effects are also highly significant after correcting for multiple hypothesis testing both in terms of the SUR tests ($p < 0.01$) and as shown in Table 4, for the within-family Hommel tests for all of the average effects and all of the gender-specific effects.

We now turn to a discussion of how the increased exposure to the edutainment show affected the participants in the short term and in the long term.

6. Short-Term Impact: Ambitions, Knowledge, and Mindset

An important aim of the edutainment show was to increase the entrepreneurship ambitions among the viewers and make them consider starting their own business. The focus group discussions suggested that the edutainment show succeeded in this respect as reflected in the following quote from one of the participants:

> I can say that Ruka Juu has inspired me to be more determined to succeed and to expand my business. I was thinking if there was a school about business and how to manage it, I would have joined so that I could broaden my knowledge.[16]

In the laboratory experiment, we included several measures of the participants' interest in entrepreneurship both incentivized and nonincentivized. The incentivized measure was introduced at the end of the laboratory experiment, where the participants were given the choice between a participation fee of 4,000 Tsh or participation in two weekend courses on business training. The price of each course was 2,000 Tsh, which would be subtracted from the cash payment at the end of the laboratory session;[17] 60% of the participants did not sign up for either of the two business courses, whereas 10% signed up for both courses.

The first column in Table 5 reports from a regression of the willingness to spend 4,000 Tsh on additional training. We observe that, for the full sample (panel A in Table 5), there is no significant treatment effect of the edutainment show on the demand for business training. As shown in panel B in Table 5, there is suggestive evidence of there being a gender difference in the treatment effect: the treated female students are almost 6 percentage points more likely to sign up for the courses, corresponding to 0.22 of a standard deviation, whereas there is no treatment effect for the male students.[18] In the second and third columns in Table 5, we report regressions on nonincentivized measures of entrepreneurship ambitions. The second column in Table 5 reports the results of a nonincentivized question on what type of course the participants would take if they were given a free week-long training course, where we consider the probability of them choosing "training in entrepreneurship."[19] For both male and female participants, there is a strong effect of the edutainment show on the nonincentivized responses, with an increase in the probability of choosing entrepreneurship training of almost 0.25 of a standard deviation. We also asked the participants whether they would prefer to start a business

Table 5. Impact on Business Ambitions

	Demand for business training		Rating of having own business	Ambition index
	Incentivized	Self-report		
		Panel A: Overall impact		
Treated (edutainment)	0.038	0.123***†††	0.150**††	0.264***†††
	(0.028)	(0.029)	(0.061)	(0.078)
Observations	1,902	1,897	1,851	1,847
R^2	0.007	0.043	0.013	0.039
		Panel B: Gender-specific impact		
Treated (edutainment)	0.058*	0.112***††	0.121	0.259**†
	(0.032)	(0.039)	(0.084)	(0.107)
Treated × male	–0.045*	0.025	0.069	0.012
	(0.026)	(0.048)	(0.103)	(0.107)
Male	0.016	–0.055	–0.039	–0.066
	(0.018)	(0.040)	(0.071)	(0.091)
Treatment on males	0.012	0.137***†††	0.190***††	0.271***†††
	(0.029)	(0.035)	(0.071)	(0.074)
Observations	1,902	1,897	1,851	1,847
R^2	0.008	0.043	0.014	0.039
		Panel C: Statistics on dependent variable (in control group)		
Mean	0.079	0.573	2.776	1.210
Standard deviation	0.270	0.495	0.948	1.000

Notes. The table reports linear regressions in which the dependent variable is as follows: first column, an indicator variable taking the value of one if the participant wants to spend 4,000 Tsh on two additional weekend courses in entrepreneurship; second column, an indicator variable taking the value of one if the participant chooses training in entrepreneurship as the preferred free week-long training course; third column, a variable reflecting how the participant ranks (if income and work hours were kept constant) having own business relative to being employed in public sector, being employed in private sector, and farming (1 to 4: 4, own business is ranked as first choice); fourth column, an index that is the sum of the indicator variables from the first and second columns and an indicator variable taking the value of one if the dependent variable in the third column takes the value of four (own business is ranked as first choice). *Treated:* indicator variable for the participant being in the treatment group; *Treated × male:* interaction variable between *Treated* and *Male; Male:* indicator variable taking the value of one if the participant is a male. Also included in the regressions but not reported are the other background variables reported in Table 2. Panel A reports overall impact, whereas panel B reports gender-specific impact, where *Treatment on males* is the linear combination of *Treated* and *Treated × male*. See Tables A.8 and A.9 in Online Appendix A for the corresponding full regressions, including all controls. Panel C reports statistics on the dependent variable in the control group. Standard errors in parentheses are clustered on schools; family-wise error–corrected treatment effects (within the table) are indicated by daggers. In cases where a treatment effect is considered as a member of more than one family, the largest (corrected) *p*-value is indicated.

$^{*}p < 0.10$; $^{**}p < 0.05$; $^{***}p < 0.01$; $^{\dagger}p < 0.10$; $^{\dagger\dagger}p < 0.05$; $^{\dagger\dagger\dagger}p < 0.01$.

of their own over other careers (private sector employee, government employee, or farmer) if income and hours were exactly the same across alternatives. We observe from the third column in Table 5 that the treatment group is more likely to report a preference for starting their own business, particularly among the male participants. Finally, in the fourth column of Table 5, we consider the treatment effect on an index combining the incentivized and nonincentivized entrepreneurship ambition measures.

Overall, for both male and female participants, there is a treatment effect on the ambition index, which is suggestive evidence of the edutainment show succeeding in making the viewers more interested in entrepreneurship and business. In line with this, the SUR tests provide a strong rejection of the null hypotheses that there are no nonzero average or gender-specific effects in this family of outcomes (average: $p < 0.01$, gender specific: $p < 0.01$). Furthermore, as shown in Table 5, all of the average and gender-specific effects that are significant are robust to within-family Hommel correction. However, it is important to keep in mind that we only observe robust effects in the nonincentivized responses. We may have concerns about an experimenter demand effect shaping these responses, where students in the treatment group may feel that they are expected to show an interest in business. Thus, we have more confidence in the weaker findings from the incentivized measure.

The edutainment show also aimed at educating the participants by providing them with business knowledge and focusing on the importance of having an entrepreneurial mindset. With respect to business knowledge, the edutainment show provided factual information, introduced key business concepts, and highlighted good business practices with respect to,

Table 6. Impact on Knowledge

	Subindices				
		Business			
	Macro facts	Facts	Concepts	Practice	Knowledge index
			Panel A: Overall impact		
Treated (edutainment)	0.101	0.045	–0.146*	–0.068	–0.068
	(0.077)	(0.037)	(0.078)	(0.111)	(0.204)
Observations	1,902	1,902	1,902	1,902	1,902
R^2	0.020	0.010	0.047	0.026	0.041
			Panel B: Gender-specific impact		
Treated (edutainment)	0.035	0.045	–0.168*	–0.111	–0.199
	(0.094)	(0.055)	(0.099)	(0.138)	(0.243)
Treated × male	0.154	–0.001	0.052	0.101	0.306
	(0.113)	(0.066)	(0.108)	(0.159)	(0.284)
Male	0.284***	–0.055	0.148**	0.136	0.513***
	(0.078)	(0.054)	(0.069)	(0.110)	(0.188)
Treatment on males	0.189**	0.044	–0.116	–0.010	0.107
	(0.095)	(0.042)	(0.089)	(0.133)	(0.251)
Observations	1,902	1,902	1,902	1,902	1,902
R^2	0.021	0.010	0.047	0.027	0.042
			Panel C: Statistics on dependent variable (in control group)		
Mean	2.204	0.855	1.509	4.049	8.617
Standard deviation	1.286	0.719	0.875	1.556	2.625

Notes. The table reports linear regressions in which the dependent variable is the participant's number of correct answers on incentivized questions about different topics taught by the edutainment show: macroeconomic facts (0–8), business facts (0–3), business concepts (0–3), business practices (0–10), and knowledge index (0–24; sum of all answers). *Treated:* indicator variable for the participant being in the treatment group; *Treated × male:* interaction variable between *Treated* and *Male; Male:* indicator variable taking the value of one if the participant is a male. Also included in the regressions but not reported are the other background variables reported in Table 2. Panel A reports overall impact, whereas panel B reports gender-specific impact, where *Treatment on males* is the linear combination of *Treated* and *Treated × male*. See Tables A.10 and A.11 in Online Appendix A for corresponding full regressions, including all controls. Panel C reports statistics on the dependent variable in the control group. Standard errors in parentheses are clustered on schools.

*$p < 0.10$; **$p < 0.05$; ***$p < 0.01$; $^{\dagger}p < 0.10$; $^{\dagger\dagger}p < 0.05$; $^{\dagger\dagger\dagger}p < 0.01$; family-wise error–corrected treatment effects are indicated by daggers.

among other things, marketing, customer care, and record keeping. To measure the impact of the edutainment show on business knowledge, the participants answered a set of 24 incentivized multiple-choice questions on macroeconomic facts, business facts, business concepts, and business practices. The participants were paid 100 Tsh for each correct answer. The questions had been covered in the edutainment show and were developed in collaboration with the producers of the show as well as experts from the University of Dar es Salaam Entrepreneurship Centre, where the experts had been involved in the design and implementation of the show. To illustrate, one question on key business concepts was "What is profit?" The four answers that the participants had to choose among were (A) "Profit is sales of the most important products," (B) "Profit is sales minus the cost of goods and operating expenses," (C) "Profit is sales minus cost of goods and what you take home from the business," and (D) "Profit is sales plus cost of goods and operating expenses."[20]

Table 6 reports regressions on the number of correct answers to the four subindicies of questions as well as on the knowledge index given by the total number of correct answers. We do not find a systematic treatment effect of the edutainment show on the incentivized test on business knowledge in the laboratory, although we should note that there is suggestive evidence of a positive effect on the knowledge about macroeconomic facts among the male viewers. The SUR tests are also significant (average: $p = 0.08$, gender specific: $p = 0.06$). Still, the overall impression from the business knowledge part is that the edutainment show largely did not succeed in transferring business knowledge to the viewers. This is to some extent confirmed by the focus group discussions, which revealed that the viewers did not remember much of the factual information covered by the edutainment show. Participants in the focus groups mostly did not even remember that there had been any fact sheets displayed on the television screen, despite them appearing in every episode of the edutainment show.

Moreover, the episodes covering classroom training led by facilitators from the University of Dar es Salaam and a guest speaker from Tanzania Revenue Authority were hardly mentioned at all by the focus group participants.

The focus group discussions did, however, reveal that some viewers felt that they had gained knowledge about business practices from observing the participants, particularly with respect to customer service: "I learnt to be attentive to the customers and listen to their needs, and not to shout at the customers but have a good language and general cleanliness in the business environment." We cannot, therefore, rule out that the edutainment show transmitted some business knowledge to the viewers that was not captured by our test.

The edutainment show also conveyed the importance of having an entrepreneurial mindset, including patience and the willingness to take risks.[21] This was reflected in the focus group discussions, where viewers expressed admiration for the risk-taking behavior of the contestants:

> I liked the entrepreneur, the one with the cosmetics shop. I liked the way she handled the situation when the goods were stolen, she accepted the situation and moved on. She didn't panic although she had incurred a loss because as an entrepreneur one has to realize that one is investing and that there are risks in the process.

Viewers also expressed that they had been impressed by the contestants' willingness to save and take a long-term perspective.

To study whether the edutainment show had made the viewers adopt a more entrepreneurial mindset, we conducted a series of incentivized tests in the laboratory to elicit their willingness to take risk, patience, and competitiveness preferences.[22] To elicit their willingness to take risk, we asked the participants in the laboratory to choose between a safe alternative and a risky alternative in three different situations (one of the situations

Table 7. Impact on Mindset

	Risk	Patience	Compete	Mindset index
		Panel A: Overall impact		
Treated (edutainment)	0.083	0.078	–0.020	0.072
	(0.063)	(0.150)	(0.091)	(0.109)
Observations	1,902	1,902	1,901	1,901
R^2	0.012	0.013	0.038	0.011
		Panel B: Gender-specific impact		
Treated (edutainment)	0.144**	0.171	–0.055	0.117
	(0.069)	(0.192)	(0.106)	(0.133)
Treated × male	–0.143*	–0.216	0.081	–0.103
	(0.075)	(0.163)	(0.079)	(0.130)
Male	0.088*	–0.074	0.010	0.053
	(0.050)	(0.087)	(0.061)	(0.089)
Treatment on males	0.001	–0.045	0.026	0.013
	(0.076)	(0.136)	(0.087)	(0.117)
Observations	1,902	1,902	1,901	1,901
R^2	0.015	0.014	0.039	0.012
		Panel C: Statistics on dependent variable (in control group)		
Mean	1.329	3.375	0.375	2.763
Standard deviation	0.718	1.497	0.484	1.000

Notes. The table reports linear regressions in which the dependent variable is as follows: first column, the number of times that the participant chooses the risky alternative (1–3); second column, the number of times that the participant chooses the later payment date (0–6); third column, an indicator variable taking the value of one if the participant chooses to compete; fourth column, a mindset index of the dependent variables in the first, second, and third columns in which each variable is weighted by the inverse standard deviation in the control group and then normalized to have unit variance in the control group. *Treated:* indicator variable for the participant being in the treatment group; *Treated × male:* interaction variable between *Treated* and *Male; Male:* indicator variable taking the value of one if the participant is a male. Also included in the regressions but not reported are the other background variables reported in Table 2. Panel A reports overall impact, whereas panel B reports gender-specific impact, where *Treatment on males* is the linear combination of *Treated* and *Treated × male*. See Tables A.12 and A.13 in Online Appendix A for the corresponding full regressions, including all controls. Panel C reports statistics on the dependent variable in the control group. Standard errors in parentheses are clustered on schools.

*$p < 0.10$; **$p < 0.05$; ***$p < 0.01$; $^{\dagger}p < 0.10$; $^{\dagger\dagger}p < 0.05$; $^{\dagger\dagger\dagger}p < 0.01$; family-wise error–corrected treatment effects are indicated by daggers.

was randomly selected to determine the payment from this part of the experiment). The payoffs were the same for all three situations: in the safe option, 2,000 Tsh; in the risky option, 4,000 Tsh if lucky and 0 if unlucky. The only difference between the situations was the probability of the lucky outcome in the risky option (25%, 50%, or 75%). From Table 7, we observe that watching the edutainment show did not have a significant effect on the willingness to take risk in the overall sample (panel A in Table 7). Panel B in Table 7, however, shows that there seems to be an interesting gender difference. We observe an increase in the female viewers' willingness to take risk, whereas we do not observe any effect on the males.[23] This gender difference should be interpreted with care, however, because the gender interaction effect is only marginally significant. However, the female-specific effect on risk taking may be seen as suggestive evidence of the edutainment show having an effect on the viewers' perceptions of females as risk takers, which then shaped the female viewers' willingness to take risk.[24]

To analyze the impact on patience, we asked the participants to make choices in two sets of situations. In the first set of situations, the participants chose between receiving 1,000 Tsh today and a larger amount of money after eight weeks. They made this choice in three situations where the amount of money received at the later dates varied (1,500, 3,000, and 5,000 Tsh). In the second set of situations, they made the same three choices but between money in eight weeks or money in sixteen weeks. For each of the two sets of situations, one situation was randomly drawn to determine the payment from this part of the experiment. We observe from Table 7 that we do not find a significant effect on the overall sample (panel A in Table 7) or for females or males (panel B in Table 7).[25]

In measuring competition preferences, we followed the approach of Niederle and Vesterlund (2007). The participants were first asked to add up numbers for three minutes, where they received 200 Tsh per correct answer. They were then asked about their beliefs about how well they performed compared with the others in the session. Finally, they were told to do another round of adding up numbers, but this time, they could choose between a fixed payment of 100 Tsh per correct answer or a payment of 300 Tsh per correct answer if they performed as least as well as the average in the previous round in their session and 0 if they performed worse than the average. As shown in the fourth column in Table 7, we do not find any treatment effect on the willingness to compete for the overall sample (panel A in Table 7) or for females or males (panel B in Table 7).[26]

Finally, in Table 7, we report treatment effects for the mindset index, which combines the three mindset dimensions. We observe that we do not find any overall mindset effect in the full sample (panel A in Table 7) or for females or males (panel B in Table 7). In line with this, the SUR tests are also not significant (average: $p = 0.63$, gender specific: $p = 0.22$), and as we observe from Table 7, none of the aggregate or gender-specific effects are robust to within-family Hommel correction. The series of incentivized tests on risk, patience, and competition, therefore, largely do not provide evidence of the edutainment show shaping the mindset of the viewers, possibly with the exception of females becoming more risk willing.

In sum, the results from the laboratory experiment provide some suggestive evidence of the edutainment show making the viewers more interested in entrepreneurship and business, and the estimated effects on the ambition index are robust to across-family Hommel correction (average: $p < 0.01$, gender specific: $p = 0.08$ (females) and $p < 0.01$ (males)). However, we find no evidence of the show having an impact on the business knowledge of the viewers and only suggestive evidence of the female viewers becoming more entrepreneurial in terms of their willingness to take risk.

7. Long-Term Impact on Behavior

We now turn to a discussion of the impact of the edutainment show on long-term behavior with respect to both school performance and occupational status.

We find evidence of the edutainment strengthening entrepreneurship ambitions in the short run. An increased interest in entrepreneurship could make them put more effort into school work if they perceived the school activities or school performance to be important to succeed in business. However, the edutainment show might also cause a substitution away from school work if the schooling is seen as irrelevant for business and the students consider it more beneficial to spend time exploring business opportunities.

To study the long-term effect of increased entrepreneurship ambitions on school performance, we collected administrative data on whether the students passed the O-level examination, which they took around eight months after the edutainment show ended. Strikingly, we observe from Table 8 that the treatment group performed significantly worse on the school examination than the control group; the fraction that passed the O-level examination is significantly lower in the treatment group than in the control group. This finding suggests that the increased focus on entrepreneurship as a possible career path made the students less motivated to study hard at school.

The attrition analysis in Table 3 sheds additional light on how the edutainment show affected the students' investment in schooling, because attrition

at the laboratory experiment is equivalent to not attending school on the day of the research visit.[27] We observe from Table 3 that the edutainment show had a negative treatment effect on school attendance, which suggests that increased entrepreneurial focus made the students less interested in school activities. Consistent with this, we observe in the competitiveness experiment that the treated students performed worse in the math task in the first round of the competitiveness experiment: they had 1.73 fewer correct answers than the control students ($p = 0.003$). Finally, we note from Table 3 that there is a significant negative association between business ambitions at baseline and school attendance; students that stated that they would use 1 million Tsh to start a business are 7% less likely to attend school. This suggests that students do not consider schooling to be particularly relevant for business. Overall, our analysis shows that the edutainment show affected school performance negatively by making students less motivated for school and thereby, lowering their school attendance (and possibly, the effort that they put into school more generally as well).

Almost two years after the intervention, we again surveyed the participants to study whether the edutainment show had an impact on long-term occupational status. Consistent with more students having failed the O-level examination, we observe from Table 8 that it is less likely that the treatment group participants self-report currently being a student.[28] Taken together, the long-term data thus provide strong evidence for the edutainment show causing poorer school performance and making it less likely that the students continued schooling.

The remaining columns in Table 8 report long-term effects on business startups, employment status, and mobility.[29] The participants reported having started various types of kiosks and retail activities on the street, including selling snacks, water, chips, or other small products. Others reported having entered into repair work, computers, general welding, or low-level financial intermediation. However, overall, we

Table 8. Impact on Long-Term Behavior

	Administrative: passed final examination	Long-term survey			
		Currently a student	Started a business	Employed	Moved
		Panel A: Overall impact			
Treated (edutainment)	–0.198***†††	–0.187***††	0.057	–0.044	0.065
	(0.059)	(0.066)	(0.056)	(0.047)	(0.058)
Observations	2,029	281	279	279	279
R^2	0.162	0.132	0.023	0.023	0.093
		Panel B: Gender-specific impact			
Treated (edutainment)	–0.232***†††	–0.099	0.086	–0.073	0.104
	(0.067)	(0.077)	(0.071)	(0.064)	(0.077)
Treated × male	0.077	–0.200*	–0.067	0.067	–0.089
	(0.058)	(0.115)	(0.109)	(0.075)	(0.093)
Male	0.066*	0.127	0.007	–0.084	–0.065
	(0.038)	(0.082)	(0.062)	(0.054)	(0.075)
Treatment on males	–0.155**	–0.299***††	0.019	–0.007	0.016
	(0.063)	(0.094)	(0.086)	(0.056)	(0.067)
Observations	2,029	281	279	279	279
R^2	0.164	0.141	0.024	0.025	0.095
		Panel C: Statistics on dependent variable (in control group)			
Mean	0.655	0.610	0.269	0.144	0.201
Standard deviation	0.475	0.490	0.445	0.352	0.402

Notes. The table reports linear regressions in which the dependent variable is as follows: first column, an indicator variable taking the value of one if the participant passed the final O-level examination; second column, an indicator variable taking the value of one if the participant is currently a student; third column, an indicator variable taking the value of one if the participant has started a business; fourth column, an indicator variable taking the value of one if the participant is currently employed; fifth column, an indicator variable taking the value of one if the participant has moved since the short-term survey. *Treated:* indicator variable for the participant being in the treatment group; *Treated × male:* interaction variable between *Treated* and *Male; Male:* indicator variable taking the value of one if the participant is a male. Also included in the regressions but not reported are the other background variables reported in Table 2. Panel A reports overall impact, whereas panel B reports gender-specific impact, where *Treatment on males* is the linear combination of *Treated* and *Treated × male*. See Tables A.16 and A.17 in Online Appendix A for full regressions, including all controls. Panel C reports statistics on the dependent variable in the control group. Standard errors in parentheses are clustered on schools; family-wise error–corrected treatment effects are indicated by daggers.

*$p < 0.10$; **$p < 0.05$; ***$p < 0.01$; $^{\dagger}p < 0.10$; $^{\dagger\dagger}p < 0.05$; $^{\dagger\dagger\dagger}p < 0.01$.

do not find strong evidence of the poorer school performance being replaced with a significant increase in business ownership. The estimated treatment effect in Table 8 on business startups is not statistically significant in the overall sample (panel A in Table 8) or for males or females separately.[30] In terms of employment and whether the students have moved since secondary school, we do not find any statistically significant treatment effects. We note that the estimated effect on mobility is positive for females, which is suggestive of the edutainment show making them more entrepreneurial in their thinking and therefore, also more willing to move to seek out economic opportunities.[31]

Overall, the long-term findings provide strong evidence of the entertainment show having shaped the long-term behavior of the viewers, and the SUR tests are highly significant (average: $p < 0.01$, gender specific: $p < 0.01$). The results are particularly strong for school outcomes, where we observe from Table 8 that the estimated average effects of whether they have passed the final examination and currently are studying are robust to within-family Hommel correction (final exam: $p < 0.01$, currently a student: $p = 0.02$) as well as the gender-specific effect of having passed the final examination for females ($p < 0.01$) and currently being a student for males ($p = 0.01$). However, we only find some suggestive evidence of the poorer school performance being replaced by other valuable activities.

8. Concluding Remarks

We have studied the short-term and long-term impacts of an edutainment show on entrepreneurship broadcasted on national television in a developing country. In the short term, we find some evidence of the show making the viewers more interested in entrepreneurship and suggestive evidence of some mindset changes. At the same time, we find no evidence of the show impacting the business knowledge of the viewers. Our findings thus suggest that it is challenging to use an edutainment show as a vehicle for knowledge transmission. However, we should keep in mind that, although the encouragement design caused an exogenous difference in the exposure to the edutainment show, the treatment difference in the average number of episodes watched is not very large. This partly reflects the fact that the viewing conditions were difficult for many participants. Hence, the treatment intensity may not have been sufficient to ensure knowledge transmission, which we believe provides an important reminder for television-based edutainment initiatives in developing countries. It may be hard to achieve the level of consistency in viewing that is needed to facilitate learning.

In the long term, we find that encouragement of entrepreneurship caused students to invest less in schooling, which seems to reflect that they do not consider the present education to be particularly relevant for business. However, we do not find convincing evidence of the poorer schooling performance being replaced by an increase in business ownership or other valuable activities.

The spillover effect from entrepreneurship education to schooling serves as a reminder of the importance of taking a broad view when evaluating the impact of different field interventions. The fact that we find limited evidence of the program causing an increase in other valuable activities suggests that the overall effect of the edutainment show was negative. However, we should keep in mind the context of our study, which was characterized by low educational quality and very few students (11.7%) being able to continue to A-level even if they pass the O-level exam (Table 4.7 in United Republic of Tanzania 2011). One might argue that the strong effect on long-term schooling provides evidence of the edutainment show being powerful in terms of creating a proactive entrepreneurship mindset, which critically evaluates the schooling path, but failed to provide the viewers with the basis and knowledge needed to create an alternative pathway in life.

In this respect, an important question is whether reallocating investments from education to business is a good strategy for young people in poor countries. The return on investments in education and microenterprise in developing countries is a challenging topic, but available evidence suggests that it may, in fact, be more beneficial for the poor in many developing countries to invest in building a microenterprise than in additional education (Glewwe 2002, Schultz 2004, Söderbom et al. 2006, De Mel et al. 2008, Peet et al. 2015). In fact, a recent report from UNESCO argues that the quality of education in sub-Saharan Africa is so poor that it threatens the future of entire generations: children and adolescents are not learning the minimum needed to prepare them for decent employment (UNESCO 2017).

Edutainment shows broadcasted on television and radio represent an intriguing approach to a host of development issues, because they are potentially low-cost interventions with large outreach. More research is, therefore, needed to understand how these shows can be used to initiate behavioral and social change. In particular, an open question remains whether there are ways of making edutainment shows a vehicle for knowledge transmission and as such, a complement to the formal education in developing countries. Another interesting avenue for future research is to study whether edutainment shows may be used in different settings in addition to being broadcasted on television (for example, at schools or in villages by the use of mobile cinema) and thereby, serve as a point of

departure for teaching and community discussions. Finally, the digital revolution opens up new approaches to edutainment education where, for example, digital games allow individuals to explore and learn by role taking (Singhal 2013), and it will be interesting for future research to tap into these opportunities and study how they can support human capital formation in developing countries.

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Endnotes

[1] An edutainment show is typically defined as a program that purposely designs and implements a media message to both entertain and educate to "increase audience knowledge about an educational issue, create favorable attitudes, and change behavior" (Singhal et al. 2004). For an overview of recent developments in entertainment education, see Singhal (2013).

[2] For additional discussion of the challenges facing youth in Tanzania, see Helgesson (2006). There is also increasing interest in targeting the youth with financial education, but the focus is more on saving and financial decision making (Lührmann et al. 2015, 2018; Bruhn et al. 2016; Berry et al. 2018).

[3] A recent survey of the educational sector in Tanzania showed huge problems with teacher attendance and the quality of the teaching (Uwezo 2017).

[4] Another related paper is by Tanguy et al. (2014), who, in Ethiopia, studies the effect of exposing poor people to documentaries about people from similar communities who had succeeded in agriculture or small business. Six months later, they find positive effects on aspirations, locus of control, and several economic and school outcomes. There are also a number of studies outside of economics that have analyzed the impact of edutainment and related initiatives. The work by Rogers et al. (1999) is an early study in Tanzania of the effects of using a soap opera on the radio to initiate behavioral change. Using a region not reached by the radio broadcast as the control, the study finds strong effects of the radio show on family planning. The work by Abdulla (2004) is another early contribution showing the potential of edutainment shows in the context of a public health campaign in Egypt. In a more recent study using qualitative methods, Ramafoko et al. (2012) show how a reality show involving five deprived communities in South Africa targeted social issues, like human immunodeficiency virus/acquired immunodeficiency syndrome, alcohol abuse, and crime. See also Paluck (2009), Paluck and Green (2009), Cheung (2012), and Trujillo and Paluck (2012) for other interesting studies of how soap operas, edutainment shows, and radio programs impact savings and aspirations, school outcomes, prejudice and conflict, and political attitudes, respectively.

[5] Our paper is also related to the broader literature on financial education and financial literature (see Hastings et al. 2013, Fernandes et al. 2014).

[6] There are also educational classroom field interventions targeting the youth to make them more forward looking in their behavior (see Alan and Ertac 2018).

[7] In addition to Ruka Juu, Femina HIP also produces Fema Magazine, Fema Radio Show, and Fema TV Show. For additional discussion of Ruka Juu, see Ekström and Sekei (2014).

[8] We restricted the study to government and community secondary schools, although one private secondary school was included because of an administrative mistake in the list prepared for us by the district education officer. There were 134 government and community secondary schools in Dar es Salaam in 2011 (Table 4.24 in United Republic of Tanzania 2011). It turned out that two of the schools belonged to the same administrative unit; the results are not sensitive to the removal of these two schools.

[9] The fact that we randomized at the school level across Dar es Salaam makes it unlikely that participants were aware of the other treatment arm being implemented elsewhere.

[10] A translated version of all supplementary material to the field experiment is provided in Online Appendix B.

[11] In total, 5,000 Tsh were paid out when they signed the contract; the remaining 5,000 Tsh were paid out when we did the midterm survey.

[12] The weekend movie is a well-established television show in Tanzania, which is supposed to be a family treat that showcases the best movies from Tanzania.

[13] The average, 3.4, is between 3 ("sometimes easy, sometimes difficult") and 4 ("quite easy"); 24.7% do not have a television at home.

[14] At the national level, 70% of the students failed the O-level exam in 2010. The lower failure rate for the schools in this study largely reflects that these schools are located in the main city of Tanzania.

[15] In Online Appendix A, we provide additional balance tables. Tables A.1 and A.2 in Online Appendix A provide balance tables for the baseline sample by gender, and Tables A.3–A.5 in Online Appendix A provide balance tables for the different subsamples that we reached in the different follow-up rounds. In Figure A.1 in Online Appendix A, we provide an overview of the distribution of the share of females across schools. We note that there is one male-only school in the control group. All of our results are robust to the removal of this school from the sample.

[16] In the text, we present a set of quotes from participants. These are selected because they represent views that came up frequently during the focus group discussions.

[17] The two courses offered were on how to start up and operate a new business (Course 1) and how to access microfinance and apply for a business loan (Course 2). The participants were told that (i) the courses would be offered by experts, (ii) there would be a limited number of seats, (iii) invitations to attend would be randomly distributed among those who signed up for a course, and (iv) they would be paid back the course fee if they were not selected. In total, 62 participants were offered a business course in the fall of 2011. Our long-term results are robust to the removal of these participants.

[18] There are two alternative approaches to measuring the demand for business training: the dependent variable could be the number of courses that they signed up for (0, 1, 2) or an indicator for whether they signed up for any courses. Because the content of the two courses is different, we prefer to focus on whether they signed up for both courses. However, we report the alternative specifications in Table A.9 in Online Appendix A, where we observe the same gender-specific patterns, but the effects are less precisely estimated and are not significant for females or males.

[19] The other alternatives were "training in office work," "training on health issues," "vocational training," and "don't know."

[20] Questions illustrating the other categories are as follows: "How many percent of Tanzanians have a bank account?"(macro facts),

"When do you have to prepare a financial statement for tax estimation?" (business facts), and "Which of the following is an important part of customer service?" (business practices). See Online Appendix B for a complete list of the business knowledge questions.

[21] The traits that are essential for becoming a successful entrepreneur are still an open research question, and the answer will most likely vary across different types of business environments and cultures. There is some evidence, however, suggesting that the willingness to take risk is an important determinant of the decision to become self-employed in various environments (see, for example, Dohmen et al. 2011, Hvide and Panos 2014, Berge et al. 2015b), and there is evidence suggesting that poverty may cause risk-averse and short-sighted decision making (Haushofer and Fehr 2014). The focus of this edutainment show on risk taking and patience was largely based on advice from the experts from the University of Dar es Salaam Entrepreneurship Centre who have worked with the local business community for years.

[22] Note that we cannot disentangle whether any effect of the edutainment show on the willingness to take risk comes from a change in risk preferences or a change in the beliefs that participants have about their future income. We also conducted incentivized tests of their social preferences to see whether the focus on entrepreneurship and business in the show made the participants more selfish or meritocratic (Cappelen et al. 2007, 2010; Almås et al. 2010). As shown in Tables A.18–A.20 in Online Appendix A, we do not find any impact of the show on the social preferences.

[23] In the main analysis, we take the number of times that they chose the risky option as a measure of a participant's willingness to take risk. In Figure A.2 in Online Appendix A, we show that the reported result is robust to alternative definitions of risky behavior. In Table A.14 in Online Appendix A, we report the corresponding ordered probit regressions.

[24] In line with this finding, when we asked the participants in the laboratory what they considered the most common characteristic of Tanzanian businesswomen, a significantly larger share of both males and females in the treatment group chose "risk taker" (males, $p = 0.004$; females, $p = 0.002$). The alternative characteristics were "fast in decision making," "good at collaborating," and "never give up."

[25] In the main analysis, we take the number of times that they chose the later payment date as a measure of their patience. The participants were, on average, more patient when choosing payments in the future ($p < 0.01$), but we obtain very similar estimates of treatment effects if we run separate regressions for the two sets of situations. In Figure A.3 in Online Appendix A, we show that we get statistically significant treatment effects on patience if we define patience as choosing the later payment date at least five times. In Table A.15 in Online Appendix A, we report the corresponding ordered probit regressions.

[26] There was also no statistically significant difference between the treatment group and the control group in beliefs about own performance (males, $p = 0.82$; females, $p = 0.39$).

[27] It seems very unlikely that anyone would refrain from attending school that day to avoid taking part in the laboratory experiment. First, the date of the laboratory experiment was not announced to the students in advance. Second, the laboratory experiment represented a possibility for earning money, which made it attractive for the students to participate.

[28] We do not have detailed data on what they are studying. They may have continued with A-level secondary schooling, started vocational education, or repeated classes for a retake of the O-level examination.

[29] In the long-term survey, we also collected information on marriage and childbearing; 9% of the participants were married, and 8.2% had or were expecting a child. We do not find any difference between the treatment group and the control group on these two variables.

[30] The effect on business startups for females is borderline statistically significant if we apply a one-sided test of equality ($p = 0.10$), which may seem appropriate, because the initial hypothesis clearly was that the edutainment show should increase the likelihood of starting a business. It is also interesting to note that the long-term estimates on business startups are very similar and are not statistically different from our short-term findings on the demand for business training as reported in Table 5. First, the size of the effect for females on the probability of having started a business is almost the same as that for the demand for business training (8.6 percentage points versus 5.8 percentage points); second, for both measures, there is negligible effect for the males (1.9 percentage points versus 1.2 percentage points). Still, overall, we consider our data at best to provide suggestive evidence of the edutainment show having a positive long-term effect on business startups.

[31] A recent study from Tanzania suggests that there are significant economic returns to migration (Beegle et al. 2011), whereas a study from Kenya and Indonesia finds more moderate effects (Hicks et al. 2017).

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