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**What Works for Women Does Not Work  
for Men: A Large Field Experiment on  
Countering Gendered Occupational  
Choices**

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# What Works for Women Does Not Work for Men: A Large Field Experiment on Countering Gendered Occupational Choices \*

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July 2024

To foster gender equality and diversity in the workplace, firms and policymakers strive to attract women and men to gender-atypical occupations. However, particularly for men, such attempts have been of limited success. We theorize (a) that identity threat-related barriers hinder gender-atypical occupational choices, (b) that these barriers differ for women and men, and (c) that therefore the success of recruitment strategies aimed at encouraging gender-atypical occupational choices differs for women and men. We conduct a large-scale field experiment on a widely used online job board with young women and men choosing their occupations when applying for their first job. We find that, for women, a low-cost recruitment intervention countering occupational stereotypes in typically male jobs substantially increases their applications for those jobs. However, for men, an equivalent intervention countering occupational stereotypes in typically female jobs does not increase their applications for those jobs. Thus strategies that work for women do not necessarily work for men. Supplementary survey evidence supports our theoretical expectation that women and men face differences in identity threat-related barriers to entering gender-atypical occupations. Our research has significance for the management field because reducing occupational gender segregation remains an important challenge for firms and societies.

**Keywords:** occupational choice; gender typicality; occupational gender segregation; field experiment.

**JEL Classifications:** J24, J16, I24, M59

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## INTRODUCTION

Gender differences in occupational choices constitute a persistent feature of workplaces worldwide (Charles & Bradley, 2009; Cortes & Pan, 2018). Such gender-stereotypical occupational choices can limit the optimal matching of workers' talents to occupations, contribute to skills shortages and the gender pay gap, and reinforce gender stereotypes (Adecco, 2022; Alonso-Villar et al., 2012; Blau & Kahn, 2017; Hegewisch et al., 2010). Thus both firms and policymakers are seeking ways of encouraging young people to consider gender-atypical occupations—e.g., science, technology, engineering, and mathematics (STEM) occupations for women.

For the past three decades, both research and policy have largely focused on attracting women to male-dominated domains. To encourage women's interest in gender-atypical occupations, research has highlighted the importance of strategies that counter occupational stereotypes, such as providing counter-stereotypical role models (e.g., female IT specialists) and counter-stereotypical reframing of occupations (e.g., emphasizing teamwork in STEM occupations) (Dasgupta & Asgari, 2004; Del Carpio & Guadalupe, 2021; Diekman et al., 2011; Pietri et al., 2021). Consequently, both firms and policymakers have used these intervention strategies in job ads and campaigns for women (e.g., “She Can STEM” in the U.S. and “Come on, let's do STEM” in Germany<sup>1</sup>).

More recently but still more rarely, firms and policymakers have also started applying such counter-stereotypical strategies to encourage men's interest in female-dominated occupations

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<sup>1</sup> Information on the “She can STEM campaign” can be found at <https://www.nytimes.com/2018/09/09/business/media/ad-council-stem-girls.html>. Information on the “Come on, let's do STEM” (in German: “Komm mach MINT”) can be found at <https://www.komm-mach-mint.de/>.

(e.g., the “Are you man enough to be a nurse” campaign in the U.S.; Clow et al., 2014)—often implicitly assuming that the same strategies work equally well for women and men (e.g., Meeussen et al., 2020). However, even though practitioners widely apply such intervention and recruitment strategies in job ads and campaigns, two major questions remain unanswered. First, do such strategies work equally well for women and men? Second, are such brief, low-cost interventions (e.g., in job ads or on job boards) effective at changing real-life outcomes (e.g., real job applications, as opposed to surveyed attitudes or intentions), and, if so, how large are their effects? Theorizing and large scale empirical evidence on both questions is missing so far.

To answer these questions, we draw on social psychology to build management theory that explains how barriers to choosing a gender-atypical occupation may differ by gender and how, as a result, intervention and recruitment strategies aimed at encouraging gender-atypical occupational choices may differ in their effectiveness for women and men. Empirically, we test our theory and analyze the effectiveness of counter-stereotypical intervention strategies on real-life occupational choices by conducting a large-scale field experiment with young women and men choosing their occupations when applying for their first jobs on an online job board that covers approximately 90 percent of the relevant market.

To build a theoretical framework on (a) the barriers women and men face when considering choosing a gender-atypical occupation and (b) effective intervention and recruitment strategies for helping them overcome these barriers, we integrate social role theory (Eagly, 1987; Eagly & Karau, 2002; Eagly et al., 2000; Eagly & Wood, 2012) with social identity threat theories (Breakwell, 1986; Ellemers et al., 2002; He & Kang, 2021; Roberts, 2005; Steele et al., 2002). Both theory and research on social roles have demonstrated that women and men can experience an incongruity between their gender and occupational roles, causing them to shy away from

gender-atypical occupations (e.g., Eagly & Karau, 2002). However, social role theory by itself does not specify whether such role incongruities trigger the same threats and barriers to choosing gender-atypical occupations in women and men. By combining social role theory with a social identity threat perspective and applying it to the context of occupational choice, we theorize that when individuals consider choosing a gender-atypical occupation, role incongruities can trigger two types of social identity threats: (a) devaluation threat, which involves fears of not living up to the ideals of the occupational role (Roberts, 2005) and thus predominantly stems from *within* the work context; and (b) legitimacy threat, which involves fears of not living up to the ideals of the gender role (Roberts, 2005) and predominantly stems from social pressures *outside* the work context (Torre, 2018).

We argue that the devaluation threat stemming from within the work context poses a bigger threat to women choosing gender-atypical occupations, because women are more likely to believe that they would be perceived as unsuitable for the job, lacking the necessary skills, or likely to receive no job offers in male-dominated fields (He & Kang, 2021). In contrast, we theorize that the legitimacy threat stemming from outside the work context poses a bigger threat to men choosing gender-atypical occupations, because manhood has been shown to be a precarious status calling for repeated proving, particularly for young men (Vandello & Bosson, 2013; Schrock & Schwalbe, 2009). Specifically, we argue that men are more likely to believe that they would be perceived as less masculine, and would be ridiculed by their friends and family, if they chose a female-dominated occupation.

We then theorize that the most widely employed intervention and recruitment strategies for encouraging gender-atypical occupational choices (e.g., portraying counter-stereotypical role models within the occupation such as women working in STEM) mainly target the devaluation

threat. These strategies stem from decades of research on attracting women to gender-atypical fields and convey that women are valued in occupations dominated by the other gender. More recently, the same strategies have also been employed in the few interventions targeting men (e.g., Clow et al., 2014). However, they do not directly address the threat of being ridiculed by others *outside* the workplace (i.e., the legitimacy threat). Because these strategies target the main obstacle for women to enter gender-atypical occupations (i.e., devaluation threat) but not the one for men (i.e., legitimacy threat), we hypothesize that such strategies are more effective at encouraging women to apply for male-dominated occupations than at encouraging men to apply for female-dominated occupations.

We test our hypotheses in a large-scale field experiment, in which we randomly assign adolescent females and males engaged in the occupational choice process to brief, low-cost interventions portraying counter-stereotypical role models and employing counter-stereotypical framing of STEM occupations (intervention 1) or health and care occupations (intervention 2). For this experiment, we needed a setting that both allows us to provide information to individuals during their occupational choice process and provides a valid measure of occupational choice. For more reliable and externally valid estimates, this choice should ideally not be a hypothetical one but rather a real occupational decision in the labor market. At the same time, however, the measure should not yet be confounded by employers' recruiting decisions (i.e., not be a matching outcome that may also reflect employers' biases) and by previous job experiences. Therefore, we would ideally observe adolescents' real applications to their first jobs immediately after finishing compulsory school and before having acquired any work experience.

Switzerland's unique educational and labor market setting constitutes an institutional setting that allows us to ideally fulfill these conditions. Approximately two-thirds of Swiss adolescents

choose their occupation when they enter a vocational education and training (VET) pathway. To do so, they have to apply for an in-firm training position immediately after completing their compulsory education at about age 15 to 16. To apply for apprenticeship positions, the adolescents have to submit job applications to “training firms” (i.e., firms offering apprenticeship positions) in one or several occupations in the universe of over 200 occupations. During this occupational choice process, adolescents both process information on occupations provided on job boards and by career counselors and then submit applications for apprenticeship positions to training firms that offer apprenticeships in the occupations they are interested in. As almost all adolescents apply for these positions online via an apprenticeship job board, we conduct our field experiment in collaboration with Yousty, Switzerland’s largest private online job board for apprenticeship positions with a coverage of approximately 90 percent of the apprenticeship market. This job board thus constitutes an ideal setting for both providing information to adolescents during their occupational choice process and using their apprenticeship applications to measure their real occupational choices.

Our research contributes to management theory in three key ways. First, most of the theoretical and empirical management literature on gender-related workplace diversity focuses on the barriers, threats, and backlash that women face in male-dominated domains (e.g., Akinola et al., 2017; Brands & Mehra, 2018; He & Kang, 2021). In contrast, we discuss not only women’s but also men’s barriers to occupational choice by contributing a theoretical framework that describes how barriers to choosing a gender-atypical occupation differ by gender and how, as a result, intervention and recruitment strategies aimed at encouraging gender-atypical occupational choices differ in their effectiveness for women and men.

Second, we offer insight into how interventions and job ads that strive to attract individuals into gender-atypical occupations can be designed according to the gender of potential applicants by demonstrating in a large-scale, real-life setting that the effectiveness of interventions to counter gender-typical occupational choices systematically differs for women and men. For women, our research suggests that brief online interventions (under one minute) that counter occupational stereotypes (e.g., with counter-stereotypical role models and reframing) can effectively encourage women to apply for male-dominated occupations.

In contrast, for men, our research suggests that these interventions do not work because legitimacy threat (i.e., threats outside the job such as societal norms) discourages them from applying to female-dominated occupations. Thus, firms, professional associations, and policymakers should not expect strategies that are effective in encouraging women to apply for male-dominated occupations to be equally effective in encouraging men to apply for female-dominated occupations. Different approaches that focus not only on devaluation but also on legitimacy threat are necessary for encouraging men's interest in female-dominated occupations—for example, by including friends and family in intervention efforts in the short run and gradually changing societal masculinity norms as a threat outside the job in the long run. Focusing the majority of research and intervention efforts on opening doors to male-dominated domains for women, while neglecting specific strategies for opening doors to female-dominated domains for men, may hinder advancement toward gender equality in the workplace.

Third, in further analyses we also offer first evidence on how counter-stereotypical interventions aimed at the gender minority affect the gender majority in that same field. Although real-world interventions and job ads often reach both genders, this question has been largely overlooked in the literature and public discourse so far. Our research demonstrates that brief

counter-stereotypical interventions aimed at the gender minority in an occupational field (e.g., STEM interventions aimed at women) do not change the job application behaviors of the gender majority in this field (e.g., men applying for STEM jobs). Together with our main results, this finding suggests that brief counter-stereotypical interventions can increase women's applications for male-dominated occupations without reducing men's applications for those same occupations. These types of interventions can thus increase the overall efficiency of job ads.

## **THEORY AND HYPOTHESES DEVELOPMENT**

To explain how barriers to choosing a gender-atypical occupation may differ by gender and how, consequently, intervention strategies aimed at encouraging gender-atypical occupational choices may differ in their effectiveness for women and men, we develop a theoretical framework in four steps. First, we introduce social role theory (Eagly, 1987; Eagly & Wood, 2012) and its implications for occupational choice. Second, to provide a framework that describes both women's and men's identity threat-related barriers to entering gender-atypical occupations, we integrate social role theory with theories on social identity threat (Breakwell, 1986; Ellemers et al., 2002; Steele et al., 2002) and the professional image construction model (Roberts, 2005). Third, to derive specific hypotheses, we apply this theoretical framework to the context of intervention and recruitment strategies aimed at countering gender-atypical occupational choices. Fourth, we discuss possible unintended side effects of counter-stereotypical interventions on the majority gender group.

### **Social Role Theory, Gender Roles, and Occupational Choices**

Social role theory (Eagly, 1987; Eagly & Wood, 2012) provides a social-psychological and evolutionary perspective on gender differences in occupational choice. This theory posits that differences in both physical gender and local social conditions originally led to a division of labor

between women and men (Eagly & Wood, 2012). Gender role expectations—i.e., shared expectations about the presumed attributes and behavior of women and men—thus emerged from early humans’ observations of women’s and men’s behavior in their family and work roles. As a result, women are expected to enact “communal” behaviors (i.e., other-oriented, caring, friendly behaviors), while men are expected to enact “agentic” behaviors (i.e., action-oriented, assertive, competitive behaviors) (Eagly & Wood, 2012). As gender role expectations tend to be shared by members of a society, people receive more approval from others for gender role-consistent behavior but face penalties when they do not conform (Eagly & Wood, 2012; Rudman, 1998; Rudman & Glick, 2001).

Not only gender but also occupations are linked to stereotypical attributes and the expected behaviors of professionals working in these occupations (Cejka & Eagly, 1999; White & White, 2006). For example, most people tend to associate health and care occupations with communal attributes, while they associate STEM occupations with agentic ones (Diekmann et al., 2011; White & White, 2006). Consequently, the female gender role is viewed as incongruent with STEM occupations and the male gender role as incongruent with health and care occupations. These incongruencies between gender roles and occupational roles offer a potential explanation for gender differences in occupational choices (White & White, 2006).

However, as social role theory by itself does not specify whether such role incongruities trigger the same threats and barriers to choosing gender-atypical occupations in women and men, we combine it with a social identity threat perspective (Breakwell, 1986; Ellemers et al., 2002; He & Kang, 2021; Roberts, 2005; Steele et al., 2002). Integrating these theories allows us to create a framework that offers a more nuanced understanding of how gender-atypical occupations are

perceived by and reacted to by each gender, paving the way for more targeted intervention strategies.

### **Identity Threat-Related Barriers to Entering Gender-Atypical Occupations**

According to Roberts' (2005) professional image construction model, social identities (e.g., gender, ethnicity) are central in building an individual's professional identity. Identity threats may cause people to experience discrepancies between their *perceived* professional image (e.g., how STEM professionals think that others at work perceive them) and their *desired* professional image (e.g., how a particular STEM professional would like to be perceived by others at work). The two types of social identity threats are devaluation threat and legitimacy threat (Breakwell, 1986; Ellemers et al., 2002; Roberts, 2005).

Devaluation threats occur when others devalue the characteristics of an individual's social identity group in a given context (Breakwell, 1986; Ellemers et al., 2002; Roberts, 2005). In the context of occupational choice, women may experience a devaluation threat when they feel that others regard them as unsuitable for engaging in a male-dominated occupation (He & Kang, 2021). Conversely, men may experience a devaluation threat when they feel that others regard them as unsuitable for engaging in a female-dominated occupation. Devaluation threats thus occur predominantly within the work context.

In contrast, legitimacy threats occur when others question people's membership in their social identity group (Breakwell, 1986; Ellemers et al., 2002; Roberts, 2005). In the context of occupational choice, a woman may experience a legitimacy threat when she feels that others perceive her as less feminine if she chooses a male-dominated occupation (e.g., a STEM occupation). Conversely, a man may experience a legitimacy threat when he feels that others

perceive him as less masculine if he chooses a female-dominated occupation (e.g., a health and care occupation). Legitimacy threats thus occur predominantly outside the work context.

Drawing on both social role theory and identity threat theories, we argue that role incongruities between a person's gender and an occupation keep people from entering that occupation because of devaluation threat, legitimacy threat, or both. We further posit that, for occupational choice, the devaluation threat is more closely tied to the work context and the fear of not living up to the ideals of the occupational role, whereas the legitimacy threat is more closely tied to the non-work context and the fear of not living up to the ideals of the gender role. We argue that with devaluation threat, people feel that their gender role prevents them from living up to the ideals associated with the occupational role. For example, people may think that their gender (a) makes their colleagues regard them as less suitable for engaging in an occupation dominated by the other gender or (b) makes both them and others doubt their abilities to develop the necessary skills and complete the required tasks (Colbeck et al., 2001; He & Kang, 2021; Koch et al., 2022). In contrast, with legitimacy threat, people feel that their occupational role prevents them from living up to the ideals associated with their gender role. For example, they may fear that if they work in an occupation dominated by the other gender, their friends would ridicule them or perceive them as less feminine or masculine (He & Kang, 2021; Lupton, 2000; Simpson, 2004).

Combining social role with social identity threat theories, we argue that the extent to which people experience these two identity threats depends on their gender role. In line with He and Kang (2021), we argue that the devaluation threat is the major threat experienced by women who are considering choosing a male-dominated occupation. Given that, in most societies, women have traditionally had lower social status than men (Rashotte & Webster, 2005; Ridgeway, 1997; Ridgeway & Correll, 2004), women are likely to experience a negative incongruity between their

gender role and the occupational role in a male-dominated occupation (He & Kang, 2021). Women are likely to feel that their gender and associated attributes and behaviors are unsuitable or “not good enough” for succeeding in male-dominated occupations (e.g., women may think that they are not good enough at math or that their colleagues will not take them seriously).

Likewise, men may also experience an incongruity between their gender role and their occupational role in a female-dominated occupation. However, this incongruity is likely to have positive outcomes at the workplace for men, given that men have traditionally had higher social status than women (Rashotte & Webster, 2005; Ridgeway, 1997; Ridgeway & Correll, 2004). Consistent with this argument, research on the careers of men in female-dominated occupations provides evidence that men’s careers progress faster than those of women in female-dominated occupations (Schwiter et al., 2021; Torre, 2018; Williams, 1992, 2015). Therefore, men are likely to worry less about not being good enough or not being taken seriously at work in female-dominated occupations. We thus argue that, for women, the devaluation threat poses a larger barrier to entering gender-atypical occupations than for men.

In contrast, we argue that the legitimacy threat is the major threat experienced by men when they consider choosing a female-dominated occupation. The literature on precarious manhood (Vandello & Bosson, 2013; Vandello et al., 2008) has shown that most societies perceive manhood as a precarious status that must be repeatedly proven. Examples are manhood rituals in some societies or common exhortations, such as “to man up” or “be a real man,” or expressions such as “man enough,” or, in contrast, “you’re such a girl” (Vandello et al., 2008). Such rituals do not apply to women, who do not constantly need to prove their womanhood. In addition, men experience a stronger need to prove their manhood or to transition to manhood through rituals during adolescence (i.e., when they also choose their first occupation), thus amplifying the

potential impact of the legitimacy threat on occupational choice. Thus men, particularly during adolescence, tend to feel more anxious about their gender status than women (Schrock & Schwalbe, 2009; Vandello et al., 2008). Building on this literature, we argue that the legitimacy threat poses a larger barrier for men wishing to enter female-dominated occupations than for women wishing to enter male-dominated ones. Indeed, qualitative research indicates that men in female-dominated occupations risk not being taken seriously or even being ridiculed for their occupational choice by their friends, family, and acquaintances (Lupton, 2000; Simpson, 2004).

We argue that, compared to men, women are less likely to experience a legitimacy threat when they consider choosing a male-dominated occupation, for the following two reasons. First, because women belong to the traditionally less valued gender group, others are less likely to question a membership in that less-valued group (He & Kang, 2021). Second, because most societies perceive womanhood as a permanent, biologically assigned status that does not need continual proving (Vandello & Bosson, 2013; Vandello et al., 2008), women should be less worried than men that friends or family will ridicule them for choosing a gender-atypical occupation (e.g., engineering).

Taking a social identity threat perspective on occupational choice thus suggests that the identity threats individuals face when choosing gender-atypical occupations differ by gender. Such gender differences may in turn have important consequences for how firms, policymakers, and researchers need to design job ads, campaigns, and interventions for countering gender-typical occupational choices. We argue that, for such interventions to be effective, they need to factor in the type of identity threat-related barrier most applicable to women and men.

## **An Identity-Threat Perspective on Intervention Strategies for Encouraging Gender-Atypical Occupational Choice**

Research on gender-atypical occupational choice has predominantly focused on women in male-dominated domains and highlights the importance of strategies that counter occupational stereotypes such as portraying counter-stereotypical role models and framing counter-stereotypical aspects of careers (Dasgupta & Asgari, 2004; Del Carpio & Guadalupe, 2021; Diekman et al., 2011; Pietri et al., 2021). Applying the combination of social role theory and social identity threat theory to the context of occupational choice, we derive four hypotheses and research questions on the effectiveness of such strategies in encouraging gender-atypical occupational choice.

First, because such intervention and recruitment strategies that counter occupational stereotypes mainly target people's perception of the occupational role in the work context, we argue that they reduce the devaluation threat. If, for example, firms or policymakers portray female role models and use counter-stereotypical framing of male-dominated occupations in their job ads or campaigns, this likely signals that (a) they value females working in male-dominated occupations, (b) women can be successful in these occupations, and (c) communal skills (e.g., being a team player) are both necessary and valuable in these occupations (e.g., Diekman et al., 2011; Pietri et al., 2021). As all of these messages counter the devaluation threat, they should be effective in attracting women to male-dominated occupations. We therefore hypothesize as follows:

*Hypothesis 1. Interventions that counter occupational stereotypes in male-dominated occupations increase women's applications for male-dominated occupations.*

Second, such interventions do not directly target the legitimacy threat (i.e., the dominant threat for men). If job ads counter occupational stereotypes (e.g., by portraying male role models in a nursing job ad), this does not take into account men's potential anxiety about not being respected

as “a real man” by others outside the work context. Given that, for men, we assume the legitimacy threat to be the main barrier to entering female-dominated occupations, we hypothesize as follows:

*Hypothesis 2. Interventions that counter occupational stereotypes in female-dominated occupations do not increase men’s applications for female-dominated occupations.*

Third, efforts to counter occupational stereotypes may have unintended side effects. Given that in real life (in contrast to the laboratory) counter-stereotypical interventions such as campaigns or job ads do not exist in a vacuum and are thus rarely seen by only one gender, we have to study potential unintended side effects of interventions targeted at the gender minority in an occupation on the gender majority in that occupation. That is, how do men react to interventions that counter occupational stereotypes of male-dominated occupations? Likewise, how do women react to interventions that counter occupational stereotypes of female-dominated occupations? Because our theories do not suggest a clear prediction on the direction of this effect, we posit this as empirical research questions.<sup>2</sup>

*Research Question 1. Do interventions that counter occupational stereotypes to attract women to male-dominated occupations affect men’s applications for those male-dominated occupations?*

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<sup>2</sup>Theory provides some arguments both for a negative effect and for a null effect of interventions that counter occupational stereotypes on the occupational choices of the majority gender in an occupation. If such interventions would reverse individuals’ perception of the gender representation (e.g., an individual perceives a traditionally male-dominated occupation as female-dominated after the intervention), we would, in line with our previous argumentation, expect men to experience higher degrees of legitimacy threat and women to experience higher degrees of devaluation threat. Higher degrees of these social identity threats should, in turn, lead to a negative effect on individuals of the majority gender. However, if such interventions only change the perceived gender representation to some degree but do not reverse it, we would not expect such counter-stereotypical interventions to elicit social identity threats and would thus expect no effect on the majority gender.

*Research Question 2. Do interventions that counter occupational stereotypes to attract men to female-dominated occupations affect women's applications for those female-dominated occupations?*

## **DATA**

To empirically test our hypotheses and answer our open research questions, we face two important requirements for an empirical setting. First, we need to be able to randomly provide brief interventions that counter occupational stereotypes to adolescents who are in the process of choosing an occupation. Second, for both adolescents who received the intervention and those who did not, we need to be able to gather a valid and reliable measure for occupational choices. Such a measure should thus come from a real-world setting rather than from a hypothetical one and be unconfounded by both employers' recruiting decisions and individuals' prior job experiences.

An ideal setting fulfilling both of these requirements is provided by Switzerland's vocational education and training (VET) system. In this setting, adolescents choose their training occupation right after compulsory school (at about age 15 to 16), thus representing their first occupational choice. To get an apprenticeship training position in a specific occupation, adolescents have to apply at the firm of their choice. To do so, most adolescents consult online job boards to obtain information about the different occupations and apply for apprenticeship positions. Collaborating with Yousty, the largest private apprenticeship job board within Switzerland's VET system, allowed us to (a) randomize counter-stereotypical interventions and (b) analyze process-generated job application data. This job application data reveals adolescents' true occupational preferences, which are not yet confounded by firms' hiring decisions. In this section, we provide background information on Switzerland's VET system and describe the apprenticeship job board Yousty.

## **Institutional Setting**

In Switzerland, after nine years of compulsory schooling, students choose between two main types of upper secondary education: (1) VET in dual apprenticeship programs, which involves a transition from school into the labor market at about age 15 or 16 and (2) Baccalaureate Schools (*Gymnasium*), which prepare for transitioning into academic education in universities. The vast majority of Swiss adolescents (roughly 70%) enter the labor market right after compulsory schooling by opting for VET, in which they can choose from over 200 training occupations. Such dual apprenticeship programs last three to four years and start with an application for apprenticeship positions that are offered by firms. These VET programs combine an on-the-job apprenticeship (3.5 to 4 weekdays) at a firm that offers apprenticeships (a “training firm”) with formal education at a vocational school (1 to 1.5 weekdays). The application process and thus the choice of a “training occupation” typically starts when students are in eighth or ninth grade (i.e., in the last two years before graduation, ages 14-15). In eighth grade, schools require students to apply for and complete short-term internships called “trial apprenticeships” (Hofmann & Neuenschwander, 2021), which typically last five days and allow students to learn about a specific occupation and a specific training firm.

Following this trial apprenticeship period, the majority of students apply for regular three- to four-year apprenticeships in ninth grade. Once one of the firms they applied to offers them an apprenticeship contract, they are automatically enrolled in the corresponding vocational school, with these vocational schools being free of charge.

The application process for a trial apprenticeship and for a regular apprenticeship position is very similar to a job application of adult workers for regular jobs. Adolescents typically search on online job boards for apprenticeship positions in the particular occupations they are interested in

and often apply online by uploading their application documents: a cover letter, a curriculum vitae, and school transcripts (Granato, 2013; Tschümperlin, 2022). These applications that adolescents send via online job boards are the outcome of interest in our field experiment. Afterwards, as in any other hiring decision, firms review the applications, invite selected students for job interviews, and choose the most suitable candidate(s). As the firms' answers reach students only later, the applications we use as our outcome measure are unconfounded by firms' hiring decisions and thus go beyond realized occupational choices.

### **The Apprenticeship Job Board “Yousty”**

To conduct our field experiment, we collaborated with the apprenticeship job board “Yousty”. Founded in 2009, Yousty has become the largest private online job board for apprenticeship positions in Switzerland, covering approximately 90 percent of all online job ads for apprenticeship positions and trial apprenticeships. For the majority of job ads posted on Yousty (about 70 percent), adolescents can apply directly on the job board via a standardized application form.

Yousty not only posts job ads but also offers youth-oriented information about the more than 200 training occupations (e.g., video clips in which current apprentices present their training occupation and training firm), application advice (e.g, how to write a motivation letter), and templates for application documents. While firms pay to advertise their apprenticeship positions, adolescents use Yousty for free.

## **METHOD**

### **Field Experiment Design**

*Development.* We developed two versions, one for adolescent women and one for adolescent men, of a brief counter-stereotypical intervention in collaboration with Yousty. The version for women focuses on typically male STEM occupations and the version for men on typically female

health and care occupations, with both versions countering gender stereotypes in those occupations and thus focusing on the devaluation threat potentially occurring within the job. We developed the contents of the treatments in four steps: First, to identify possible content that might encourage gender-atypical choices, we drew on the literature on nudging and information treatments in education (Baker et al., 2018; O’Hara & Sparrow, 2019), the literature on the importance of role models for counter-stereotypical career choice (e.g., Porter & Serra, 2020), and the literature on counter-stereotypical reframing of STEM careers (e.g., Diekman et al., 2011).

Second, to evaluate the relevance of the conclusions that we drew from (a) previous studies and (b) different interventions for our particular target group of young adolescents, we used focus groups from this target group. Seeking feedback on different versions of possible interventions, we led focus group discussions with five groups of students aged 12-to-15 years (grades six through eight) who had not yet entered VET. Third, we used the results from the focus group discussions to revise the design of the interventions and refine them together with Yousty, whose staff also has extensive experience in designing content that appeals to adolescents. Fourth, to optimize the revised interventions, we again presented them to a focus group of adolescent students before finalizing the treatments. Yousty’s staff also formally edited the interventions to fit within Yousty’s corporate design to ensure that adolescents receiving an intervention on the job board during our experiment considered it a regular element of the job board.

**Content.** Figures A1 and A2 in Appendix A show the content of the brief counter-stereotypical interventions. These interventions were provided via pop-up windows on Yousty’s job board. They consist of a picture, a short 40-second informational video, a short informational text, and a list of occupations. Specifically, the STEM treatment contains a picture of a female apprentice working with a colleague while operating computer-assisted machinery in a STEM occupation (i.e., a

counter-stereotypical role model) and a short text highlighting the importance of team player skills and working diligently in STEM occupations, two aspects that are typically important to female applicants (i.e., using counter-stereotypical framing within the job context). In addition, the STEM treatment includes a 40-second informational video showing real scenes from the daily life of students working in STEM occupations,<sup>3</sup> and a list of seven of the largest apprenticeship occupations in STEM as specific examples facilitating a clear visualization of specific options.

Similarly, the health and care treatment contains a picture of a male apprentice working with a patient at a healthcare facility (i.e., a counter-stereotypical role model) and a short text highlighting career opportunities and the challenging aspect of health and care occupations, two aspects that are typically important for male applicants (i.e., using counter-stereotypical framing within the job context). The 40-second informational video shows real scenes from the daily life of students working in health and care occupations, and a list of the seven largest apprenticeship occupations in health and care.

***Timeline.*** The field experiment was running throughout the entire academic year 2021/2022 (i.e., September 2021 through July 2022) in the German part of Switzerland, which constitutes two-thirds of the Swiss population.

***Randomization.*** To randomize all adolescents who were registered on the job board (at the time during which our experiment ran) into the treatment and control groups, we used the last two digits of Yousty's unique user ID. Given that Yousty allocates this ID to adolescent users purely according to the timing of a user's first registration, the last two digits are as good as random and thus constitute an ideal randomization instrument. We randomly assigned all registered users to

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<sup>3</sup> The scenes shown in the short videos again focus on counter-stereotypical role models and counter-stereotypical reframing of STEM occupations (intervention 1) or health and care occupations (intervention 2).

three almost equally sized groups:<sup>4</sup> the STEM treatment group, the health and care treatment group, or the control group, who received no pop-up window.

To (a) ensure the same treatment intensity across users, (b) focus the experiment on adolescents that are right in the process of informing themselves about apprenticeship occupations, and (c) meet Yousty’s requirement of ensuring a good user experience, we sent the treatment only to users who fulfilled four conditions. Users must (1) be logged in to their Yousty account, (2) visit an informational subpage on Yousty (i.e., any subpage providing application tips and templates or information on any VET occupation), (3) use Yousty from a desktop rather than a mobile device (to ensure the pop-up windows are displayed properly), and (4) remain on one of these subpages for at least 10 seconds. We technically ensured that every user receives the pop-up treatment only once to avoid any differences in treatment intensity.

Our analyses include all users within the typical age range of first applications for potential apprenticeships (ages 13 to 16) and for whom we observe at least one real apprenticeship application (our outcome measure) during the period of the experiment. In total, our sample thus comprises  $N = 29,481$  adolescents participating in our field experiment.

Figure 1 summarizes the randomization and assignment to treatment and control groups.<sup>5</sup>

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Insert Figure 1 about here  
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<sup>4</sup> To ensure that the two treatment groups have equal sampling size, we assigned 33 percent of Yousty users to the STEM treatment group, 33 percent to the health and care treatment group, and 34 percent to the control group.

<sup>5</sup> Yousty has assigned these user IDs consecutively since 2009. Because our experiment focuses only on adolescents searching for apprenticeships during the period of the experiment in the academic year 2021/2022, the number of participants is naturally much smaller than the overall number of registered users. However, we use the full number of registered user that are in the application cohorts in the academic year 2021/2022.

## Outcome Measures

Our outcome of interest is the occupational choice of apprenticeship applicants as measured by their submitted applications. The application data we use comprises the entire universe of process-generated data during the intervention period.

Specifically, to measure the effect of having received the STEM treatment on the occupational choices of women, we use the fraction of STEM applications among all applications an applicant sent out to firms via the job board during the intervention period. For example, if a female adolescent sent four applications—two for an IT specialist position (a STEM occupation) and two for an office clerk position (a non-STEM occupation)—her STEM outcome measure has the value 0.5.<sup>6</sup> To measure the effect of having received the health and care treatment on occupational choices of men, we use the fraction of health and care applications among all applications a male adolescent sent out.<sup>7</sup>

## Analytic Strategy

As we have separate interventions and hypotheses for male and female participants, we estimate all effects separately for women and men. Because of the special feature of our randomization design, in which only about 20 percent of the selected treatment groups actually received the assigned treatments because they had to fulfill four additional requirements (step 4 in Figure 4), we use two-stage least-squares (2SLS) regression (Cunningham, 2021; Maydeu-Olivares et al., 2019; Wooldridge, 2010) instead of ordinary least squares (OLS) regression or analysis of variance (ANOVA) to avoid possible biases due to these additional requirements. We use the 2SLS method

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<sup>6</sup> Our outcome measure of STEM occupations includes not only the STEM occupations shown in the STEM treatment but also all occupations that start with the one-digit code 3 in the Swiss Standard Classification of Occupations (SBN2000). This SBN2000 code includes all occupations classified as “Technical and IT occupations.”

<sup>7</sup> Because we want to evaluate the effect of the treatments on subsequent applications, we only consider applications that treatment group members created *after* receiving the treatment.

because it is common in the policy intervention literature whenever not everyone assigned to an intervention actually received one (e.g., Muralidharan & Sundararaman, 2015; Schwerdt et al., 2012). Specifically, we estimate a 2SLS model with the random treatment group assignment as an instrument for having actually received the STEM or the health and care treatment. The resulting second-stage estimate is an unbiased estimate for the average effect of having received the STEM or health and care intervention on occupational choice for assigned treatment group members who actually received the intervention.

To test our hypotheses, we estimate the following 2SLS model:<sup>8</sup>

$$\begin{aligned}
 \text{First Stages} \quad T_i^{STEM} &= \pi_{10} + \pi_{11}Z_i^{STEM} + \pi_{12}Z_i^{Health} + \pi_{13}X_i + \mu_{1i} \\
 T_i^{Health} &= \pi_{20} + \pi_{21}Z_i^{STEM} + \pi_{22}Z_i^{Health} + \pi_{23}X_i + \mu_{2i} \\
 \text{Second Stage} \quad Y_i &= \beta_0 + \beta_1\hat{T}_i^{STEM} + \beta_2\hat{T}_i^{Health} + \beta_3X_i + \varepsilon_i
 \end{aligned}$$

where  $T_i$  is an indicator for whether adolescent  $i$  actually received the STEM or health and care intervention (step 4 in Figure 1) and  $Z_i$  is an indicator for whether adolescent  $i$  was assigned to the STEM or health and care treatment group (step 3 in Figure 1).  $X_i$  represents a vector of individual and application characteristics (including age and a dummy each for rural regions, for whether an adolescent applied for at least one trial apprenticeship, for whether an adolescent has any search subscriptions on Yousty, for an adolescent's school track in lower secondary school, and for whether an adolescent completed Yousty's interest test<sup>9</sup>).  $Y_i$  is the dependent variable for adolescent  $i$  (the share of STEM applications or the share of health and care occupations).  $\hat{T}_i$  is the

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<sup>8</sup> Our results remain robust when we estimate a model where we exclude women assigned to the health and care treatment group and men assigned to the STEM treatment group, that is, adolescents who received a treatment targeted at the opposite gender (results available upon request).

<sup>9</sup> Yousty offers an interest test on their job board that contains 33 questions. After filling out the interest test, the adolescents receive recommendations for occupations.

predicted probability that adolescent  $i$  received the STEM or health and care intervention resulting from the first stages.

## RESULTS

We present the results of the main intervention effects in the first subsection (for women, hypothesis 1) and the second subsection (for men, hypothesis 2). Afterwards, in the third subsection we present further analyses in which we distinguish different types of apprenticeship positions (trial apprenticeships versus regular apprenticeships) and, in the fourth subsection, we present additional analyses on potential unintended side effects of the treatments on the majority gender. Furthermore, in the fifth subsection we provide additional supportive evidence from a supplementary survey to better understand the underlying mechanisms and to check the plausibility of our theoretical explanations compared to potential alternative explanations.

### **STEM Intervention Effects on Women's Occupational Choice**

Column 2 of Table 1 shows the second-stage estimate of the effect of having received the counter-stereotypical STEM intervention on women's applications for STEM occupations (i.e., the fraction of STEM applications in all applications a woman sent). The coefficient of 0.059 is positive and statistically significant ( $b = 0.059$ ,  $SE = 0.029$ ,  $p = 0.041$ ). Having received the counter-stereotypical STEM intervention led to a 5.9 percentage point increase in women's fraction of STEM applications compared to women who have not received the intervention. Given that the average percentage of STEM applications out of all applications a woman sent is only 9.9 percent, the 5.9 percentage point increase corresponds to a 63 percent and thus a substantial increase in women's applications for STEM occupations. This result is consistent with our Hypothesis 1 that interventions portraying counter-stereotypical role models inside male-dominated occupations will increase women's applications for male-dominated occupations.

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Insert Table 1 about here  
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### **Health and Care Intervention Effects on Men's Occupational Choice**

Column 2 of Table 2 shows the second-stage estimate of the effect of having received the counter-stereotypical health and care intervention on men's applications for health and care occupations (i.e., the share of health and care applications out of all applications a man sent). The coefficient of -0.017 is small and not statistically significant ( $b = -0.017$ ,  $SE = 0.016$ ,  $p = 0.281$ ). Thus having received the counter-stereotypical health and care intervention did not significantly impact men's applications for health and care occupations compared to men who have not received the intervention. This result is consistent with our Hypothesis 2 that interventions that portray counter-stereotypical role models inside female-dominated occupations do not significantly increase men's applications for female-dominated occupations.

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Insert Table 2 about here  
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### **Analysis by Type of Application**

Users of Yousty's job board can apply for both trial apprenticeship positions (i.e., short-term internships designed to introduce individuals to a specific occupation and training firm, taking place in early stages of the occupational choice process) and regular apprenticeship positions (i.e., multi-year training programs). Because these two application types take place at different stages of the occupational choice process (see subsection on the *institutional setting*), we analyze whether the intervention effects differ by application type. To empirically test the strength of the intervention effects by application type, we estimate our model, described in the section on the *analytic strategy*, separately for trial apprenticeships and regular apprenticeships.

The 2SLS results in Table 3 show the results for women. While the effect of having received the counter-stereotypical STEM intervention is positive and significant for early-stage STEM applications ( $b = 0.095$ ,  $SE = 0.035$ ,  $p = 0.007$ ), it is very small and insignificant for later-stage STEM applications ( $b = -0.001$ ,  $SE = 0.033$ ,  $p = 0.970$ ). This result suggests that the effect of an intervention that counters occupational stereotypes is stronger for women in earlier stages of their occupational choice process.

In contrast, Table 4 shows that, for men, the effect of having received the counter-stereotypical health and care intervention is insignificant for both early- and later-stage health and care applications. Thus, our theoretical expectation that interventions that counter occupational stereotypes in female-dominated occupations do not increase men's applications for those occupations (hypothesis 2) holds independent of whether men are in the early stages of their occupational choice process (i.e., applying for trial apprenticeships) or in the later stages (i.e., applying for regular apprenticeships).

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Insert Table 3 about here  
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Insert Table 4 about here  
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### **Side Effects of Countering Stereotypical Information on the Majority Gender Group**

To test for any potential unintended side effects of our interventions on the majority gender (research questions 1 and 2), we use the same estimation strategy as with our Hypotheses 1 and 2. However, in this case we analyze the effect of having received a health and care treatment on

health and care applications for women and the effect of having received a STEM treatment on STEM applications for men.

The 2SLS results in Tables 5 and 6 show that men who received a brief intervention featuring female role models and counter-stereotypical framing of STEM occupations applied neither significantly less nor significantly more frequently for STEM occupations ( $b = 0.004$ ,  $SE = 0.036$ ). Likewise, women who received a brief intervention featuring female role models and counter-stereotypical framing of health and care occupations applied neither significantly less nor significantly more frequently for health and care occupations ( $b = 0.035$ ,  $SE = 0.047$ ). These results suggest that brief counter-stereotypical interventions do not change the application behavior of the majority gender group and therefore do not have unintended side effects. These types of interventions thus have the potential to increase the overall efficiency of job ads by attracting more potential applicants from the minority gender group while not discouraging applications from the majority gender group.

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Insert Table 5 about here  
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Insert Table 6 about here  
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### **Mechanisms**

This section presents additional supportive evidence to better understand the mechanisms underlying our intervention effects. Specifically, we use supplementary survey data to empirically test our theoretical explanation that women and men face different identity threat-related barriers when considering applying for gender-atypical occupations. The section also provides a discussion

of alternative explanations, such as differences in prestige and earnings between male- and female-dominated occupations.

We collected survey data on 146 students in the age range of preparing an apprenticeship application in the foreseeable future (students from eleven lower-secondary school classes in the German part of Switzerland, grades 7 through 9). The students were exposed to descriptions of one male-dominated apprenticeship position (for an IT specialist) and one female-dominated apprenticeship position (for a nurse).

The description for the IT specialist position was framed as follows: "Imagine seeing an apprenticeship offer as an IT specialist in an attractive firm near you. In this occupation, you will be programming software, setting up IT systems for firms, and troubleshooting technical issues. The firm presents itself as an attractive employer, emphasizing outstanding team spirit and nurturing the professional and personal development of its apprentices." The nurse position was framed as follows: "Imagine seeing an apprenticeship offer as a nurse at an attractive hospital near you. In this occupation, you will be caring for and looking after people and taking on additional tasks in the areas of nursing, nutrition, and administration. The hospital presents itself as an attractive employer, emphasizing outstanding team spirit and nurturing the professional and personal development of its apprentices."

After reading the description of the position, the students had to rate their perceptions of the devaluation threat and the legitimacy threat for this position. In addition, the survey included questions exploring students' general level of interest, intention to apply, and perceptions of the prestige and wages associated with the respective occupations.

***Gender differences in devaluation threat.*** To measure devaluation threat, we used five items from He and Kang (2021) that we translated into German and adapted to fit our context of

adolescents applying for apprenticeship positions: “I would be seen as a good fit for the apprenticeship by the firm,” “I would be viewed positively for this apprenticeship by the firm,” “I would receive this apprenticeship if I applied for it,” “I am qualified for this apprenticeship,” “My application for the apprenticeship would be appreciated by the firm.” The items were recoded so that higher values indicate higher devaluation threat. The scale ranged from 1 to 7 (Cronbach’s  $\alpha = .91$ ).

The first row in Table 7 shows our t-test results for the devaluation threat. We find that the devaluation threat is significantly higher for girls than for boys. This finding suggests that girls who consider applying for a male-typical IT position are more likely to experience a devaluation threat related to the work context than boys who consider applying for a female-typical health and care position.<sup>10</sup>

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Insert Table 7 about here  
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***Gender differences in legitimacy threat.*** To measure legitimacy threat, we used four items developed by Leavitt et al. (2022) that we translated into German and adapted to fit our context of adolescents applying for apprenticeship positions:<sup>11</sup> “As an IT specialist / a nurse I would feel like less of a (wo)man,” “I wish for an occupation that is more feminine / masculine,” “My friends

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<sup>10</sup> To ensure that these results are not driven by an overall lower level of confidence among girls compared to boys (e.g., that girls are less likely than boys to think that they are a good fit for any apprenticeship), we conducted an additional analysis in which we kept the confidence level constant by comparing only the difference of the differences between the gender-atypical and gender-typical position for both girls and boys. That is, we make a within-gender comparison of girls or boys who consider gender-typical versus gender-atypical positions to cancel out the general gender difference in confidence. The difference in devaluation threat between the two positions is significantly higher for girls, suggesting that the gender differences in devaluation threat are not driven by girls being generally less confident than boys (see Table B3 in Appendix B).

<sup>11</sup> Specifically, we adapted the item «I have experienced gender-based ridicule from my coworkers» (Leavitt et al., 2022) to capture gender-based ridicule from friends and family, as (a) the adolescents in our sample do not yet have any work experience, and (b) this matches our conceptualization of legitimacy threat.

would ridicule me if I applied for this apprenticeship,” “My family would ridicule me if I applied for this apprenticeship.” The scale ranged from 1 to 7 (Cronbach’s  $\alpha = .65$ ).

The second row in Table 7 shows our t-test results for the legitimacy threat. We find that the legitimacy threat is significantly higher for boys than for girls. This suggests that boys who consider applying for a female-typical health and care position are more likely to experience legitimacy threat outside their work environment than girls who consider applying for a male-typical IT position.

***Prestige as an alternative explanation.*** One alternative explanation for our finding that our intervention works for women but not for men are potential differences in the occupational prestige of male-dominated occupations compared to female-dominated occupations, i.e., that men would not switch from male-dominated to female-dominated occupations because of their lower prestige. In contrast, if female-dominated occupations are generally lower in prestige, women could be willing to switch to male-dominated occupations to gain in prestige. Therefore, we also asked survey questions on the importance of prestige for occupational choice.

Our results indicate that, in choosing an occupation, occupational prestige is indeed a more important topic for boys than for girls.<sup>12</sup> However, neither boys nor girls perceived the male-dominated position of an IT specialist as having significantly higher prestige than the female-dominated position of a nurse.<sup>13</sup> Consequently, differences in prestige are unlikely to explain the gender difference in the intervention effect. Our findings on the prestige of occupations are also

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<sup>12</sup> The importance of prestige for occupational choice was measured on a scale from 1 to 7 with the item “It is important to me that my future occupation is considered prestigious by others.” The difference between boys (mean = 5.169) and girls (mean = 4.097) was -1.072 ( $p < 0.001$ ).

<sup>13</sup> Perceived prestige was measured on a scale from 1 to 7 with the item “I believe that the occupation *IT specialist / nurse* is prestigious.” The difference in perceived prestige between the position of an IT specialist (mean = 4.342) and the position of a nurse (mean = 4.123) was -0.219 ( $p = 0.224$ ).

consistent with other literature on occupational prestige within VET occupations in Switzerland. Studies by Abrassart and Wolter (2020) and Joye et al. (2023) indicate no consistent pattern of male-dominated occupations being ranked as more prestigious than female-dominated ones within VET occupations. Indeed, Joye et al. (2023, p. 10) note that "gender hardly contributes to explaining the grade assigned for prestige." Given these insights, differences in occupational prestige are unlikely to explain why we found an intervention effect for women but not for men.

***Earnings as an alternative explanation.*** Another alternative explanation from the perspective of economic theory is that men would not switch to female-dominated occupations due to differences in earnings between female- and male-dominated occupations. To test whether systematic differences in earnings explain the differences in the intervention effects, we conduct a robustness check by merging expected earnings in each occupation to our field experimental data. In so doing, we use the average earnings from the Social Protection and Labour Market (SESAM) survey, a representative administrative wage data set, from 2005-2015. Again, we find that differences in earnings do not explain our results. Although our supplementary survey indicates that (a) earnings are more important to boys than to girls in choosing their occupation, and (b) students perceive the position of IT specialist as being significantly better paid than that of nurse,<sup>14</sup> we find that when we control for actual differences in expected earnings in the given occupations in our field experimental data, our intervention effects remain robust. Therefore, expected earnings

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<sup>14</sup> The importance of earnings for occupational choice was measured on a scale from 1 to 7 with the item "It is important to me that my future occupation offers a good salary." The difference between boys (mean = 5.687) and girls (mean = 5.161) was -0.525 (p = 0.025). Perceived earnings was measured on a scale from 1 to 7 with the item "I believe that the occupation *IT specialist/nurse* is well paid." The difference in perceived earnings between the position of an IT specialist (mean = 4.712) and the position of a nurse (mean = 3.918) was 0.795 (p < 0.001).

differences cannot fully explain the differences in occupational choices that we observe (see Tables B4 and B5 in Appendix B).

## **DISCUSSION**

The goal of this paper was to examine whether brief interventions that counter occupational stereotypes are effective in encouraging gender-atypical occupational choices and, if so, whether the same intervention strategies work for both women and men. In a large-scale field experiment with young women and men choosing their occupations and applying for their first jobs, we found that women who received a brief intervention countering occupational stereotypes applied more frequently for STEM occupations after the intervention. In contrast, an equivalent intervention on health and care occupations, targeting men, showed no significant effects on men's applications. Our findings also revealed that these brief interventions did not have any significant side effects on the majority gender group. In other words, men who received a brief intervention featuring female role models and counter-stereotypical framing of STEM occupations applied neither less nor more frequently for STEM jobs, with the same holding true for women who received an intervention on health and care occupations, targeting men. In addition, we found that, for women, the intervention effects differ by the stage of the occupational choice process, with brief interventions being more effective in earlier stages than in later stages of the occupational choice process.

### **Implications for Theory and Future Research**

Our study advances the management literature on gender and occupational choice in three key ways. First, this literature has predominantly focused on ways of breaking down the barriers that women face in male-dominated domains (e.g., Akinola et al., 2017; Brands & Mehra, 2018; Del Carpio & Guadalupe, 2021; He & Kang, 2021), while remaining largely silent on ways of breaking

down possible barriers that men face in female-dominated domains—often implicitly assuming that intervention mechanisms work equally well for women and men. Our research contributes to this literature by systematically comparing how strategies for raising women’s or men’s interest in gender-atypical occupations affect both women’s and men’s occupational choices. By integrating social role theory with social identity threat theories, we theorize and show that the effectiveness of interventions that counter occupational stereotypes—such as the widely employed intervention strategies of portraying counter-stereotypical role models within the work context—differs substantially between women and men.

Our results suggest that women and men face different barriers to entering gender-atypical occupations, with the result that intervention strategies that work for women do not necessarily work for men. Based on our theoretical framework, we argue that men shy away from female-dominated occupations mainly due to legitimacy threat (i.e., identity threat outside the work context such as social pressure and the fear of being ridiculed by others) while women shy away from male-dominated occupations mainly due to devaluation threat (i.e., identity threat within the work context such as the fear of being regarded as unsuitable for an occupation). Thus interventions that aim at countering men’s gendered occupational choices need to specifically tackle barriers related to legitimacy threat (e.g., by including friends and family in intervention efforts).

Second, our findings contribute to the discussion on using interventions to reduce occupational gender segregation by showing that brief interventions of only a few seconds can change real-life job application behavior of women. Given that gender norms and stereotypes are typically very persistent (Gruneau, 2022; Janssen, Tuor Sartore, & Backes-Gellner, 2016), this finding is noteworthy. It demonstrates that the supply-side of occupational gender segregation (i.e., gender

differences in individuals' occupational choices) can be mitigated not only with long-term campaigns aimed at changing social norms but also with simple nudges in firms' job ads—at least for women's occupational choices.

This conclusion is in line with studies on the design of job ads and brief interventions for encouraging women to apply for jobs in male-dominated domains (e.g., Del Carpio & Fujiwara, 2023; Gaucher, Friesen, & Kay, 2011; Wille & Derous, 2018). Most closely related to our study is Del Carpio and Guadalupe (2021), who find that simple informational nudges can be successful in increasing women's applications to a five-month software-coding program in Mexico and Peru and who conclude that nudges can help change occupational gender segregation. Our research substantially adds to these studies by showing that these findings on the effectiveness of brief interventions for women's occupational choices do not apply to interventions to counter gendered occupational choices of men.

Third, we add to the literature on gender and occupational choice by investigating potential unintended side effects of brief counter-stereotypical interventions on the gender majority in that occupation. Even though, in real life, interventions and campaigns are rarely seen by only one gender, the question of side effects on the majority group has received little attention in the literature and in public discussions thus far (with the exception of Delfino, 2024, on social workers). Our analyses show that brief counter-stereotypical interventions targeting the gender minority (e.g., STEM interventions targeting women and health and care interventions targeting men) do not affect the job application behavior of the gender majority (e.g., STEM job applications from men or health and care job applications from women). Together with our main finding, this specific finding suggests that brief counter-stereotypical interventions can help increase women's

applications for male-dominated occupations while not decreasing men's applications for those same occupations.

### **Implications for Practice**

Our research offers practical implications in a world in which reducing gender inequality remains a significant issue, with recent discussions raising awareness that gender inequality negatively affects not only women but also men (e.g., Kotsonis & Chakrabarti, 2022). For women, our research—along with prior theory and research—suggests that countering occupational stereotypes with strategies such as portraying counter-stereotypical role models and counter-stereotypically reframing male-dominated occupations is effective for encouraging women to apply for male-dominated occupations. Firms can employ these strategies in job postings and on job boards to signal that (a) they value women working in male-dominated occupations, (b) women can be successful in these occupations, and (c) communal skills (e.g., being a team player) are both necessary and valuable in these occupations. For example, firms can do so by including pictures of female professionals and emphasizing the communal aspects of a male-dominated occupation (e.g., teamwork). Professional associations and policymakers can likewise employ these strategies in campaigns and informational interventions.

Our finding that brief counter-stereotypical interventions (i.e., under one minute) can be effective suggests that they do not necessarily need to be time-intensive or costly. Moreover, we find that counter-stereotypical interventions are effective at the earlier stages of the occupational choice process, i.e., for choices such as short-term internships or trial apprenticeships, and can thus help reduce entry barriers to gender-atypical occupations. This finding suggests that firms and professional associations should offer opportunities such as short-term internships for women to learn more about and try out male-dominated occupations at early occupational choice stages.

Our results for men, however, have different implications. For men, our findings imply that firms, professional associations, and policymakers should not expect strategies that are effective in encouraging women to apply for male-dominated occupations to be equally effective in encouraging men to apply for female-dominated occupations. For women, more than three decades of research, campaigns, and programs on overcoming women's barriers to male-dominated domains have led to researchers' and practitioners' current knowledge about what kinds of strategies and interventions are effective. In contrast, neither researchers nor policymakers have paid much attention to strategies for overcoming men's barriers to female-dominated domains.

Our research, along with a very small but emergent stream of literature on men in female-dominated occupations (Delfino, 2024; Forsman & Barth, 2017), points to the conclusion that men face different barriers to entering gender-atypical occupations than women. As a result, different approaches—such as including friends and family in intervention efforts in the short run and gradually changing societal masculinity norms in the long run—are necessary for encouraging men's interest in female-dominated occupations. If firms and policymakers rely exclusively on the strategies that stem from decades of research on women in male-dominated domains, they may inadvertently slow advancement toward full gender equality in the workplace.

### **Limitations and Future Directions**

Our research has limitations, many of which offer promising directions for future research. First, while our research offers specific implications on strategies for raising women's interest in male-dominated occupations, which specific types of strategies can help raise men's interest in female-dominated occupations remains an unanswered question that future research needs to take up.

Second, we offer a theoretical explanation based on social identity threats for why the effectiveness of counter-stereotypical interventions differs by gender and provide survey evidence showing gender differences in these threats. However, future studies need to test these mechanisms on a larger scale and further investigate the construct validity of the two types of identity threats.

Third, our results show that counter-stereotypical interventions increase women's applications for short internship positions in gender-atypical occupations, positions that (a) allow students to become acquainted with an occupation and a training firm and (b) take place in the early stages of the occupational choice process. While the intervention in our field experiment did not directly increase women's applications to later-stage (e.g., three- to four-year) apprenticeships in gender-atypical occupations, women's participation in a short internship in such occupations can potentially lead to a career in gender-atypical occupations in the long run. Indeed, longitudinal studies from Switzerland show that the occupations students explore during these short internships strongly predict the occupations they later pursue (e.g., Hofmann & Neuenschwander, 2021). Therefore, studying in detail both the long-term effects of counter-stereotypical interventions and the factors that encourage young people to remain in gender-atypical occupations presents a promising avenue for future research.

Fourth, we conducted our field experiment in Switzerland, a country with a strong vocational education and training system, in which most individuals decide on an occupation at a young age (about 15 years). Although our theory and hypotheses are in no way restricted to Switzerland, future research could explore how our findings generalize to other countries and career decisions that individuals take in later stages of life (e.g., students' first job choices after college graduation or adults' occupational choices when changing jobs).

Fifth, while our field experimental data did not allow us to identify gender nonbinary or gender fluid individuals, exploring the barriers that these individuals face to entering male-dominated or female-dominated occupations is important for further research. In addition, new studies can explore how strategies such as portraying role models are effective for these individuals and whether and, if so, how such strategies need to be adapted.

## **Conclusions**

While both firms and policymakers strive to attract women and men to gender-atypical occupations, little is known about whether brief interventions are effective in changing real-life occupational choices and, if so, whether the same intervention strategies work for both women and men. Our findings suggest that brief interventions countering occupational stereotypes by portraying counter-stereotypical role models and employing counter-stereotypical reframing of male-dominated occupations are effective at increasing women's applications for male-dominated occupations. However, our findings also suggest that the effectiveness of these strategies—which are based on decades of research on women in male-dominated domains—cannot be generalized to men in female-dominated domains. Our research points to the need for new research avenues and for firms and policymakers to not only continue focusing on and investing in policies, interventions, and research targeted at attracting women to male-dominated occupations but also to increasingly research and design interventions for encouraging men to consider female-dominated occupations in high-growth sectors such as health and care.

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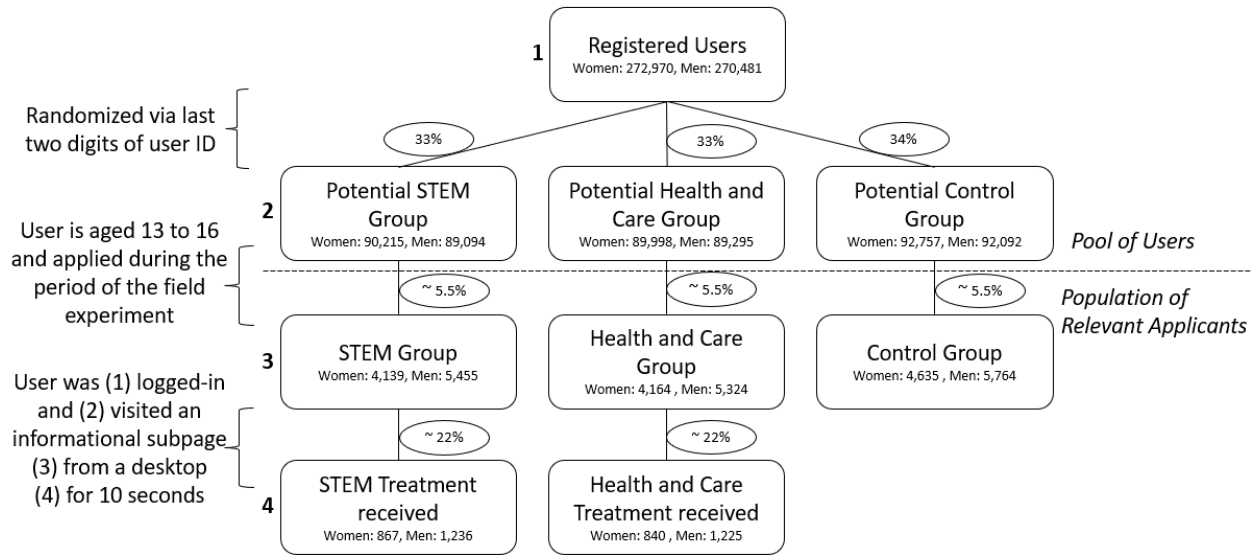
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**Figure 1: Randomization and assignment to treatment and control groups**



**Table 1: STEM treatment effects on women’s applications for STEM occupations**

Variable	(1) 1 <sup>st</sup> stage	(2) reduced form	(2) 2 <sup>nd</sup> stage
STEM treatment received		0.012** (0.006)	0.059** (0.029)
Health treatment received		0.007 (0.006)	0.035 (0.029)
STEM treatment group	0.210*** (0.006)		
Health treatment group	0.202*** (0.006)		
Controls	Yes	Yes	Yes
<i>N</i>	12938	12938	12938

*Notes:* 2SLS regression. Robust standard errors are reported in parentheses. The dependent variable is the fraction of STEM applications in all applications an individual sent. The 1<sup>st</sup> stage coefficient (0.209) shows the rate of women who actually received the STEM treatment out of all women assigned to the STEM treatment. The reduced form coefficient (0.012) shows the average effect of being assigned to the STEM treatment group on applying for STEM occupations. The 2<sup>nd</sup> stage coefficient (0.059) shows the unbiased estimate for the average effect of having received the STEM treatment on applying for STEM occupations for assigned treatment group members who actually received the STEM treatment. We provide a table including the coefficients of all the control variables in Appendix B, Table B1 \*\*\* p < 0.01, \*\* p < 0.05, \* p < 0.10.

**Table 2: Health and care treatment effects on men’s applications for health and care occupations**

Variable	(1) 1 <sup>st</sup> stage	(2) reduced form	(2) 2 <sup>nd</sup> stage
Health and care treatment received		-0.004 (0.004)	-0.017 (0.016)
STEM treatment received		-0.005 (0.004)	-0.022 (0.016)
Health and care treatment group	0.231*** (0.006)		
STEM treatment group	0.227*** (.006)		
Controls	Yes	Yes	Yes
<i>N</i>	16543	16543	16543

*Notes:* 2SLS regression. Robust standard errors are reported in parentheses. The dependent variable is the share of health and care applications out of all applications an individual sent. The 1<sup>st</sup> stage coefficient (0.231) shows the rate of men who actually received the health and care treatment out of all men assigned to the health and care treatment. The reduced form coefficient (-0.004) shows the average effect of being assigned to the health and care treatment group on applying for health and care occupations. The 2<sup>nd</sup> stage coefficient (-0.017) shows the unbiased estimate for the average effect of having received the health and care treatment on applying for health and care occupations for assigned treatment group members who actually received the health and care treatment. We provide a table including the coefficients of all the control variables in Appendix B, Table B2 \*\*\* p < 0.01, \*\* p < 0.05, \* p < 0.10.

**Table 3: STEM treatment effects on women’s early- versus later-stage applications for STEM occupations**

Variable	(1) DV: early-stage STEM applications	(2) DV: later-stage STEM applications
STEM treatment received	0.095*** (0.035)	-0.001 (0.033)
Health treatment received	0.036 (0.037)	-0.005 (0.033)
Controls	yes	yes
<i>N</i>	7885	7688

*Notes:* 2<sup>nd</sup> stage estimates of 2SLS regression. Robust standard errors are reported in parentheses. The dependent variables are (1) the fraction of early-stage STEM applications (i.e., short-term internships) in all early-stage applications an individual sent and (2) the fraction of later-stage STEM applications (i.e., 3- to 4-year training programs) in all later-stage applications an individual sent. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.10$ .

**Table 4: Health and care treatment effects on men’s early- versus later-stage applications for health and care occupations**

Variable	(1) DV: early-stage health and care applications	(2) DV: later-stage health and care applications
STEM treatment received	-0.012 (0.017)	0.000 (0.020)
Health treatment received	0.002 (0.018)	-0.027 (0.020)
Controls	yes	yes
<i>N</i>	10417	9769

*Notes:* 2<sup>nd</sup> stage estimates of 2SLS regression. Robust standard errors are reported in parentheses. The dependent variables are (1) the fraction of early-stage STEM applications (i.e., short-term internships) in all early-stage applications an individual sent and (2) the fraction of later-stage STEM applications (i.e., 3- to 4-year training programs) in all later-stage applications an individual sent. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.10$ .

**Table 5: STEM treatment effects on men's applications for STEM occupations**

	(1) 1 <sup>st</sup> stage	(2) reduced form	(2) 2 <sup>nd</sup> stage
STEM treatment received		0.001 (0.008)	0.004 (0.036)
Health and care treatment received		0.004 (0.008)	0.019 (0.036)
STEM treatment group	0.231*** (0.006)		
Health and care treatment group	0.227*** (.006)		
Controls	yes	yes	yes
<i>N</i>	16543	16543	16543

Notes: 2SLS regression. \*\*\* p < 0.01, \*\* p < 0.05, \* p < 0.10. Robust standard errors are reported in parentheses. The dependent variable is the fraction of STEM applications in all applications an adolescent sent.

**Table 6: Health and care treatment effects on women's applications for health and care occupations**

	(1) 1 <sup>st</sup> stage	(2) reduced form	(2) 2 <sup>nd</sup> stage
Health and care treatment received		0.007 (0.010)	0.035 (0.047)
STEM treatment received		-0.001 (0.009)	-0.007 (0.045)
Health and care treatment group	0.209*** (0.006)		
STEM treatment group	0.202*** (.006)		
controls	yes	yes	yes
<i>N</i>	12938	12938	12938

Notes: 2SLS regression. \*\*\* p < 0.01, \*\* p < 0.05, \* p < 0.10. Robust standard errors are reported in parentheses. The dependent variable is the share of STEM applications out of all applications an adolescent sent.

**Table 7: Gender differences in devaluation threat and legitimacy threat**

	Girls reacting to IT position	Boys reacting to health and care position	$\Delta$
<b>Devaluation Threat</b>	5.18 (0.16)	4.78 (0.15)	0.40** (0.25)
<b>Legitimacy Threat</b>	1.52 (0.10)	2.57 (0.12)	-1.05*** (0.17)
<i>N</i>	62	84	146

Notes: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.10$ . Standard errors are reported in parentheses.

## APPENDIX A: STEM and Health and Care Treatment

Community-Team von Yousty

**Technik- und Informatikberufe: Berufe für Teamplayer!**

Du bist teamfähig, sorgfältig, hast Freude an Technik und Computern?

Technik- und Informatikberufe

Technik- und Informatikberufe

Erfahre mehr und bewerbe dich bei Interesse:

- [Informatiker/in EFZ](#)
- [Elektroinstallateur/in EFZ](#)
- [Polymechaniker/in EFZ](#)
- [Automobil-Fachmann/-frau EFZ](#)
- [Automatiker/in EFZ](#)
- [Montage-Elektriker/in EFZ](#)
- [Konstrukteur/in EFZ](#)

STEM Occupations: Occupations for Teamplayers!

Are you a teamplayer, do you work diligently, and do you enjoy technology and computers?

STEM Occupations

Learn more and apply if interested:

- IT Specialist
- Electrician
- Mechanical Engineer
- Automotive Specialist
- Automation Specialist
- Assembly Electrician
- Design Engineer

Figure A1: STEM treatment (with English translation)

Community-Team von Yousty

**Karriere machen in Gesundheits- und Betreuungsberufen**

Du suchst Herausforderung, Vielseitigkeit, und gute Karrierechancen?

Gesundheits- und Betreuungsberufe

Gesundheits- und Betreuungsberufe

Erfahre mehr und bewerbe dich bei Interesse:

- [Fachmann/-frau Gesundheit EFZ](#)
- [Fachmann/-frau Betreuung EFZ](#)
- [Medizinische/r Praxisassistent/in EFZ](#)
- [Dentalassistent/in EFZ](#)
- [Pharma-Assistent/in EFZ](#)
- [Assistent/in Gesundheit und Soziales EBA](#)
- [Augenoptiker/in EFZ](#)

Climb the Career Ladder in Health and Care

Are you looking for challenge, versatility, and good career opportunities?

Health and Care Occupations

Learn more and apply if interested:

- Health Professional
- Care Professional
- Medical Practice Assistant
- Dental Assistant
- Pharmaceutical Assistant
- Health and Social Assistant
- Optician

Figure A2: Health and care treatment (with English translation)

**APPENDIX B: Supplemental Tables**

**Table B1: STEM treatment effects on women's applications for STEM occupations including controls**

Variable	(1) 1 <sup>st</sup> stage	(2) reduced form	(2) 2 <sup>nd</sup> stage
STEM treatment received		0.012** (0.006)	0.058** (0.029)
Health treatment received		0.007 (0.006)	0.035 (0.029)
STEM treatment group	0.210*** (0.006)		
Health treatment group	0.202*** (0.006)		
Age	-0.005** (0.003)	-0.014*** (0.003)	-0.014*** (0.003)
Rural	-0.018*** (0.005)	0.008 (0.008)	0.010 (0.008)
Trial apprenticeship	0.020*** (0.004)	0.047*** (0.005)	0.045*** (0.005)
Interest test	0.035*** (0.005)	0.007 (0.005)	0.004 (0.006)
Search subscriptions	0.044*** (0.010)	0.015 (0.011)	0.010 (0.011)
Higher school track	0.027*** (0.005)	0.039*** (0.007)	0.037*** (0.007)
Lower school track	0.024*** (0.005)	-0.031*** (0.006)	-0.033*** (0.006)
<i>N</i>	12938	12938	12938

*Notes:* 2SLS regression. Column (1) displays the first-stage coefficients of the control variables (age, rural, trial apprenticeship, interest test, search subscriptions, higher school track, lower school track) on having received the STEM treatment. Robust standard errors are reported in parentheses.

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

**Table B2: Health and care treatment effects on men's applications for health and care occupations including controls**

Variable	(1) 1 <sup>st</sup> stage	(2) reduced form	(2) 2 <sup>nd</sup> stage
Health and care treatment received		-0.004 (0.004)	-0.017 (0.016)
STEM treatment received		-0.005 (0.004)	-0.022 (0.016)
Health and care treatment group	0.231*** (0.006)		
STEM treatment group	0.227*** (0.006)		
Age	0.001 (0.002)	0.008*** (0.002)	0.008*** (0.002)
Rural	-0.013** (0.005)	-0.007* (0.004)	-0.008* (0.004)
Trial apprenticeship	0.025*** (0.004)	0.007* (0.003)	0.008** (0.003)
Interest test	0.032*** (0.004)	0.007** (0.003)	0.008** (0.003)
Search subscriptions	0.054*** (0.010)	0.001 (0.006)	0.003 (0.006)
Higher school track	0.029*** (0.005)	-0.022*** (0.004)	-0.021*** (0.004)
Lower school track	0.034*** (0.005)	-0.006 (0.004)	-0.004 (0.004)
<i>N</i>	16543	16543	16543

*Notes:* 2SLS regression. Column (1) displays the first-stage coefficients of the control variables (age, rural, trial apprenticeship, interest test, search subscriptions, higher school track, lower school track) on having received the health and care treatment. Robust standard errors are reported in parentheses.

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

**Table B3: Gender differences in devaluation threat (difference of the difference)**

	difference of girls reacting to IT versus health and care position	difference of boys reacting to health and care versus IT position	$\Delta$
<b>Devaluation Threat</b>	1.96 (0.21)	0.54 (0.22)	1.42*** (0.32)
<i>N</i>	62	84	146

Notes: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.10$ . Standard errors are reported in parentheses.

**Table B4: Robustness check for women's STEM treatment effects accounting for earnings**

Variable	(1) 1 <sup>st</sup> stage	(2) reduced form	(2) 2 <sup>nd</sup> stage
STEM treatment received		0.012** (0.006)	0.056** (0.028)
Health treatment received		0.007 (0.006)	0.036 (0.029)
STEM treatment group	0.210*** (0.006)		
Health treatment group	0.202*** (.006)		
Expected earnings	Yes	Yes	Yes
Other controls	Yes	Yes	Yes
<i>N</i>	12938	12938	12938

Notes: 2SLS regression. Robust standard errors are reported in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.10$ .

**Table B5: Robustness check for men’s health and care treatment effects accounting for earnings**

Variable	(1) 1 <sup>st</sup> stage	(2) reduced form	(2) 2 <sup>nd</sup> stage
Health and care treatment received		-0.004 (0.004)	-0.018 (0.015)
STEM treatment received		-0.005 (0.004)	-0.021 (0.016)
Health and care treatment group	0.231*** (0.006)		
STEM treatment group	0.227*** (.006)		
Expected earnings	Yes	Yes	Yes
Controls	Yes	Yes	Yes
<i>N</i>	16543	16543	16543

*Notes:* 2SLS regression. Robust standard errors are reported in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.10$ .